Enhanced Primary Care for Healthy Ageing: Literature Review

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Acknowledgement of Country

Victoria University acknowledges the Ancestors, Elders and families of the Kulin Nation (Melbourne campuses), the Eora Nation (Sydney campus) and the Yugara/YUgarapul and Turrbal Nation (Brisbane campus) who are the traditional owners of University land. We also acknowledge the ongoing contribution of Aboriginal and Torres Strait Islander people across the healthcare system and in the wider community. We pay our respects to the Ancestors, Elders and families of the traditional owners of this land.

About us

The Australian Health Policy Collaboration (AHPC), led by the Health Policy group in the Institute for Health and Sport at Victoria University, is a national collaboration of Australia's leading health policy, population health and chronic disease experts. Established in 2014, it brings together a broad range of organisations and topic-specific experts, including academics, health professionals, and consumers, to translate contemporary evidence and expertise into consensus-based policy recommendations aimed at preventing and reducing the impact of chronic diseases on the population.

About this project

Inala Primary Care Ltd commissioned this literature review to identify effective models of care that support healthy ageing and inform the development of clinical delivery models, tools, workflows, resources and evaluation projects. The literature review was undertaken by members of the health policy group at Victoria University with expert guidance from contributors to the Australian Health Policy Collaboration. The scope and direction of the review were further shaped by insights from a workshop held with primary care practitioners and service providers during the evidence search phase.

Project team

The AHPC team comprised:

- Professor Rosemary Calder, Project Lead
- Professor Maximilian de Courten, Project Research Fellow
- Adjunct Professor Maria Duggan, Policy Fellow
- Ms. Caroline Pilot, Policy Associate and Project Coordinator
- Ms. Wania Usmani, Health and Policy Research Assistant
- Ms. Kat Way, Policy Analyst.

Expert Advisers

The AHPC team acknowledge the guidance and support of two expert advisers to this evidence review:

- Professor Mark Morgan, Professor of General Practice, Bond University and clinical adviser
- Ms Shelley Thomson, Director, Patient Experience Management Agency and human-centred design adviser.

VU Library

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List of abbreviations

Abbreviations	Full Description
ABS	Australian Bureau of Statistics
ACCHOs	Aboriginal Community-Controlled Health Organisations
ACSQHC	Australian Commission on Safety and Quality in Health Care
AI	Artificial Intelligence
AIR	Australian Immunisation Register
Ahpra	Australian Health Practitioner Regulation Agency
ADHA	Australian Digital Health Agency
AHRQ	Agency for Healthcare Research and Quality
AIHW	Australian Institute of Health and Welfare
BMI	Body Mass Index
BP	Blood Pressure
Bp/Bp Premier	Best Practice (Software)
CALD	Culturally and Linguistically Diverse
CCM	Chronic Care Model
CGA	Comprehensive Geriatric Assessment
COPD	Chronic Obstructive Pulmonary Disorder
EHRs	Electronic Health Records
CVD	Cardiovascular Disease
GP	General Practitioner
MBS	Medicare Benefits Schedule
MoC	Models of Care
NIP	National Immunisation Program (NIP) Schedule
NP	Nurse Practitioner
OA	Osteoarthritis
OSA	Obstructive Sleep Apnoea
PAMs	Patient Activation Measures
PHN	Primary Health Network
PRMs	Patient Reported Measures

PREMs	Patient Reported Experience Measures
PROMs	Patient Reported Outcome Measures
PRODA	Provider Digital Access
QI	Quality Improvement
RACGP	The Royal Australian College of General Practitioners
SDM	Shared Decision Making
SP	Social Prescribing
UCC	Urgent Care Clinic
WHO	World Health Organization

Glossary of common terms

Term	**Definition**
Advance care planning	It is a process that involves planning for an individual's future health care decisions. It allows consumers to outline the types of care they would or wouldn't want if they were to become seriously ill and unable to communicate or make decisions for themselves (1).
Age-related changes	As a natural process of aging, older adults may experience diseases and age-related changes, these changes are defined as "normal, physiological, maturational developments accompanied by physical and cognitive changes associated with aging" (2). In this review, age-related changes are referred to as hearing and vision loss, menopause, changes in immunity, age-related musculoskeletal changes and urologic changes (such as nocturia) (3).
Age-related conditions	Age-related physiological changes can increase the risk of chronic, progressive, and multifactorial conditions (4). In this review, these conditions are referred to as age-related diseases and include cardiovascular diseases, respiratory conditions (such as COPD), cancer and geriatric syndromes (such as falls, frailty and cognitive decline) (3,5).
Allied health/allied health professionals	Allied health professionals are qualified in preventing, diagnosing, and treating a range of conditions and illnesses, often working in multidisciplinary teams to provide specialised support for tailored patient needs (6). These professionals differ from doctors, nurses, and dentists and include professionals like dietitians, physiotherapists, podiatrists, speech pathologists, and psychologists. Most are regulated by AHPRA and the national boards (7).
Body Mass Index (BMI)	BMI is a measurement of body size, calculated using weight and height. BMI is one of several factors, along with blood pressure, cholesterol levels, and others, that can help assess the risk of heart disease or stroke (8).
Carers	Carers are people who look after someone with a disability, mental illness, chronic condition, terminal illness, an alcohol or other drug issue or who is frail aged (9,10). A carer can be paid or unpaid (11): • *Unpaid carers* are usually family, friends, or neighbors providing support, either short or long term. • *Volunteer carers* look after people on a volunteer basis. • *Paid carers,* also known as care workers, include roles such as aged care, disability support, home care, and personal care workers.
Case finding	Case finding (mostly referred to as opportunistic screening in this chapter) is the examination of an individual or group suspected of having, or at risk of, a condition. It is a targeted approach to identifying conditions in a select group of patients who may or may not already have symptoms (12).
Chronic care model (CCM)	CCM is a widely adopted framework for enhancing the quality of care for people with chronic conditions. This model is centred in primary care and promotes a shift from reactive, acute-focused care to proactive, planned, and population-based care.

	The model places strong emphasis on the active involvement of patients and their families in managing health (13,14).
Co-design	Co-design refers to an iterative and participatory engagement process in which members of the community work collaboratively with service providers, policymakers and/or other relevant stakeholders to design new or improve existing services, programs and public policy (15,16) While existing definitions of co-design can vary, most emphasise a process of active (rather than passive) consumer participation and the importance of shared decision-making in creating outcomes that are mutually acceptable to communities and service providers/policymakers (16–18).
Cognitive impairment	Cognitive impairment refers to difficulties in attention, learning (verbal and nonverbal), short-term and working memory, visual and auditory processing, problem-solving, processing speed, and motor skills (19). In literature, the terms cognitive impairment, cognitive dysfunction, and cognitive decline are often used interchangeably to describe these types of cognitive deficits.
Consumers	A consumer is someone who currently uses, has previously used, or may use health services or health information in the future. Consumers can engage individually or through community groups, organisations or as representatives appointed. Their involvement can take many forms, including as a patient, carer, person with lived experience, co-designer, co-producer, active citizen, or advocate (20,21). The terms consumer and patient are used interchangeably throughout the literature report to refer to individuals receiving health care services.
Continuity of care/continuous care	Numerous definitions and concepts have been established for continuity of care, however, the most widely used concept proposes continuity of care within three main dimensions: • the traditional notion of continuity of care is considered within the context of the doctor–patient relationship (relational continuity of care); • the availability of appropriate information to enable safe, coherent care (informational continuity); • the consistency of care delivery (management continuity) (22).
Culturally and linguistically diverse (CALD)	It is used to describe "communities with diverse languages, ethnic backgrounds, nationalities, traditions, societal structures and religions" (23). This term is sometimes used interchangeably with 'ethnic communities', however, CALD is the preferred term used by Australian service providers and agencies (23).
Dementia	Dementia is defined as "an organic disease of the brain with cognitive dysfunction and a gradual loss of memory, orientation, executive function, and the ability to carry out the activities of daily living" (24).
Diagnostic accuracy	Diagnostic accuracy (referred to as accuracy of screening tests/tools in this review) means how well medical tests or diagnostic tools can distinguish between individuals with the condition of interest and those who are healthy (25). High diagnostic accuracy means fewer false positives and false negatives, leading to more reliable clinical decisions. Common measures of diagnostic accuracy included in this review are (25): . • *Sensitivity,* defined as "the probability of getting a positive test result in subjects with the disease";

	- *Specificity* represents "the probability of a negative test result in a subject without the disease" (25).
Feasibility	In the context of screening tools, feasibility refers to how practical and achievable the tool is to implement in real-world settings. Feasibility is calculated based on several factors, including the time required to administer the tool and its ease of use for both healthcare providers (26,27). Feasibility also involves assessing the resources needed, such as training, equipment, and staffing, as well as successful integration of the screening tool into existing clinical workflows and systems (28)
Frailty	Frailty is a complex, multidimensional syndrome characterised by a decline in physical and cognitive reserve and capacity to maintain function, leading to increased vulnerability to stressors and adverse health outcomes (29).
General practitioner (GP)	A general practitioner (GP) is "a doctor who is also qualified in general medical practice. GPs are often the first point of contact for someone, of any age, who feels sick or has a health concern" (30).
Geriatrics	Geriatrics is a branch of medicine focused on the health care and management of diseases in the older population. It aims to promote well-being in later life through comprehensive, age-specific approaches (31).
Geriatrician	A geriatrician is "a doctor with specialist training in caring for the health of older people, diagnosing and treating age-related conditions" (32).
Grade (strength of recommendations)	In the RACGP guidelines (such as the *Red Book or Silver Book*), a "grade" refers to the strength and certainty of a recommendation, based on the quality of supporting evidence and the balance of benefits versus harms (33). Recommendation grading is classified into the following categories (33): - *Recommended (strong):* Indicates strong confidence that the benefits of an intervention outweigh the harms. - *Not recommended (strong*)**:** Indicates strong confidence that the harms of an intervention outweigh the benefits. - *Conditionally recommended***:** Indicates uncertainty about the benefit - harm balance (e.g. due to low-quality evidence or varying preferences), making patient values crucial to the decision-making process. - *Generally not recommended:* Indicates uncertainty about potential harms (e.g. due to low-quality evidence or variable preferences), so individual patient values should guide the decision. - *Practice points:* Developed by consensus when evidence is lacking or not covered by source guidelines, these recommendations address important aspects of care identified by the Red Book working groups or Executive Committee.
Green Book	The Green Book (*Putting Prevention into Practice)* is a clinical guideline developed by the RACGP that consolidates evidence-based research and best practices. It serves as a practical tool to support general practices in integrating preventive care into their routine clinical activities (34).
Health literacy	Health literacy describes the capacity of an individual to access, understand, navigate and use information about their health and wellbeing, including information about maintaining their health and wellbeing and information about health treatment and managing health conditions (35).

Healthy ageing	WHO define healthy ageing as “the process of developing and maintaining functional ability that enables wellbeing in older age” (5).
Integrated care	Integrated care is defined as “well-connected, effective and efficient care that takes account of and is organised around a person's health and social needs” (36).
Learning health systems	For this review, the term Learning Health System is used more broadly, encompassing the context of healthy ageing and primary care. In this context, a Learning Health System integrates data-driven improvements and patient-reported outcomes and experiences to support person-centred care (37,38).
Link workers	Link workers, also known as social prescribers or community connectors, are defined as “people who liaise between clients, health professionals and community organisations to connect people to community-based support, including activities and services that meet practical, social and emotional needs” (39).
Medicare Benefit Schedule (MBS)	MBS is a list of medical services subsidised by the Australian Government under Medicare. It includes fees and item numbers for a wide range of healthcare services such as consultations, diagnostic tests, procedures, and some allied health services delivered in primary and specialist care (40).
Models of Care (MoC)	A model of care in healthcare is a comprehensive framework that outlines how health services are delivered to individuals or specific population groups as they progress through stages of a condition or health event (41).
Multidisciplinary team	Multidisciplinary team care in health care is assumed to mean collaborative care, which occurs when multiple health professionals from different professional backgrounds provide comprehensive services by working with each other, and with patients, their families, carers and communities to deliver the highest quality of care across settings (42).
Multimorbidity and comorbidity	Multimorbidity refers to when a person has two or more chronic conditions at the same time. It differs slightly from comorbidity, which describes one or more additional conditions that exist alongside a primary condition of focus (43).
Nurse-led interventions	Nurse-led intervention is an emerging healthcare approach in which registered nurses lead planning, delivering, and managing various aspects of patient care. These interventions are based on the nurse’s skills, knowledge and expertise and can be implemented across diverse settings, including hospitals, clinics, community centres, and home care (44).
Palliative care	Palliative care supports people in living as fully and comfortably as possible while facing a life-limiting or terminal illness. Its goal is to relieve suffering and improve the quality of life for both patients and their families (45).
Patient activation measures (PAMs)	PAMs are the survey/tools that collect information on patients’ self-efficacy skills (ie, confidence in managing their own health) and capacity and willingness to engage in health and self-care (46).
Patient reported measures (PRMs)	PRMs are surveys/tool that collect information directly from patients about their healthcare experiences and health outcomes (47). PRMs are of two main types: Patient-Reported Experience Measures (PREMs), which capture patients’ perceptions of their interactions with healthcare services (47) and Patient-Reported Outcome Measures (PROMs), which assess a person’s views on their quality of life, daily functioning, symptoms and overall health and wellbeing (48).

Preventive health	Preventive health is any action taken to keep people healthy and well and prevent or avoid the risk of poor health, illness, injury and early death. This includes both population-level policy interventions and individual-based actions that aim to minimise disease burden and associated risk factors. Preventive health is of fundamental importance to overall population health and wellbeing (49).
Primary healthcare	Primary healthcare describes the first contact a person has with the health system for treatment or management of non-emergency health issues, typically outside of a hospital or specialist. In the Australian context, the primary care system encompasses a broad range of services delivered in the community, including general practice, community pharmacy, allied health (e.g. physiotherapy, psychology, occupational therapy etc.) and mental health services, as well as Aboriginal Community Controlled Health Services (ACCHS) (47).
Primary Health Networks (PHNs)	PHNs are independent organisations, funded by the Australian Government to coordinate primary health care in their region (50).
Priority populations	There are a range of different population groups within society who experience a disproportionate burden of disease and disparities in health outcomes. The National Preventive Health Strategy 2021-2030 identifies these 'priority populations' as including, but not limited to: • Aboriginal and Torres Strait Islander people; • culturally and linguistically diverse (CALD) populations; • lesbian, gay, bisexual, transgender, intersex, queer, asexual and/or other sexuality and gender diverse people (LGBTIQA+); • people with mental illness; • people of low socioeconomic status; • people with disability and • rural, regional and remote populations.
Quality Improvement (QI)	The Royal Australian College of General Practitioners (RACGP) defines quality improvement as "an ongoing activity undertaken within a general practice with the primary purpose to monitor, evaluate or improve the quality of health care delivered to practice patients" (51).
Red Book	The *Red Book*, now in its 10th edition (*Guidelines for Preventive Activities in General Practice*), provides evidence-based recommendations for preventive screening, case finding and prevention across the life course, with emphasis on the early identification and management of risk factors and chronic conditions in older adults (33)
Scope of practice	Scope of practice: Professional activities that a health professional is educated (skill and knowledge), competent and authorised to perform, and for which they are accountable. The individual scope is time-sensitive and dynamic. Scope of practice for individual health professionals is influenced by the settings in which they practise, the health needs of people, the level of their individual competence and confidence and the policy requirements (authority/governance) of the service provide (42).
Shared-decision making (SDM)	The Australian Commission on Safety and Quality in Health Care defines SDM as an integral part of patient-centred care that involves discussion and collaboration between a consumer and their healthcare provider to make healthcare choices (52).

	SDM allows healthcare practitioners to consider consumer’s values, goals, and preferences, grounded in the best available evidence regarding benefits, risks, and uncertainties of treatment, to make the most appropriate healthcare decisions (52).
Silver Book	The *Silver Book* (*Guidelines for the Care of Older Persons in General Practice*) complements the Red Book by offering practical, evidence-informed guidance for managing the complex, multidimensional health needs of older people within the clinical settings (53).
Social isolation and loneliness	Social isolation refers to the objective absence of social contact, while loneliness reflects the subjective experience of feeling disconnected or lacking companionship. Both are linked to a range of negative outcomes, including increased risks of depression, anxiety, cognitive decline, functional deterioration and premature mortality (54).
Social prescribing	Social prescribing involves the practice of individuals being referred to a range of social supports, community-based programs and services, and other non-clinical interventions to improve health and wellbeing (55,56).
Socioeconomic advantage/ disadvantage	It is described as a “measure of people’s access to material and social resources, and their ability to participate in society” (57).
Socioeconomic status (SES)	SES is the level of socioeconomic advantage/disadvantage experienced by an individual or community. Socioeconomic status is influenced by range of factors including income, education, employment, occupation and housing characteristics (58).
Urgent care clinic	Urgent care clinics are walk-in, no-appointment, bulk-billed clinics that provide timely medical attention for an illness or injury that can’t wait for a regular appointment with a GP but doesn’t require care for emergency or life-threatening illnesses or injuries (59,60).
Validity	Validity refers to whether a study or measurement tool measures what it's intended to measure. It encompasses various forms, including: • internal validity (the extent to which the results can be attributed to the interventions tested); • external validity (the generalisability of findings to broader contexts) and • construct validity (how well the chosen measures represent the condition of interest) (61). If a screening tool is not thoroughly developed and validated, it is impossible to know whether the data collected from the tool is appropriate or relevant. Validity and accuracy are related but different in concept and are used together to measure the tool/survey’s effectiveness.
Wider determinants of health	Refers to the social, environmental, structural, economic, cultural, commercial and digital factors that are often outside the control of individuals and can either strengthen or undermine health and wellbeing. The wider determinants of health concept acknowledges that health and wellbeing are inextricably linked to the environments and conditions in which people are born, grow, live, work and age, and the wider set of forces and systems that shape health and wellbeing (49,62,63).

References

1. Advance Care Planning. Advance care planning explained [Internet]. 2025 [cited 2025 Jul 28]. Available from: https://www.advancecareplanning.org.au/understand-advance-care-planning/advance-care-planning-explained
2. Ge S, Wu KC, Frey H, Saudagaran M, Welsh D, Primomo J, et al. Engaging With Aging: A Qualitative Study of Age-Related Changes and Adaptations. Lingler JH, editor. Innovation in Aging [Internet]. 2022 Sep 1 [cited 2025 Jul 30];6(6):igac054. Available from: https://academic.oup.com/innovateage/article/doi/10.1093/geroni/igac054/6757004
3. Jaul E, Barron J. Age-Related Diseases and Clinical and Public Health Implications for the 85 Years Old and Over Population. Front Public Health [Internet]. 2017 Dec 11 [cited 2025 Jul 30];5:335. Available from: http://journal.frontiersin.org/article/10.3389/fpubh.2017.00335/full
4. García-Domínguez M. Pathological and Inflammatory Consequences of Aging. Biomolecules [Internet]. 2025 Mar 12 [cited 2025 Jul 30];15(3):404. Available from: https://www.mdpi.com/2218-273X/15/3/404
5. World Health Organization. World report on ageing and health [Internet]. Geneva: World Health Organization; 2015 [cited 2025 Jul 18]. Available from: https://iris.who.int/handle/10665/186463
6. Allied Health Professions Australia. What is allied health? [Internet]. [cited 2025 Jul 1]. Available from: https://www.ahpa.com.au/what-is-allied-health
7. Better Health Channel. Seeing an allied health professional [Internet]. Department of Health & Human Services; 2024 [cited 2025 Jul 1]. Available from: http://www.betterhealth.vic.gov.au/health/servicesandsupport/seeing-an-allied-health-professional
8. Heart Foundation. What's your body mass index (BMI)? [Internet]. 2025 [cited 2025 Jul 1]. Available from: https://www.heartfoundation.org.au/bmi-calculator
9. Carers Australia. Who is a carer? [Internet]. 2020 [cited 2025 Jul 1]. Available from: https://www.carersaustralia.com.au/about-carers/who-is-a-carer/, https://www.carersaustralia.com.au/about-carers/who-is-a-carer/
10. Carer Gateway. Who are carers? [Internet]. [cited 2025 Jul 1]. Available from: https://www.carergateway.gov.au/your-life-carer/caring-essentials/who-are-carers
11. Better Health Channel. Unpaid and professional carers [Internet]. Department of Health & Human Services; 2024 [cited 2025 Jul 1]. Available from: http://www.betterhealth.vic.gov.au/health/servicesandsupport/Unpaid-and-professional-carers
12. Aldrich R. Using socioeconomic evidence in clinical practice guidelines. BMJ [Internet]. 2003 Nov 29 [cited 2025 Jul 2];327(7426):1283–5. Available from: https://www.bmj.com/lookup/doi/10.1136/bmj.327.7426.1283
13. Rural Health Information Hub. Chronic Care Model - RHIhub Chronic Disease Management Toolkit [Internet]. 2025 [cited 2025 Jul 30]. Available from: https://www.ruralhealthinfo.org/toolkits/chronic-disease/2/chronic-care
14. Kadu MK, Stolee P. Facilitators and barriers of implementing the chronic care model in primary care: a systematic review. BMC Fam Pract [Internet]. 2015 Dec [cited 2025 Jul 30];16(1):12. Available from: https://bmcfampract.biomedcentral.com/articles/10.1186/s12875-014-0219-0
15. Agency for Clinical Innovation,. Patient Experience and Consumer Engagement: A Framework for Action - Understand, Act, Empower. 2015.
16. Blomkamp E. The Promise of Co-Design for Public Policy. Aust J Public Adm [Internet]. 2018 Dec [cited 2025 Jul 1];77(4):729–43. Available from: https://onlinelibrary.wiley.com/doi/10.1111/1467-8500.12310
17. SA Health. CONSUMER, CARER AND COMMUNITY ENGAGEMENT Strategic Framework 2021 - 2025 [Internet]. 2021 [cited 2025 Jan 7]. Available from: https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/resources/consumer+carer+and+community+engagement+strategic+framework+2021-2025
18. Agency for Clinical Innovation. Agency for Clinical Innovation. Agency for Clinical Innovation (ACI); 2021 [cited 2025 Jul 1]. A guide to build co-design capability. Available from: https://aci.health.nsw.gov.au/networks/mental-health/resources/co-design
19. Lam RW, Kennedy SH, McIntyre RS, Khullar A. Cognitive Dysfunction in Major Depressive Disorder: Effects on Psychosocial Functioning and Implications for Treatment. Can J Psychiatry [Internet]. 2014 Dec [cited 2025 Jul 1];59(12):649–54. Available from: https://journals.sagepub.com/doi/10.1177/070674371405901206
20. Queensland Health. Health Care Providers' Guide to Engaging Multicultural Communities and Consumers [Internet]. corporateName=The State of Queensland; jurisdiction=Queensland; 2016 [cited 2025 Jul 1]. Available from: https://www.health.qld.gov.au/multicultural/support_tools/engage-guide

21. Department of Health and Aged Care. Draft National Consumer Engagement Strategy for Health and Wellbeing [Internet]. 2023 [cited 2025 Jan 7]. Available from: https://consultations.health.gov.au/national-preventive-health-taskforce/draft-national-consumer-engagement-strategy-for-he/supporting_documents/Draft%20National%20Consumer%20Engagement%20Strategy%20for%20Health%20%20Wellbeing%20NCESHW.pdf
22. Wright M. Continuity of care is in the eye of the beholder. Aust J Gen Pract [Internet]. 2018 Oct 1 [cited 2025 Aug 5];47(10):661–661. Available from: https://www1.racgp.org.au/ajgp/2018/october/continuity-of-care-is-in-the-eye-of-the-behold-1
23. State Government of Victoria. Data collection standards - Culturally and linguistically diverse communities [Internet]. 2021 [cited 2025 Jul 1]. Available from: https://www.vic.gov.au/victorian-family-violence-data-collection-framework/data-collection-standards-culturally-and
24. Lake CR. A 2,000-year History of Bipolar. In: Bipolar [Internet]. Elsevier; 2021 [cited 2025 Jul 1]. p. 65–83. Available from: https://linkinghub.elsevier.com/retrieve/pii/B9780128192566000031
25. Šimundić AM. Measures of Diagnostic Accuracy: Basic Definitions. EJIFCC. 2009 Jan;19(4):203–11.
26. Ambagtsheer R, Visvanathan R, Cesari M, Yu S, Archibald M, Schultz T, et al. Feasibility, acceptability and diagnostic test accuracy of frailty screening instruments in community-dwelling older people within the Australian general practice setting: a study protocol for a cross-sectional study. BMJ open [Internet]. 2017 Aug 3;7(8):e016663. Available from: https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=mnh&AN=28775191&site=ehost-live&custid=s1145751
27. Lim SH, Malhotra R, Østbye T, Ang SY, Ng XP, Agus N, et al. Assessing the reliability and feasibility of frailty screening tools among hospitalised older adults. Proceedings of Singapore Healthcare [Internet]. 2023 Dec [cited 2025 Jul 1];32:20101058231215167. Available from: https://journals.sagepub.com/doi/10.1177/20101058231215167
28. Dutch D, Bell L, Zarnowiecki D, Johnson BJ, Denney-Wilson E, Byrne R, et al. Screening tools used in primary health care settings to identify health behaviours in children (birth–16 years); A systematic review of their effectiveness, feasibility and acceptability. Obesity Reviews [Internet]. 2024 Apr [cited 2025 Jul 1];25(4):e13694. Available from: https://onlinelibrary.wiley.com/doi/10.1111/obr.13694
29. Victorian Government, Department of HEALTH. Frailty [Internet]. 2024 [cited 2025 Jun 5]. Available from: https://www.health.vic.gov.au/older-people-in-hospital/frailty
30. Department of Health & Human Services. General practitioner services [Internet]. Department of Health & Human Services; [cited 2025 Aug 6]. Available from: http://www.betterhealth.vic.gov.au/health/serviceprofiles/general-practitioner-services
31. Türkbeyler İH, Öztürk ZA, Göl M, Abiyev A, Kaya B, Atakur S, et al. What is Geriatrics? Geriatrics or Older Adults Health and Diseases? ejgg [Internet]. 2019 Oct 24 [cited 2025 Aug 6];1(2):51–5. Available from: https://ejgg.org/articles/doi/ejgg.galenos.2019.92
32. Department of Health & Human Services. Geriatrician [Internet]. Department of Health & Human Services; [cited 2025 Aug 6]. Available from: http://www.betterhealth.vic.gov.au/health/serviceprofiles/geriatrician-service
33. RACGP. Guidelines for preventive activities in general practice, Vision(Red book) [Internet]. [cited 2025 Jun 2]. Available from: https://hw.qld.gov.au/blog/ch-resource/guidelines-for-preventive-activities-in-general-practice-red-book/
34. RACGP. Putting prevention into practice: guidelines for the implementation of prevention in the general practice setting. Third edition. East Melbourne, Victoria: RACGP; 2018.
35. Australian Commission on Safety and Quality in Health Care. Health literacy: taking action to improve safety and quality [Internet]. 2014 [cited 2025 Jun 24]. Available from: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/health-literacy-taking-action-improve-safety-and-quality
36. Victorian Government Department of Health. Integrated care [Internet]. State Government of Victoria, Australia; 2025 [cited 2025 Aug 5]. Available from: https://www.health.vic.gov.au/primary-and-community-health/integrated-care
37. The Learning Healthcare System: Workshop Summary (IOM Roundtable on Evidence-Based Medicine) [Internet]. Washington, D.C.: National Academies Press; 2007 [cited 2025 Sep 2]. Available from: http://www.nap.edu/catalog/11903
38. Monash Partners. Learning Health System [Internet]. Monash Partners. [cited 2025 Sep 2]. Available from: https://monashpartners.org.au/learning-health-system/
39. Baker JR, Bissett M, Freak-Poli R, Dingle GA, Zurynski Y, Astell-Burt T, et al. Australian link worker social prescribing programs: An integrative review. Ager ME, editor. PLoS ONE [Internet]. 2024 Nov 11 [cited 2025 Jun 5];19(11):e0309783. Available from: https://dx.plos.org/10.1371/journal.pone.0309783

40. Australian Medical Association. Guide for Patients on How the Health Care System Funds Medical Care [Internet]. [cited 2025 May 8]. Available from: https://ama.com.au/sites/default/files/documents/Guide%20for%20Patients%20on%20How%20the%20Health%20Care%20System%20Funds%20Medical%20Care.pdf
41. Clarke J, Davis K, Douglas J, Peters MDJ. Defining nurse-led models of care: Contemporary approaches to nursing. International Nursing Review [Internet]. 2025 Mar [cited 2025 Aug 4];72(1):e13076. Available from: https://onlinelibrary.wiley.com/doi/10.1111/inr.13076
42. Australian Government Department of Health and Aged Care. Unleashing the Potential of our Health Workforce – Scope of Practice Review [Internet]. Australian Government Department of Health and Aged Care; 2025 [cited 2025 Jun 5]. Available from: https://www.health.gov.au/our-work/scope-of-practice-review
43. Australian Institute of Healh and Welfare. Australian Institute of Health and Welfare. 2021 [cited 2025 Aug 5]. Chronic condition multimorbidity 2021, What is multimorbidity and how common is it? Available from: https://www.aihw.gov.au/reports/chronic-disease/chronic-condition-multimorbidity-2021/contents/what-is-multimorbidity-and-how-common-is-it
44. Bulto LN, Hendriks JM. The role of nurse-led interventions to empower patients in cardiovascular care. European Journal of Cardiovascular Nursing [Internet]. 2024 Mar 12 [cited 2025 Aug 5];23(2):e17–9. Available from: https://academic.oup.com/eurjcn/article/23/2/e17/7271431
45. Australian Government Department of Health, Disability and Ageing. What is palliative care? [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Jul 8]. Available from: https://www.health.gov.au/topics/palliative-care/about-palliative-care/what-is-palliative-care
46. Nichols T, Calder R, Morgan M, Lawn S, Beauchamp A, et al. Self-care for health: a national policy blueprint. Policy paper [Internet]. 2020. Available from: www.mitchellinstitute.org.au
47. Agency for Clinical Innovation. Agency for Clinical Innovation. Agency for Clinical Innovation (ACI); 2025 [cited 2025 Jun 16]. About patient-reported measures. Available from: https://aci.health.nsw.gov.au/statewide-programs/prms/about
48. Australian Commission on Safety and Quality in Health Care. Patient-Reported Measures [Internet]. 2023 [cited 2025 Jun 16]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/person-centred-care/person-centred-care-network/patient-reported-measures
49. Australian Government Department of Health D and A. National Preventive Health Strategy 2021–2030 [Internet]. Australian Government Department of Health, Disability and Ageing; 2021 [cited 2025 Aug 4]. Available from: https://www.health.gov.au/resources/publications/national-preventive-health-strategy-2021-2030?language=en
50. Australian Government Department of Health and Aged Care. What Primary Health Networks do [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2024 Aug 9]. Available from: https://www.health.gov.au/our-work/phn/what-PHNs-do
51. North Western Melbourne Primary Health Network. Quality improvement (QI) [Internet]. 2025 [cited 2025 Jun 13]. Available from: https://nwmphn.org.au/for-primary-care/quality-improvement/
52. Australian Commission on Safety and Quality in Health Care. Shared decision making [Internet]. 2025 [cited 2025 Jul 22]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/shared-decision-making
53. RACGP. RACGP aged care clinical guide (Silver Book) [Internet]. 2025 [cited 2025 May 29]. Available from: https://www.racgp.org.au/silverbook
54. Potential Public Health Relevance of Social Isolation and Loneliness: Prevalence, Epidemiology, and Risk Factors | Public Policy & Aging Report | Oxford Academic [Internet]. [cited 2025 May 21]. Available from: https://academic.oup.com/ppar/article-abstract/27/4/127/4782506?redirectedFrom=fulltext
55. The Welsh Government. National Framework for Social Prescribing [Internet]. 2023. Available from: https://www.gov.wales/national-framework-social-prescribing
56. Muhl C, Mulligan K, Bayoumi I, Ashcroft R, Godfrey C. Establishing Internationally Accepted Conceptual and Operational Definitions of Social Prescribing Through Expert Consensus: A Delphi Study Protocol. Int J Integr Care. 2023;23(1):3.
57. Australian Bureau of Statistics. ABS. c=AU; o=Commonwealth of Australia; ou=Australian Bureau of Statistics; 2018 [cited 2024 Oct 8]. Main Features - Socio-Economic Advantage and Disadvantage. Available from: https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2071.0~2016~Main%20Features~Socio-Economic%20Advantage%20and%20Disadvantage~123
58. Australian Bureau of Statistics. Measures of Socioeconomic Status: Information Paper [Internet]. 2021 [cited 2024 Oct 14]. Available from: https://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&1244055001_2011.pdf&1244.0.55.001&Pu

blication&367D3800605DB064CA2578B60013445C&&New%20Issue%20for%20June%202011&22.06.2011&Latest
59. Department of Health, Disability and Ageing. Medicare Urgent Care Clinics [Internet]. 2025 [cited 2025 Jul 22]. Available from: https://www.health.gov.au/our-work/medicare-urgent-care-clinics
60. Department of Health, Disability and Ageing. Understanding the difference between routine, urgent and emergency care – animation [Internet]. 2025 [cited 2025 Jul 22]. Available from: https://www.health.gov.au/find-a-medicare-ucc/resources/videos/learn-the-difference-between-routine-urgent-and-emergency-care?language=en
61. Sullivan GM. A primer on the validity of assessment instruments. J Grad Med Educ. 2011 Jun;3(2):119–20.
62. World Health Organization. Social determinants of health [Internet]. [cited 2024 Mar 20]. Available from: https://www.who.int/health-topics/social-determinants-of-health
63. Australian Institute of Health and Welfare. Social determinants of health snapshot [Internet]. 2022 [cited 2024 Mar 20]. Available from: https://www.aihw.gov.au/reports/australias-health/social-determinants-of-health

Foreword

Australians are living longer, with life expectancy now averaging 85 years for women and over 81 years for men, amongst the highest in the world. People aged 65 and over currently comprise about 17 per cent of the population and Australia's 65+ population is projected to rise from 4.31 million in 2021 to 6.66 million by 2041, a 54% increase (1).

Whilst older people generally have better health than previous generations, growing older is associated with higher rates of chronic disease, functional decline and frailty. Many people aged 65 and over report good or very good health, yet conditions such as cardiovascular disease, cancer, diabetes, arthritis, respiratory illness and dementia remain major causes of morbidity and mortality. Dementia has become a leading contributor to disease burden in older age. Falls, sensory impairment, and reduced mobility are also common, often affecting independence and quality of life. As well, older adults living in rural and remote areas, Aboriginal and Torres Strait Islander peoples and those experiencing socioeconomic disadvantage often face poorer health outcomes and greater barriers to care (2).

In health policy, practice and research it is well known that a significant proportion of chronic health conditions, including some cancers and some dementias, can be prevented and delayed. At a policy level, Australia has placed significant emphasis on supporting older adults to maintain health and wellbeing, particularly through preventive and primary health care. Recent policy initiatives emphasise wellness, reablement and ageing in place.

Inala Primary Care Ltd, a not for profit primary care practice in Brisbane, Queensland, commissioned this literature review to inform the development of a Centre of Excellence in Healthy Ageing, with the aim to lead recognition that preventive healthcare from early adulthood through the later years of ageing can improve health and quality of life; reduce the burden of disease in older age and reduce preventable health care needs and service demands. With collaborating general practices, Inala Primary Care shares a vision that primary care and general practice should be at the forefront of implementing and testing novel approaches in lifelong prevention, early detection, timely intervention and ongoing care throughout adulthood to support healthy ageing. Almost 80% of people aged 35-44 see a general practitioner in a 12-month period with this rising to >94% of those aged 65-74 (3). Primary care, therefore, is an essential platform for the health and wellbeing of older adults – it is centrally and universally positioned to be the health care hub for healthy ageing.

This review has focused on academic, clinical evidence, policy briefs and other grey literature that demonstrates and informs the design, development and implementation of a life course approach in primary care to healthy ageing. Our literature search focused on the life stages of adulthood – that is, beginning with the 'youth of older age', in early adulthood. The review has considered clinical, community and social aspects of prevention, early intervention, treatment and support for the lifespan stages of adulthood through to end-of-life care. It has also considered the roles and diversity of older adult populations and individuals as partners in person-centred health care and the diversity of communities in which primary care practices are placed. The support systems for general practice, such as funding, workforce and technology are included. Models of care that focus on preventive and proactive health care across the adult life course are identified.

An overview of the international and national policy and research contexts relevant to health care focused on healthy ageing sets the scene for the detailed analysis in this report. Notably, the World

Health Organization, in July this year (2025), published the *Framework to implement a life course approach in practice* (4) which summarises current evidence on how to reorient health systems and services to support health and well-being. The life course approach underpins the Framework, recognizing that health is shaped by life circumstances and experiences at every stage of life. The Framework was published after this review was undertaken and provides a spotlight on the importance of establishing a life course approach to healthy ageing in primary care in Australia.

The focus of this review on the *evidence of how to promote and support healthy ageing* generated complexity, because healthy ageing is not merely the avoidance of disease, it is an evolving, multifaceted concept shaped by biological, psychological, social and environmental dimensions. Undertaking this review was challenging due to the complexity and multidimensional nature of healthy ageing, particularly the following aspects:

- It is a very broad concept, encompassing biological, psychological, social and environmental domains, not just disease avoidance.
- There were more than 65 frameworks for healthy ageing in the literature we reviewed, from single-time health outcomes to lifelong adaptive processes, often including person–environment interactions and health promotion.
- There is considerable variation in how effects are measured, with studies employing diverse tools and definitions, while environmental and functional factors are often underrepresented.
- Research relevant to healthy ageing spans gerontology, public health, psychology, sociology, epidemiology and policy, combining quantitative, qualitative, and mixed methods.
- Lifespan stages and life course trajectories and contextual adaptations add temporal complexity beyond static analyses.

These factors made synthesis challenging, requiring conceptual clarity, consistent inclusion and exclusion principles and careful organisation and presentation.

This report is organised into thematically focused chapters, each synthesising studies relevant to a specific topic. We hope this provides the reader and those who will design and implement the Centre of Excellence with a cohesive overview, capturing both the breadth and depth of practice and research and highlighting patterns, gaps and innovations in the literature that are relevant to the purpose of the Centre of Excellence.

It is hoped that this review strengthens recognition that healthy ageing depends on a life course approach, one that embeds prevention and early intervention across adulthood and is integrated into the fabric of Australia's primary care system.

References

1. CEPAR. New projections for Australia's ageing population [Internet]. 2023 [cited 2025 Aug 22]. Available from: https://www.cepar.edu.au/news-events/news/new-projections-australia-ageing-population
2. Australian Institute of Health and Welfare. Australia's health 2014: Featured article - Ageing and the health system: challenges, opportunities and adaptations. Australia's health series no. 14; 2014. https://www.aihw.gov.au/getmedia/19dbc591-b1ef-4485-80ce-029ff66d6930/6_9-health-ageing.pdf.aspx
3. Australian Bureau of Statistics. Patient Experiences [Internet]. Canberra: ABS; 2023-24 [cited 2025 October 7]. Available from: https://www.abs.gov.au/statistics/health/health-services/patient-experiences/latest-release
4. World Health Organization. Framework to implement a life course approach in practice [Internet]. [cited 2025 Aug 20]. Available from: https://www.who.int/publications/i/item/9789240112575

Chapter 1: Healthy ageing - the Australian and international context

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The Australian and international context

The World Population Prospects estimates that the world's population over the age of 65 will more than double between 2019 and 2050. By the year 2050, one in 6 people in the world will be over the age of 65: a notable increase from one in 11 in 2019 (1). This demographic transition is a global phenomenon that is driven by multiple factors, including improved living standards, better healthcare and lower birth rates. It also represents one of the most significant and challenging developments for public policy globally.

Longevity is also a public health success story. The good health of older people is a resource for societies as many older people continue to live independently and to contribute socially, economically and culturally to their families and communities until late old age. However, adding years to life creates challenges as well as opportunities for individuals and societies. The increases in life expectancy that have occurred in the last fifty years have been accompanied by changes in the burden of disease. Declines in mortality have not been accompanied by declines in morbidity. There is increasing prevalence of chronic disease, particularly amongst older people, many of whom experience complex multimorbidity and frailty-related conditions (2). Age is the most significant risk factor for most common chronic diseases (3,4). Moreover, there are significant and persistent inequalities in both life expectancy and quality of life between the least deprived and the most deprived communities (5).

Ageing is a complex process, driven by factors which are intrinsic to individuals as well as complex interactions between biological, cultural, community and environmental aspects. Hence, the conditions in which most people can achieve their full potential for health in older age are the responsibilities of governments, institutions and agencies across the whole of society. The ageing of the population transition also has challenging implications for health systems globally. It creates new health needs amongst populations, requiring shifts in care models to address primary and secondary prevention and a coordinated and comprehensive continuum of care for people with multiple, complex conditions (6), leading some to assert that “gerontology is the future of healthcare” (7). Box 1.1 provides an overview of global trends.

Box 1.1. Demographic and epidemiological transitions in ageing (9)

Demographic shifts

- **Population ageing**: The global population is ageing rapidly. By 2050, the number of people aged 60 years and older is expected to double to 2.1 billion. The number of individuals aged 80 years and older is projected to triple to 426 million.
- **Geographical distribution**: While population ageing began in high-income countries, it is now accelerating in low- and middle-income countries. By 2050, 80% of older people will live in these regions.

Epidemiological trends

- **Chronic diseases**: Older adults are more likely to suffer from chronic conditions such as heart disease, diabetes, and cancer. These conditions often coexist, leading to complex health needs.
- **Geriatric syndromes**: Common health issues in older age include frailty, urinary incontinence, falls, delirium, and pressure ulcers.
- **Mental health**: Depression and dementia are significant concerns among older populations, impacting their quality of life and increasing the need for comprehensive care.

Healthy Ageing: its importance in public policy

In recognition of the scale and challenge of these transitions, the World Health Organization (WHO) published an action plan, *Decade of Healthy Ageing 2020–2030* which calls for ten years of concerted, catalytic, sustained, multi sectoral collaboration to promote healthy ageing (10). The Action Plan identified a range of societal goals, including preventing poverty amongst older people, providing quality lifelong education, job opportunities, and age-inclusive infrastructure. Critically, the plan locates responsibility for promoting healthy ageing as beyond the scope of health systems alone. It requires whole-system collaboration to achieve the goals.

Characteristics of healthy ageing policy

Policies which aim to promote healthy ageing generally have the following characteristics:

Enhancing functional ability

Public health policies focused on healthy ageing emphasise maintaining and improving functional ability. This includes physical, mental and social capacities that enable older adults to live independently and participate in society (11).

Economic benefits

Investing in healthy ageing can reduce healthcare costs by preventing or delaying the onset of chronic diseases and disabilities. This can lead to significant savings for healthcare systems and improve the quality of life for older adults (8).

Social inclusion

Healthy ageing policies promote social inclusion by encouraging older adults to remain active and engaged in their communities. Programs to promote civic engagement (volunteerism and community engagement) by older adults and caregivers are known to promote wellbeing, especially amongst individuals with low incomes and people of colour. This can help combat loneliness and social isolation, which are common issues among older populations (11).

Comprehensive, integrated Care

Policies that support healthy ageing promote integrated and person-centred care for older adults, particularly for those with multiple chronic physical and mental conditions. Engaging older people in a systematic way may improve the experiences and outcomes for patients (12–14). There is some evidence that this also generates more meaningful interactions for healthcare professionals (15). Furthermore, person centred care can lead to more efficient use of healthcare resources as treatment plans can be tailored specifically to meet individual needs. There is some evidence that this may also assist the engagement of more disadvantaged patients, decreasing inequalities in healthcare utilisation (13,16). Such policies emphasise the need for development of new models of care involving care coordination, integrated mental health and preventive care.

Healthy ageing policies also call for ways of tackling the structural barriers which hinder many older people from accessing care and support (17). These barriers include the costs of care and the differential impact of health care costs and access by race, ethnicity, gender and socio-economic status. Healthy ageing policy encompasses the economic and physical security of vulnerable and disadvantaged older adults including the availability of pensions and retirement income; access to employment and support for transitions to work; consumer protections (predatory lending, telemarketing fraud); financial literacy; nutrition and ‘food deserts’; environmental and transportation issues, particularly in remote and regional communities and deprived urban areas (17–19).

In summary, public policy on the promotion of healthy ageing aims to ensure that older adults receive comprehensive care and support to meet physical, mental and social needs. It is based on an understanding that robust policy on healthy ageing is essential for creating sustainable and inclusive societies where older adults can thrive. Healthy ageing requires a collaborative effort from governments, communities, health care providers and individuals to implement effective public health policies and practices.

Self-efficacy, self-care and preparation for ageing

There is an extensive literature which suggests that promoting general 'self-efficacy' has potential benefits for the healthy ageing of older people (20). There is evidence that self-efficacy has positive effects on ageing and health perceptions, health behaviours, psychological health and overcoming physical decline. Having thought about and prepared for old age can be beneficial for older persons, though the capacity to undertake this kind of preparation appears to be highly influenced by both personality and access to socioeconomic and educational resources (21).

This is a complex arena that acknowledges the potentially damaging impact of fatalistic attitudes amongst communities of older people (22,23). There are distinct cultural and religious variables which impact on the extent to which individuals may see physical decline as inevitable (24). There is limited literature on the extent to which older people with multiple chronic conditions deploy self-care and other self-efficacy management strategies to address debilitating symptoms and functional decline (25). However, preparing for healthy old age cannot be left solely to individual motivation. There is good evidence about the benefit of prevention pathways for healthy ageing. It is suggested that this involves.

'Tailored, codesigned interventions, including healthy diet and cognitive health components which address the levels of self-perceived motivation to change lifestyle' (26).

Healthy ageing policies aim to increase older people's general self-efficacy in various ways, including through the promotion of self-care interventions and programs. It is suggested that understanding older adult's health beliefs and attempting to modify them is a valid goal in healthcare practice (27).

When does ageing begin?

Ageing is a complex process. The literature cites genetic and external factors as integral to the ageing process. Whilst ageing is inevitable, it is also regulated and otherwise influenced by a wide range of genetic and external factors and should not be considered as an inexorable decline into non-functionality by processes and circumstances which are completely beyond the control of individuals, health services and governments to influence. Age-related changes at the cellular level are undoubtedly highly influential (28) and there is some emerging evidence from genetics research that life spans could be extended without debilitating trade-offs (29). However, there are many other factors which mediate the ageing process such as levels of stress, physical activity, diet and social connections (8,30). Individual beliefs about ageing are also a powerful determinant (31,32).

Stages of ageing

The ageing process begins earlier than many people realise. Rather than being strictly defined by chronological age, ageing occurs gradually, influenced by physiological, functional, and lifestyle factors.

In the literature, age is commonly divided into stages or categories. Age categories like "childhood", "adolescence", "adulthood", and "old age" are widely used in sociology, psychology and medicine, but the boundaries and definitions of these stages are often debated and historically unstable (33–37). Essentially, age categories are social constructs that change over time and across cultures, influenced by social (38), historical, and institutional factors. For example, what counts as "adolescence" or "old age" can shift with changes in healthcare, social norms and economic conditions (34,36). The emergence of newly delineated life stages (e.g., adolescence, retirement) in modern societies is linked to changes in education, welfare, and labour markets, making age a more significant social factor (38).

Age stages as categories are also widely used in healthcare but are best understood as flexible, socially constructed groupings rather than fixed biological facts. Their definitions and significance can continue to shift with cultural, historical, and institutional changes, yet they play important roles in shaping identity, social expectations, and (health) policy.

Commonly, 3 -4 stages of ageing are used to present characteristic challenges and opportunities for maintaining health and independence (39,40).

Early ageing (young adulthood to midlife)

Characterised by:

- transition from young adulthood with peak physical and cognitive function typically in the 20s and 30s to middle age;
- early signs of ageing: metabolic changes, hormonal shifts, musculoskeletal changes, and early chronic conditions (e.g., hypertension, prediabetes);
- focus on prevention and lifestyle modifications.

Middle ageing (midlife to early older age)

Characterised by:

- increased burden of chronic diseases (e.g., diabetes, cardiovascular disease, osteoarthritis);
- functional decline may begin but is often manageable (e.g., sarcopenia, metabolism changes, hearing and vision loss, cognitive decline);
- higher healthcare utilization, such as acute and specialist healthcare, but still largely independent.

Late-stage ageing (older age

Characterised by:

- increased frailty, multimorbidity, immunodeficiency, and functional dependency
- greater risk of cognitive decline and social isolation
- more frequent hospitalisations and need for long-term care and end of life care.

Very old age (fourth age)

Characterised by:

- severe physical and cognitive decline;
- high dependence on caregivers;
- terminal decline and end-of-life care.

In summary, healthy ageing is understood to be a multifaceted process that involves maintaining physical, mental and social well-being throughout life. A healthy ageing pathway is, therefore, a lifelong process.

While chronological age provides a useful framework, biological age and functional status are more accurate indicators of an individual's aging phase. Healthy ageing across the adult stages of ageing can be considered to focus on building and maintaining intrinsic capacity and living in functional independence within a chosen or familiar environment until the end of life. In pursuit of this goal, there is evidence that improvement in health can occur at any stage of life (41). The most beneficial impacts in adulthood occurring in midlife are from lifestyle and behavioural modifications involving diet, exercise, smoking cessation and access to healthcare services. Continuing research is required to understand the mechanisms that permit individuals to maintain optimal health when facing a wide range of biological and social risks (42).

Healthy ageing: theories and definitions

Traditional theories of ageing

The traditional understanding of ageing saw it as a progressive and linear decline towards death. Cummings and Henry's disengagement theory identified successful ageing as the ability to detach oneself from the activities of midlife as a kind of preparation for death. Linear and stage-based theories of human development proposed that the developmental task of older age was simply to prepare for death (43). These negative theories were broadly supplanted from the 1970s onwards by others which emphasised the necessary ingredients for ‘successful ageing’ and the importance of remaining engaged and active.

Rowe and Kahn for example, proposed that successful ageing had three main ingredients:

- avoidance of disease or illness;
- maintenance of physical and cognitive function;
- and active engagement (44).

The combination of high levels of each of these components was seen to constitute successful ageing.The Rowe and Kahn theory has been extensively criticised and modified in subsequent years (44). Cosco et al (2014), for example, have identified over 100 operational definitions of successful ageing (5). Importantly, depth has been added to early theories of successful ageing by insights from resilience research, which suggests that successful ageing must, in part, require the ability to bounce back from adverse events (45–47).

Resilience

Most theories of healthy ageing propose that a high level of functioning across several domains is an essential requirement. Resilience is observable in an individual who retains a high level of functioning despite the experience of adversity. The latter stages of life contain instances of adversity for most people, whether these relate to the loss of friends and family members, declining social networks and physical and cognitive impairment. It is thought that the ability to retain high levels of functioning despite these experiences is the hallmark of successful and healthy ageing.

Wider determinants of healthy ageing

The notion that resilience is an intrinsic quality of individuals has also been criticised. There is evidence of social and economic inequalities in resilience and vulnerability amongst older adults. Individuals alone are not responsible for their health (48). Research demonstrates that health, for the whole population, is influenced by a combination of individual, psychological and biological factors and the broader environment in which people live and work. There is extensive literature on the impact of the social and economic factors that influence health and wellbeing for individuals, commonly described as the social determinants of health (49–51). There is also extensive literature on the impact of the wider determinants of healthy ageing (52). However, awareness of how social factors link to healthy ageing and how they interact at individual levels remains poor and the persistence of the social gradient in health into old age is a powerful testimony to the importance of these factors and the need for policy to address them.

Abud et al (2019) identified ten determinants of healthy ageing, including physical activity, diet, self-awareness, outlook/attitude, life-long learning, faith, social support, financial security, community engagement and independence, many of which are beyond the control of individuals (53).

Box 1.2. The Social Determinants of Healthy Ageing (54,55)

Housing

- **Stable housing**: Having a safe and stable place to live is foundational to health. Housing instability, such as difficulty paying rent, overcrowding, or frequent moves, can negatively impact physical and mental health.
- **Accessible housing**: Homes that are accessible and adapted to the needs of older adults can help prevent accidents and support independent living.

Socioeconomic status

- **Economic stability**: Economic challenges, such as limited income or financial insecurity, directly affect the ability of older adults to afford necessities like medication, nutritious food, and healthcare services.
- **Education and health literacy**: Higher levels of education and health literacy are associated with better health outcomes. Older adults with lower socioeconomic status often have less access to health information and resources.

Digital literacy

- **Access to technology**: Digital literacy is increasingly important for accessing health information and services. Older adults with low digital literacy may struggle to use online health resources and telehealth services.
- **Digital divide**: The digital divide disproportionately affects older adults, particularly those who are socially disadvantaged. Efforts to improve digital literacy can enhance self-management of health and participation in medical decisions.

Access to services

- **Healthcare access**: Timely access to healthcare services is crucial for managing chronic conditions and preventing health complications. Barriers such as lack of health insurance, poor transportation, and limited healthcare resources can hinder access.
- **Community and social services**: Access to community and social services, such as senior centers, meal programs, and social activities, can improve the quality of life and reduce social isolation among older adults

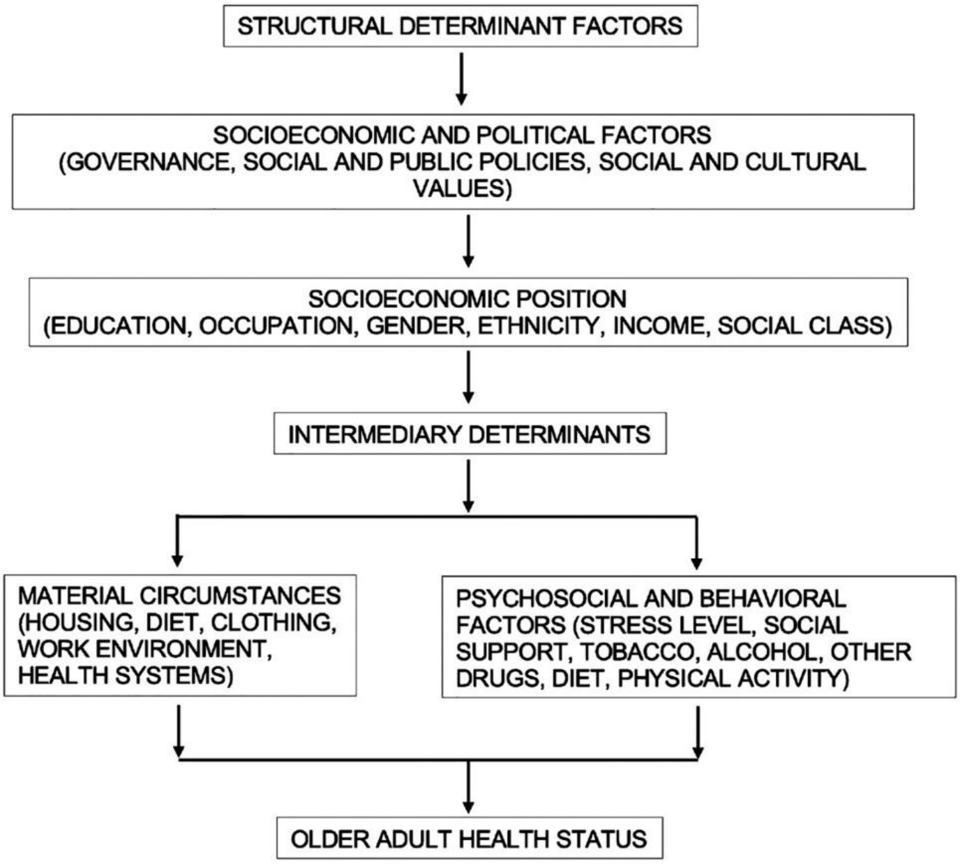
Structural determinants of health, in addition to social determinants, are often included in the concept of the wider determinants of health. Structural determinants are described as “the mechanisms by which social hierarchies are created” (56) and are considered to include:

- values and beliefs, worldviews, culture, norms, governance (57);
- laws, policies, regulations, and budgets (57) and
- institutional practices (57).

These factors contribute to hierarchical patterns of advantage and power relations (57).

The Lancet, citing the Global Report on Ageism, suggests that ageist and discriminatory attitudes towards older people is a major structural determinant of health in older age (58). Figure 1.1 illustrates the interactions of structural and social determinants on the health of older adults.

Figure 1.1 Structural determinants of healthy ageing (59)



Healthy ageing: Current theory

Criticisms of earlier theories of successful ageing have contributed to the development of the contemporary construct of healthy ageing and several associated concepts (e.g. positive ageing, ageing well, ageing productively) (60). However, the preponderance of these terms in the literature and in policy does not mean that there is conceptual or operational clarity (61). The heterogeneity of terms associated with the concept is a notable feature of the literature; as is the plethora of theoretical and operational models and definitions identified in multidisciplinary reviews and concept analyses, potentially revealing a lack of consensus about the theoretical underpinnings from which the concept of healthy ageing has emerged, including the persistent adherence to deficit views of ageing and the impact of stigma and discrimination (62,63). There is a notable lack of systematic reviews which identify common themes in the literature on healthy ageing (61) and a range of important research gaps (64).

Models of healthy ageing

Strategies to promote healthy ageing tend to conform to one of the following models:

Biomedical model

The biomedical model of healthy ageing focuses on the physical and biological aspects of ageing. It emphasises the prevention, diagnosis and treatment of diseases and conditions that commonly affect older adults. This model aims to extend lifespan and improve health outcomes by addressing medical issues through interventions such as medications, surgeries and other medical treatments. It has been criticised as reductionist and paternalistic (65).

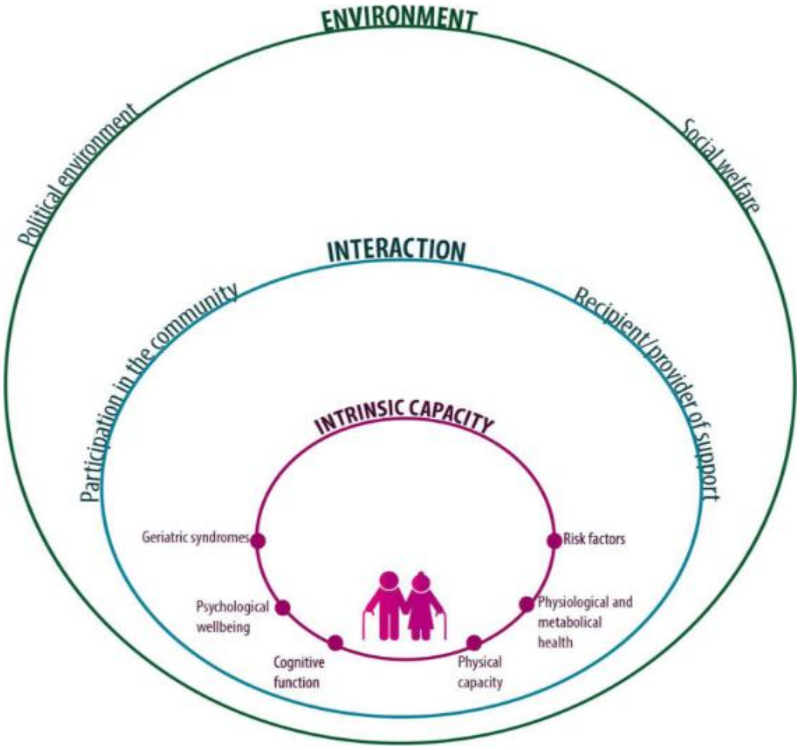
Social model

The social model of healthy ageing highlights the importance of social factors and environments in influencing the ageing process. It considers how social determinants of health, such as socioeconomic status, education, and social support impact the wellbeing of older adults. This model advocates for creating supportive environments and policies that promote social inclusion, reduce inequalities and enhance the quality of life for older individuals (66).

Multi-dimensional model

The multi-dimensional model of healthy ageing integrates both biomedical and social perspectives, emphasizing a comprehensive approach to wellbeing. It considers the physical, mental, emotional and social dimensions of health (11). This model promotes a balanced lifestyle that includes proper nutrition, regular physical activity, mental stimulation and strong social connections. It recognizes that healthy ageing is a multifaceted process influenced by a combination of genetic, environmental, and lifestyle factors (67). Figure 1.2 illustrates the multi-dimensional model.

Figure 1.2 The Multi-Dimensional Model of Ageing (68)



These models provide different but complementary approaches to understanding and promoting healthy ageing. The commonalities across the various frameworks and models involve a vision of older age that is productive, in which older people live with independence and agency and can contribute. To live this kind of purposeful life, people need to be able to maintain adequate physical and mental health status and to have good social contact.

United Nations Decade of Healthy Ageing

Despite the theoretical and conceptual complexities, the term healthy ageing, which is in current use in some countries, attempts to encapsulate a health-related quality of life dimension for older people. This conceptualisation overturns previous deficit theories of old age and the biomedical model, which focus solely on biological measures of declining function and frailty. The construct underpins the work being undertaken as part of the United Nations Decade of Healthy Ageing, 2021 to 2030, which is a global collaboration aligned with the UN's Sustainable Development Goals, to influence the lives of older people, their families and the communities in which they live.

The work on healthy ageing is led by the World Health Organization (WHO). Healthy ageing as a construct frames a multi-dimensional policy approach to ageing well and steers collaborative action towards operationalising the WHO definition of it as *"the process of developing and maintaining functional ability that enables wellbeing in older age" (41).*

Many international bodies, including the Australian Government, now align with the WHO's definition, focusing on creating environments and opportunities that enable people to be and do what they value throughout their lives. Within this framework, healthy ageing involves much more than the absence of disease but focuses on maintaining functional ability and wellbeing despite health conditions. Notably, the Australian Department of Health, Disability and Ageing emphasises 'positive ageing' which, perhaps, reflects some diversity in policy objectives and terminology (69).

The WHO approach to the Decade of Healthy Ageing emphasises a comprehensive, multi-dimensional approach, integrating health, social and environmental factors to support older adults in living healthy, active and fulfilling lives.

The Decade encompasses four areas for action:

- Age-friendly environments: creating environments that support healthy ageing by addressing social determinants and enabling older adults to live dignified lives.
- Combatting ageism: reducing stereotypes, prejudice, and discrimination based on age to improve the wellbeing of older adults.
- Integrated care: providing person-centred and integrated care that meets the needs of older adults.
- Long-term care: ensuring access to quality long-term care services for older adults who need them

Four enablers of change are identified:

- Engaging older people**:** involving older adults in decision-making processes and recognising their contributions.
- Leadership and capacity building: strengthening leadership and building capacity at all levels to support healthy ageing.
- Connecting stakeholders: fostering collaboration among governments, international organisations, civil society and the private sector.
- Data and research: enhancing data collection, research and innovation to inform policies and practices.

The aims of the Decade are to:

- improve the functional ability of older people;
  reduce health inequities;
- promote healthy ageing in all policies and programs; and
- foster environments that support healthy ageing.

Promoting functional ability

The WHO definition of healthy ageing is based on the concept of functional ability, which comprises an individual's personal characteristics or ‘intrinsic capacity’, which is closely related to the notion of resilience, discussed previously and the conditions that are present in the physical and social environment and the interactions between the two (70).

The WHO describes intrinsic capacity as “all the mental and physical capacities that a person can draw on and includes their ability to walk, think, see, hear and remember”. The level of intrinsic capacity is influenced by several factors such as the presence of diseases, injuries and age-related changes. The construct of intrinsic capability has also been criticised due to a poor definition; however, there is evidence that the assessment of intrinsic capacity provides valuable information on an individual's subsequent functioning beyond that afforded by age of the personal factors and multimorbidity (61). It is suggested that “the WHO construct of intrinsic capacity appears to provide valuable predictive information on an individual’s subsequent functioning, even after accounting for the number of multi-morbidities. The proposed general factor and subdomain structure may contribute to a transformative paradigm for future research and clinical practice” (70).

The WHO Integrated Care for Older People (ICOPE) program, which is currently under evaluation in a number of settings, demonstrates how the construct might be applicable in clinical practice, providing a resource which demonstrates ways of realigning primary care to respond to population ageing (71) and provides guidelines on community interventions to manage declines in intrinsic capacity (71).

Equity focused approaches

Indigenous perspectives

Indigenous perspectives on healthy ageing, worldwide, often emphasise a holistic approach that integrates physical, mental, emotional and spiritual wellbeing.

Key elements include:

- **Elderhood**: in many Indigenous cultures, elderhood is a respected status achieved through wisdom, community involvement, and the passing down of knowledge. Programs and policies should recognise and support the role of elders in promoting healthy ageing (72).
- **Community resilience:** Indigenous communities often focus on collective wellbeing and resilience. This includes community-driven health initiatives and culturally tailored interventions that respect traditional practices and values (72).
- **Addressing historical trauma:** recognizing and addressing the impacts of historical trauma and intergenerational stress is considered crucial. Policies should aim to undo structural inequities and support the unique needs of Indigenous older adults (73).

Culturally diverse perspectives

Equity-focused approaches for culturally diverse older adults involve:

- **Cultural tailoring:** health programs should be adapted to meet the cultural, linguistic and social needs of diverse populations. This includes providing services in multiple languages and respecting cultural practices (74).
- **Community engagement:** engaging with communities to understand their specific needs and preferences is essential. Community-based approaches can enhance the effectiveness of health interventions and ensure they are relevant and accessible (74).
- **Addressing social determinants of health**: policies should address broader social determinants such as socioeconomic status, education, and access to healthcare. This helps reduce health disparities and promotes equity (30).
- **Inclusive research and policy development:** ensuring that research and policy development include diverse perspectives can lead to more effective and equitable health outcomes. This involves involving diverse older adults in decision-making processes and tailoring policies to their specific needs (75).

These approaches highlight the importance of considering cultural and social contexts in promoting healthy ageing and ensuring that all older adults can age well.

Australian trends in ageing and health needs

Demographic trends

The proportion of Australians aged 65 and over is increasing in line with global trends. By 2053, 21% of the population will be aged 65 and over, and 4.2% will be aged 85 and over. AIHW data indicates that, in 2020, there were an estimated 4.2 million older Australians (aged 65 and over) with older people comprising 16% of the total Australian population (76).

By 2066, it is projected that older people in Australia will make up between 21% and 23% of the total population (77). For those aged 85 and over, the proportion increased from 0.5% (63,200) in 1970, to 2.1% at 30 June 2020 (528,000). The proportion is expected to continue to rise to between 3.6% and 4.4% in 2066.

In 2020, two-thirds of people over 65 lived in major cities (66%, 2.7 million), nearly 1 in 4 in inner regional areas (23%, 0.9 million) and the remaining 11% lived in outer regional and remote and very remote areas combined (0.5 million) (76). Compared with the total Australian population, a higher proportion of older people lived in Inner regional areas and a lower proportion in major cities.

Epidemiological trends

The burden of chronic disease and multimorbidity in older adults in Australia is significant and multifaceted. As the population ages, the prevalence of chronic diseases and multimorbidity increases, leading to complex health needs and challenges for the healthcare system.

In 2023, older Australians lost over 2.6 million years of healthy life due to illness or premature death, an increase from 1.7 million DALYs (Disability-Adjusted Life Years) in 2003. This reflects the higher proportion of people aged 65 and over in 2023 compared to 2003. The leading causes of disease burden among older adults include cancer, cardiovascular diseases and neurological conditions (2). Specifically, dementia, coronary heart disease and chronic obstructive pulmonary disease were the top causes of disease burden in 2023, followed by lung cancer, stroke, and other musculoskeletal disorders.

The overall leading cause of death among people aged 65 and over in Australia is Alzheimer's Disease, closely followed by coronary heart disease (78). There are differences in the causes of death between men and women, with coronary heart disease being the leading cause of death among men across all older age groups, while lung cancer and Alzheimer's disease are the leading causes among women aged 65 to 74 (78).

Figure 1.3 Causes of death for people 65 and over in 2023

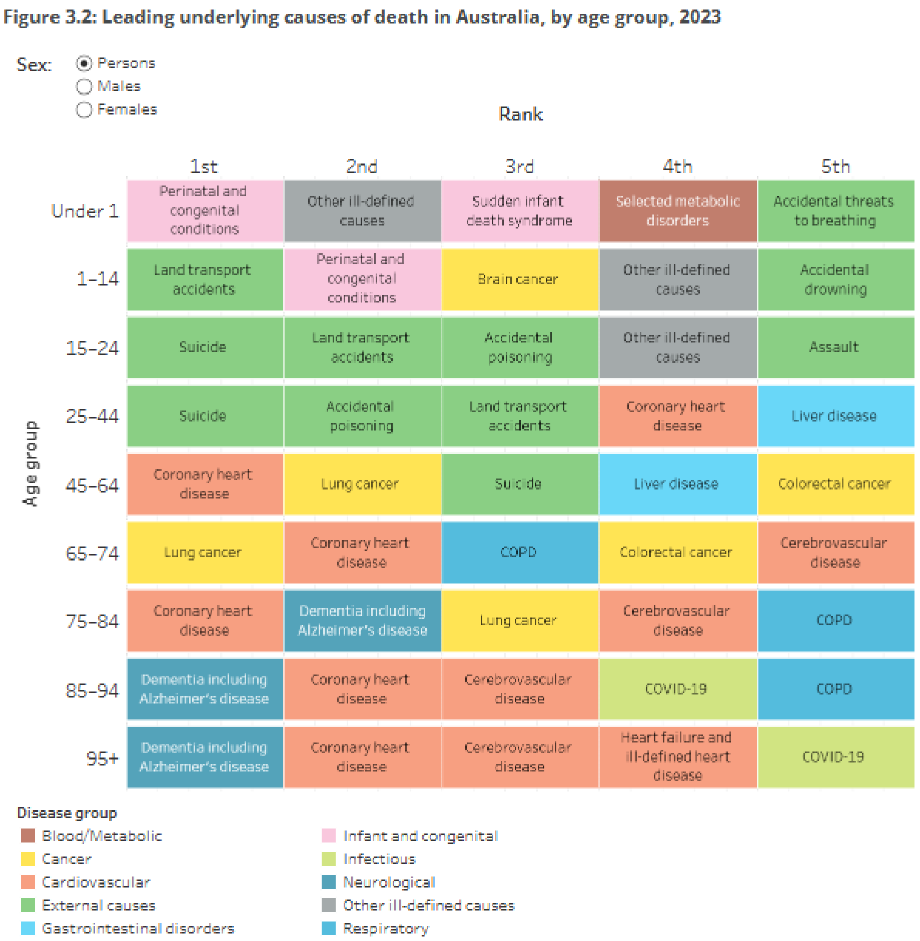


Figure 3.2: Leading underlying causes of death in Australia, by age group, 2023

Sex: ● Persons ○ Males ○ Females

Age group	1st	2nd	3rd	4th	5th
Under 1	Perinatal and congenital conditions	Other ill-defined causes	Sudden infant death syndrome	Selected metabolic disorders	Accidental threats to breathing
1–14	Land transport accidents	Perinatal and congenital conditions	Brain cancer	Other ill-defined causes	Accidental drowning
15–24	Suicide	Land transport accidents	Accidental poisoning	Other ill-defined causes	Assault
25–44	Suicide	Accidental poisoning	Land transport accidents	Coronary heart disease	Liver disease
45–64	Coronary heart disease	Lung cancer	Suicide	Liver disease	Colorectal cancer
65–74	Lung cancer	Coronary heart disease	COPD	Colorectal cancer	Cerebrovascular disease
75–84	Coronary heart disease	Dementia including Alzheimer's disease	Lung cancer	Cerebrovascular disease	COPD
85–94	Dementia including Alzheimer's disease	Coronary heart disease	Cerebrovascular disease	COVID-19	COPD
95+	Dementia including Alzheimer's disease	Coronary heart disease	Cerebrovascular disease	Heart failure and ill-defined heart disease	COVID-19

In the Australian Bureau of Statistics (ABS) National Health Survey (NHS) 2022 data on self-reported health status, 74% of people aged 65 and over reported their health as good, very good or excellent (79). However, there are differences by age group, with people aged 65–74 more likely to report their health as very good or excellent compared to those aged 75 and over.

Disability is also a significant issue among older Australians, with 50% of people over 65 having a disability (80). The prevalence of disability has remained relatively stable in recent years, but the number of older people with disability has increased (81). Disability is experienced at different levels, with nearly one in five (18%) people aged 65 and over having severe or profound disability, meaning they sometimes or always need help with self-care, mobility, or communication.

Health of older people in rural and remote areas

Rural and remote areas tend to overlap with areas identified as the most disadvantaged in Australia (81). Australians living in rural and remote areas, on average, have shorter lives, higher death rates, higher levels of disease and injury and poorer health outcomes compared with people living in metropolitan areas (82,83). This can be linked to multiple factors including lifestyle risk factors, socioeconomic disadvantage and poorer access to health services.

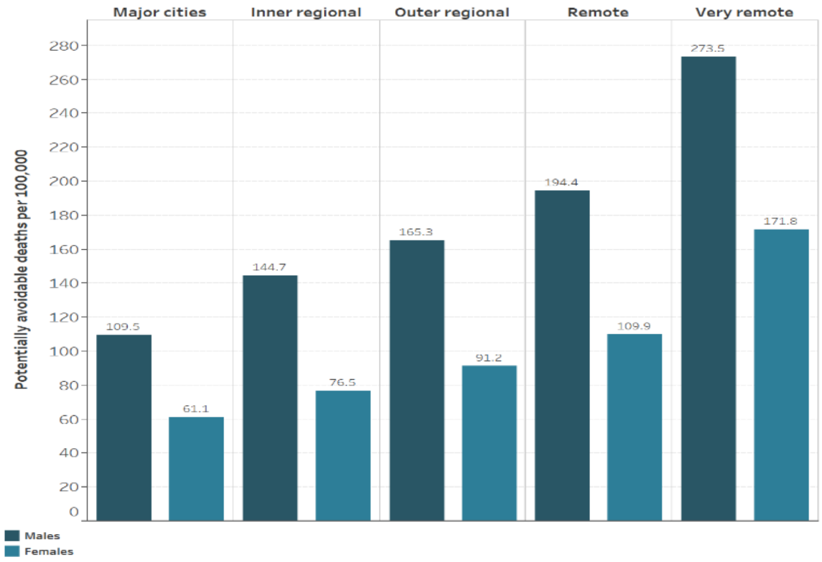
The health disadvantages of communities in rural and remote Australia can also be impacted by the availability of healthcare services. Accessibility issues, such as access to dental, general practitioner and community services, and higher prevalence of health risk factors, such as higher rates of smoking, disability and physical inactivity, can all contribute to poorer health outcomes (84).

ABS data suggests that although the prevalence of many health conditions does not vary between people living in areas of increasing remoteness, some conditions are reported more frequently among people living outside major cities. These include mental and behavioural conditions, arthritis, back pain and asthma. Alongside the factors identified above, differences in the rates of these chronic conditions may contribute to the poorer health outcomes of Australians living in rural and remote communities (85). Compared with older people living in major cities, older people living in rural and remote areas have a higher prevalence of chronic conditions such as arthritis, asthma and chronic obstructive pulmonary disease (86).

ABS data shows that both women and men living in rural and remote areas are more likely to die at a younger age than their counterparts living in major cities. Older people in rural and remote areas have higher mortality rates and higher rates of potentially avoidable deaths – deaths under the age of 75 from conditions that are potentially preventable through primary or hospital care – than those living in major cities (87).

Across Australia in 2018, the median age at death decreased as remoteness increased for both sexes and the overall population. Men had the lowest median age at death across the remoteness areas: 68 years in very remote areas compared with 79 years in major cities. Of the total number of deaths that occurred in very remote areas in 2018, 2 in 3 (67%) were premature deaths – people aged under 75. Around 3 in 5 (61%) of these premature deaths were potentially avoidable. In contrast, 33% of all deaths were premature deaths in major cities*, o*f which nearly half (48%) were considered potentially avoidable (88) (Figure 1.4).

Figure 1.4 Potentially avoidable deaths by sex and remoteness area, 2021 (88)



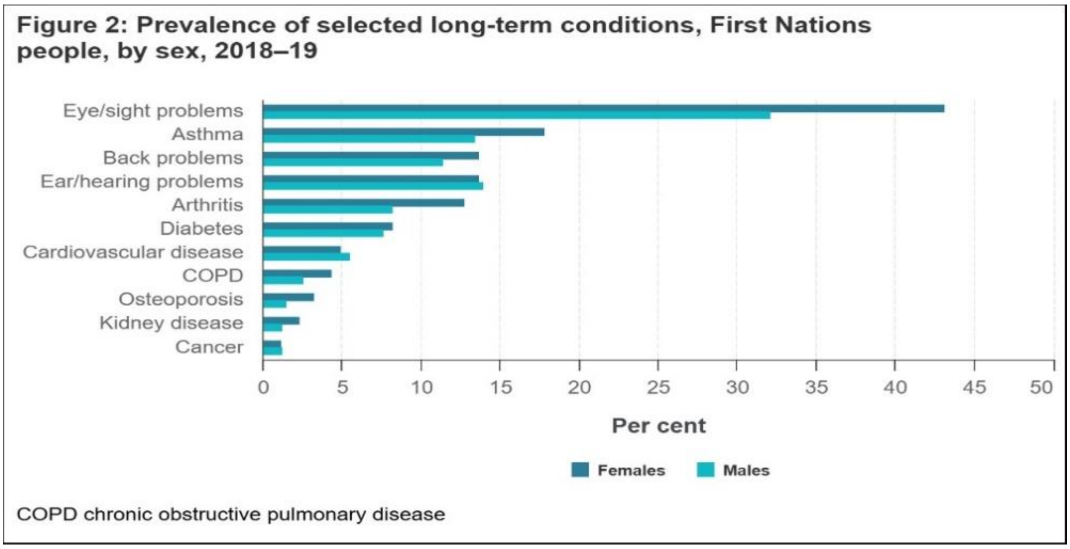
Older First Nations people

In 2021, there were 983,700 First Nations people in Australia, representing 3.8% of the total Australian population. Older Indigenous Australians (aged 50 and over) comprised 1.5% of the total Australian population aged 50 and over and 16% of the total Indigenous population. By 2031 it is expected that 1 in 5 Indigenous people will be aged 50 or over (20%) (ABS 2019a). Queensland and the Australian Capital Territory are projected to have the fastest average annual growth rate over the projection period of between 2.2% and 2.4% per year. (All data ABS, updated 2024) (78).

One in 4 older Indigenous Australians (aged 50 and over) were aged 65 and over (27%) in 2016. This proportion was slightly higher for women (28%) than men (26%) (89).

Aboriginal and Torres Strait Islander people '*continue to suffer from the consequences of European settlement, including the impact of 'new' infectious and chronic diseases*.' The interaction of other factors, including social dislocation and economic disadvantage, also contribute to poor health in many groups of Aboriginal and Torres Strait Islander people (89). Aboriginal and Torres Strait Islander people are more likely to develop serious medical conditions earlier in life and have a lower life expectancy than non-Indigenous Australians (90).

Figure 1.5 Prevalence of selected long-term conditions, First Nations people, by sex, 2018 to 2019



Culturally diverse older people

Health characteristics vary by cultural diversity, with older people from non-English-speaking countries more likely to need help with core activities than those born in Australia or English-speaking countries. People from non-English-speaking countries also have lower health literacy. The overseas-born population in Australia is older, with a significant proportion from Europe, although more recent migration is predominantly non-European (91).

International comparisons

Like many developed countries, Australia has a high median age, with a relatively large proportion of its population aged 65 and over. In 2020, the median age in Australia was estimated at 37.8 (92). Among member countries of the Organisation for Economic Co-operation and Development (OECD), this was slightly lower than for the United States of America (38.3 years) and the United Kingdom (40.5 years) and slightly higher than countries such as Turkey (31.5), Israel (30.5) and Mexico (29.2).

The estimated proportion of people aged 65 and over in OECD countries in 2020 was 16% in Australia; 17% in the United States of America and 19% in the United Kingdom, with lower proportions in Israel (12%); 9% in Turkey and 7.6% in Mexico (All data OECD) (93).

While all these countries are experiencing population ageing, the extent and specific challenges vary. Japan has the highest proportion of older people; Nordic countries have robust welfare systems to support their ageing populations. Australia, Canada, and the UK face similar challenges related to healthcare and social services, but each has a unique demographic and policy context. These trends highlight the importance of developing policies and programs that address the unique health needs of ageing populations within nations as well as globally. A comparative analysis of these challenges is summarised in Box 1.3 below.

Box 1.3. International Comparisons

Japan

- **Population ageing**: Japan has the highest proportion of elderly citizens globally. As of 2023, nearly 30% of the population is aged 65 and over.
- **Life expectancy**: Japan boasts one of the highest life expectancies in the world, with an average of 84.6 years.
- **Challenges**: Japan faces significant challenges, including a shrinking workforce, increased healthcare costs, and the need for extensive elder care services (94).

Canada

- **Population ageing**: Canada's population is also ageing, with nearly 18% of the population aged 65 and over as of 2024 (95).
- **Life expectancy**: Canadians have a high life expectancy, with males living to an average of 80 years and females to 84 years.
- **Challenges**: Canada faces challenges such as ensuring adequate healthcare and social services for its ageing population and addressing the needs of older adults in rural and remote areas (96).

United Kingdom

- **Population ageing**: In the UK, 18% of the population is aged 65 and over as of 2023
- **Life expectancy**: Life expectancy in the UK is around 79 years for males and 83 years for females
- **Challenges**: The UK faces challenges related to healthcare provision, social care, and ensuring financial security for older adults (97-98)

Nordic countries (Denmark, Finland, Iceland, Norway, Sweden)

- **Population ageing**: The Nordic countries are experiencing significant population ageing. In Sweden, for example, 20% of the population is aged 65 and over.
- **Life expectancy**: Life expectancy is high across the Nordic countries, with averages ranging from 81 to 84 years.
- **Challenges**: These countries face challenges such as maintaining sustainable welfare systems, providing adequate healthcare, and ensuring social inclusion for older adults (99).

Australian health system: strengths and challenges

In the Australian context, a number of strengths and specific structural challenges have been identified for the healthcare system in adapting to meet the needs of a growing and increasingly diverse population of older people. A significant challenge is the persistent health inequalities which affect the life expectancy and well-being of many individuals and communities, particularly those living in rural and remote areas and Aboriginal and Torres Strait Islander communities. These are summarised below.

Strengths

High utilisation

A significant majority of older Australians regularly visit general practitioners (GPs). In 2019-20, 95% of people aged 65 and over saw a GP at least once in the previous 12 months (76).

Comprehensive services

Primary care includes a wide range of services such as GP visits, pharmacy services, and allied health professionals (e.g., physiotherapists, dietitians (94). This ensures that older people have access to various types of care within their community.

Government initiatives

The Australian government has invested in strengthening Medicare, primary care services and specific programs to improve health services for aged care residents (94).

Challenges

Healthcare costs

Rising healthcare costs are a concern, especially as older people tend to use more health services (95).

Access to after-hours care

While after-hours care is available, there can be challenges in accessing it, particularly in rural and remote areas.

Coordination of care

Ensuring seamless coordination between different healthcare providers can be difficult, which may affect the quality of care for older people with complex health needs (94).

Workforce shortages:

There are ongoing concerns about shortages in the primary healthcare workforce, which can impact the availability and quality of care (94).

There are continuing concerns about whether the funding and resources allocated are sufficient to meet the growing demand for healthcare and aged care services, to meet the needs of the ageing population. In addition, there is growing evidence that the effectiveness of healthy interventions in all sectors is contingent on a number of factors, including the type of implementation approaches used to take account of the specific context in which programmes are implemented as well as the mechanisms that may be at play at the individual level (96).

The Australian health system has been described as not one system, but a complex network of services with multiple providers and multiple payers, generating complexity for both patients and providers alike. Moreover, successive governments have sought advice on how to deal with the pressures on and of the current system. An analysis of the range of Australian government reviews focused on the function and capability of Australia’s health services to provide universally available appropriate and affordable health services for all found that, whilst numerous national reviews consistently identified the same underlying challenges, there has, to date, been no consistent policy agreement about what needs to be done to create meaningful change (97).

The role of primary care

The Australian Primary Healthcare Ten Year Plan, 2022-2032 describes primary care as 'those services in the community that people go to first for health care: general practices, ACCHS, community pharmacies, many allied health services, mental health services, drug and alcohol services, community health and community nursing services, maternal and child health services, sexual health services and oral health and dental services.' Primary care is differentiated from secondary care, which is usually delivered by specialist medical practitioners requiring referral by general practitioners and from tertiary care delivered in hospitals (98).

General practice: a pivotal role in supporting healthy ageing

General practice has a primary role to play in supporting healthy ageing, although collaboration with a range of community-based services is a vital component of individual healthy ageing planning (99). General practice can intervene at various stages to support healthy ageing, focusing on prevention, early detection and management of age-related conditions.

Australian general practice is well-positioned to support healthy ageing, though, as will be discussed, it needs strong policy and funding support to do so. The role of the GP is in transition; it is increasingly broader than the traditional singular role of direct health provider and referrer to other health providers. Increasingly, the GP, working with multi-disciplinary primary care teams, provides proactive, lifelong health services aimed at preventing, delaying or minimising the impacts of multiple chronic conditions, supporting positive behavioural change, enabling the coordination of care when required, working with other community services to address unfavourable social conditions and to support people at the end of life. These are all essential components of an effective healthy ageing system.

Regular access to a doctor and a place of care is key to the early detection and treatment of disease as well as effective chronic disease management. A recent 2024 Report of the Commonwealth Fund Survey of Older Adults in 10 countries found that individuals with a regular and identifiable source of care are more likely to receive immunisations for flu, pneumonia, RSV and blood pressure and cancer screenings (100). Importantly, this study found that having a known source of care can improve attitudes towards health and can improve engagement. These include changing health habits such as diet and physical activity, tackling damaging health behaviours such as smoking and harmful alcohol consumption and a range of adverse social and living conditions. The evidence suggests that the mechanisms through which this is achieved in primary care include:

Integrated care

Primary care is essential for managing the health needs of ageing populations by offering integrated services that address both physical and mental health. This approach helps in preventing and managing chronic diseases, which are prevalent among older adults (101).

Health promotion and disease prevention

Primary care focuses on health promotion and preventive measures, which are vital for healthy ageing. This includes regular health screenings, the uptake of vaccinations, and lifestyle advice to maintain functional abilities and prevent the onset of diseases (102).

Multi-disciplinary teams

The use of multidisciplinary teams (MDTs) in primary care has been shown to improve health outcomes for older adults. These teams often include general practitioners, nurses, social workers, and other specialists who work together to provide comprehensive care (101).

Patient-centred care

Primary care emphasizes patient-centred care, which involves tailoring health services to the individual needs of older adults. This approach ensures that care plans are aligned with the patients' preferences and life goals, enhancing their quality of life (102).

Access and equity

Ensuring access to primary care is critical for reducing health disparities among older adults. Addressing barriers to primary care, such as transportation and affordability, can help improve health outcomes and reduce the risk of poor health (103).

Proactive, primary care support for healthy ageing involves translating these approaches into direct interventions with individuals and communities, targeting the complex ageing process and its whole of life trajectories. This requires a more holistic, multi-disciplinary and multi-agency approach emanating from a better understanding of the multiple determinants of healthy ageing. Reorienting the primary care system is a complex process of change, requiring a supportive policy context driving reformed models of care and funding. These implications will be discussed in detail later. In summary, this level of systematic transformative change means that traditional, single-discipline and, in Australia, fee-for-service based primary care can no longer be considered the most appropriate model (104).

Resources to support general practice

There is an extensive international evidence base on the role of general practice in promoting the well-being and functional independence of older people. These include the provision of quality standards and clinical guidelines relevant to each health system context.

In Australia, resources available to support GPs in promoting healthy ageing:

- The Royal Australian College of General Practitioners (RACGP) provides a wide range of clinical guidelines, such as the Red Book, Silver Book and Green Book (these guidelines have been discussed in chapters below), articles and other resources to assist GPs in their work. These guidelines cover various topics, including preventative care assessment and activities in general practice (105) and guidelines for the medical care of older persons in both community and residential aged care facilities (106).
- Australian Government Department of Health, Disability and Ageing provides resources on managing chronic conditions. This includes information on reducing risk factors, diagnosing chronic conditions, and treating and managing them. Medicare funds GP Chronic Condition Management Plans (GPCCMP) to assist with the primary care of people who need a structured approach to managing chronic disease (107).

Technology is playing an increasingly critical role in supporting healthy ageing within primary care. Insights from the literature highlight how digital tools, ranging from telehealth, wearable devices and clinical decision support systems to practice-level data-sharing platforms, can enable early intervention, promote self-management, enhance multidisciplinary teamwork, and support preventive care across the life course. Evidence emphasises that technology must be person-centred, integrated and co-designed with older adults to be effective; and that successful implementation depends on digital inclusion, workforce training, interoperable systems and supportive funding models. When effectively deployed, technology offers a powerful lever to resource primary care proactive, coordinated models of care that foster independence, function and wellbeing in ageing populations.

The role of Primary Health Networks

Australia's 31 Primary Health Networks (PHNs) are independent organisations working to streamline health services, particularly for those at risk of poor health outcomes and to better coordinate care so people receive the right care, in the right place, at the right time. All PHNs, through the PHN Cooperative, contributed to the development of the White Paper, Supporting Healthy Ageing: the role of PHNs (108).

The White Paper describes the ways in which the PHNs have already begun to implement a broad range of programs and activities to improve the health of older people within their regions, some examples are provided below. The White Paper suggests that the PHNs strengths in undertaking this work lies in the following characteristics:

- PHNs are embedded within their local communities to act as planners, commissioners, innovators and integrators for services in their region.
- PHNs have built a body of evidence that demonstrates their capacity for understanding, analysing and prioritising local needs, and collaboratively developing localised responses to meeting those needs.
- PHNs have a particular focus on vulnerable populations – the people most likely to miss out on the opportunity to access and engage with health and aged care services. This places PHNs in a strong position to contribute to improving consumer journeys into, within, and between the health and aged care systems (108).

The White Paper provides a comprehensive policy road map to strengthen the capacity of PHNs to promote healthy ageing with a series of recommendations focusing on:

- system coordination and integration;
- regional planning and commissioning;
- primary healthcare system stewardship and management with a focus on quality;
- primary healthcare education training and workforce development and
- health system transformation and reform.

National policy context

The Australian Government's policy approach to healthy ageing focuses on several key areas to support older Australians in maintaining their health, independence and connection to the community. Positive ageing is promoted by the Department and provides the umbrella for information about aged care, senior living and maintaining health, physical activity and community connections (69).

Positive Ageing and health and wellbeing

The promotion of positive ageing includes:

- LiveUp**,** a national online resource service which provides free and impartial healthy ageing information (81).
- encouragement of physical activity, proper nutrition, mental health care, and preventative health measures (81).
- emphasis on maintaining social connections to boost mental and physical health, reduce isolation, and enhance overall well-being. Volunteering opportunities are promoted to keep older people engaged with their communities (81).
- identifying the best ways to encourage Australians to make the most of their later years (82).

Aged care reforms

Australia's aged care reforms aim to deliver high-quality, person-centred care for older people. Key initiatives include:

- Aged Care Act 2024 which focuses on rights-based care, ensuring respect and quality of life for older adults (83).
- Support at Home Program which aims to provide high-quality, person-centred care for older Australians, ensuring they receive the support they need in their own homes (84).
- Royal Commission into Aged Care Quality and Safety. The Commission provided 148 recommendations to reform aged care, emphasising safety, quality and equity (85).

Primary care reforms

The Australian Government has introduced several primary care reforms aimed at supporting healthy ageing. These include:

Primary Health Care 10 Year Plan (2022–2032)

This plan focuses on strengthening primary health care through three main reform streams (86):

- future-focused primary health care: emphasizing innovation and sustainability;
- person-centred care: supported by funding reforms to ensure care is tailored to individual need;
- integrated care: locally delivered to ensure seamless coordination across different health services (86).

Strengthening Medicare

An $11.8 billion investment over several budgets (2022-2025) to enhance primary healthcare services, including better access to general practitioners, pharmacies and allied health professionals (86).

These reforms are designed to create a more robust and responsive primary health care system, ultimately promoting healthier ageing for all Australians. There is a specific focus on supporting older people at risk of long stays as hospital inpatients to prevent avoidable hospital presentations and admissions and improve the transition from hospital to other care (109).

National Preventive Health Strategy (2021–2030)

The National Preventive Health Strategy aims to improve the health and wellbeing of all Australians at all stages of life. It focuses on a systems-based approach to prevention, addressing the wider determinants of health, reducing health inequities, and decreasing the overall burden of disease. Key goals include ensuring all Australians have the best start in life, live in good health for as long as possible, and achieve health equity for priority populations (87).

National Strategic Framework for Chronic Conditions

This framework provides guidance for developing and implementing policies, strategies, actions, and services to reduce the impact of chronic conditions in Australia. It moves away from a disease-specific approach and provides national direction that applies to a broad range of chronic conditions (110).

The Aged Care Data and Digital Strategy 2024–2029

This Strategy sets out a national framework for harnessing data and digital technologies to improve aged care delivery, workforce efficiency and outcomes for older Australians. While focused on the aged care sector, the strategy has broader implications for technology-enabled healthy ageing. The strategy:

- Outlines a national framework to enhance person-centred aged care through digital transformation and improved data sharing.
- Aligns with primary healthcare principles by promoting:
    - preventive and proactive care
    - digital inclusion and equity
    - culturally safe, person-centred models
    - multi-disciplinary, team-based care coordination
- Supports the life course approach by:
    - enabling healthy ageing earlier in life through digital literacy and self-management
    - facilitating seamless transitions between care settings
    - encouraging system-wide interoperability across aged care, health, and social services
- Priorities include:
    - promoting healthy ageing, independence and choice
    - strengthening care connections through interoperable digital systems
    - reducing administrative burden to free up time for direct care
    - building workforce and system digital capability

The strategy aligns with broader health and government reforms, including the Digital Health Blueprint 2023–2033, National Preventive Health Strategy 2021-2030, and Australia’s Primary Health Care 10 Year Plan. 2022-2032 It underscores the need for interoperability across aged care, health, and social services, making it a strong foundation for discussions on integrated digital models of care across the life course.

Policy frameworks and initiatives focused on healthy ageing

Some state governments, such as QLD and NT, have developed healthy ageing policy frameworks to guide the planning and delivery of health and social services. Additionally, many Primary Health Networks (PHNs) across Australia have also introduced strategies that prioritise preventive health and person-centred care to promote and support healthy ageing. International policy frameworks also offer valuable examples of effective, population-wide approaches to healthy ageing. Refer Appendix 1 for national and international examples.

References

1. United Nations, Department of Economic and Social Affairs. World Population Prospects 2019: Highlights. New York: United Nations; 2019. 1 p. (Statistical Papers - United Nations (Ser. A), Population and Vital Statistics Report).

2. Australian Institute of Health and Welfare. Australian Burden of Disease Study 2024 [Internet]. 2024. Available from: https://www.aihw.gov.au/getmedia/925b4875-ac93-47c3-84ae-de485c99bc3b/australian-burden-of-disease-study-2024.pdf?v=20241219145736&inline=true
3. Fiacco S, Walther A, Ehlert U. Steroid secretion in healthy aging. Psychoneuroendocrinology [Internet]. 2019 Jul [cited 2025 Mar 24];105:64–78. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0306453018305791
4. Zhang ZD, Milman S, Lin JR, Wierbowski S, Yu H, Barzilai N, et al. Genetics of extreme human longevity to guide drug discovery for healthy ageing. Nat Metab [Internet]. 2020 Jul 27 [cited 2025 Mar 24];2(8):663–72. Available from: https://www.nature.com/articles/s42255-020-0247-0
5. Cosco TD, Howse K, Brayne C. Healthy ageing, resilience and wellbeing. Epidemiol Psychiatr Sci [Internet]. 2017 Dec [cited 2025 Mar 24];26(6):579–83. Available from: https://www.cambridge.org/core/product/identifier/S2045796017000324/type/journal_article
6. World Health Organization, Health Care Team. Innovative care for chronic conditions : meeting report [Internet]. 2001. Available from: https://iris.who.int/handle/10665/66955 Description
7. Pincus HA, Pike KM, Spaeth-Rublee B, Elinson L. Health and Aging Policy Fellows Program: Shaping a Healthy Future for Older Americans. J American Geriatrics Society [Internet]. 2017 Sep [cited 2025 Mar 24];65(9):2088–93. Available from: https://agsjournals.onlinelibrary.wiley.com/doi/10.1111/jgs.15036
8. World Health Organization, Health Care Team. Ageing and health [Internet]. 2024. Available from: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health
9. Jane Osareme, Ogugua, Muridzo Muonde, Chinedu Paschal Maduka, Tolulope O Olorunsogo, Olufunke Omotayo. Demographic shifts and healthcare: A review of aging populations and systemic challenges. Int J Sci Res Arch [Internet]. 2024 Jan 30 [cited 2025 Mar 24];11(1):383–95. Available from: https://ijsra.net/content/demographic-shifts-and-healthcare-review-aging-populations-and-systemic-challenges
10. World Health Organization, Health Care Team. Decade of Healthy Ageing: Baseline Report. 1st ed. Geneva. https://www.who.int/publications/i/item/9789240017900
11. World Health Organization, Health Care Team. Healthy ageing and functional ability [Internet]. 2020. Available from: https://www.who.int/news-room/questions-and-answers/item/healthy-ageing-and-functional-ability
12. Hargraves I, Montori VM, Tilburt JC. Curare Aude-Caring for Patients, with Them. J Clin Ethics. 2020;31(1):79–82.
13. Søgaard MB, Andresen K, Kristiansen M. Systematic review of patient-engagement interventions: potentials for enhancing person-centred care for older patients with multimorbidity. BMJ Open [Internet]. 2021 Dec [cited 2025 Mar 24];11(12):e048558. Available from: https://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2020-048558
14. Butterworth JEH R; McDonagh, ST J; Bower, P; Pitchforth, E; Richards, S H; Campbell, JL. Involving older people with multimorbidity in decision-making about their primary healthcare: A Cochrane systematic review of interventions (abridged). Patient education and counseling. 2020;103(10):2078–94.
15. Martínez T, Postigo Á, Cuesta M, Muñiz J. Person-Centred Care for older people: Convergence and assessment of users' relatives' and staff's perspectives. Journal of Advanced Nursing [Internet]. 2021 Jun [cited 2025 Mar 24];77(6):2916–27. Available from: https://onlinelibrary.wiley.com/doi/10.1111/jan.14821
16. Pieterse AH, Stiggelbout AM, Montori VM. Shared Decision Making and the Importance of Time. JAMA [Internet]. 2019 Jul 2 [cited 2025 Mar 24];322(1):25. Available from: http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2019.3785
17. Hastings-Truelove A, Ghahari S, Coderre-Ball A, Kessler D, Turnnidge J, Lester B, et al. Barriers and facilitators to older adults' engagement in healthy aging initiatives. JGG [Internet]. 2022 Sep [cited 2025 Mar 24];70(3):1–10. Available from: http://www.jgerontology-geriatrics.com/article/view/407
18. Khan H, Addo KM. Factors affecting healthy aging and its interconnected pathways. TJHAM [Internet]. 2024 Mar [cited 2024 Jan 1];(1):9–24. Available from: https://dergipark.org.tr/en/pub/tjham/issue/83497/1439512
19. Clarke P, Twardzik E. The role of the built environment for healthy aging: barriers and enablers. In: Handbook of Aging and the Social Sciences [Internet]. Elsevier; 2021 [cited 2025 Mar 24]. p. 115–30. Available from: https://linkinghub.elsevier.com/retrieve/pii/B9780128159705000085
20. Remm S, Halcomb E, Hatcher D, Frost SA, Peters K. Understanding relationships between general self-efficacy and the healthy ageing of older people: An integrative review. Journal of Clinical Nursing [Internet]. 2023 May [cited 2025 Mar 24];32(9–10):1587–98. Available from: https://onlinelibrary.wiley.com/doi/10.1111/jocn.16104

21. Kornadt AE, Rothermund K. Preparation for old age in different life domains: Dimensions and age differences. International Journal of Behavioral Development [Internet]. 2014 May [cited 2025 Mar 24];38(3):228–38. Available from: https://journals.sagepub.com/doi/10.1177/0165025413512065
22. El-Sayed MM, Mohsen HA, El-Ashry AM, Khaled AMS, Shoukr EMM. Association of health anxiety, fatalism and medication adherence among geriatric clients: An exploratory study. Geriatric Nursing [Internet]. 2023 Nov [cited 2025 Mar 24];54:8–15. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0197457223002100
23. Osokpo O, Riegel B. Cultural factors influencing self-care by persons with cardiovascular disease: An integrative review. International Journal of Nursing Studies [Internet]. 2021 Apr [cited 2025 Mar 24];116:103383. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0020748919301737
24. Clemson L, Turner JR, Turner JR, Jacquez F, Raglin W, Reed G, et al. Fatalism. In: Gellman MD, Turner JR, editors. Encyclopedia of Behavioral Medicine [Internet]. New York, NY: Springer New York; 2013 [cited 2025 Mar 24]. p. 791–3. Available from: http://link.springer.com/10.1007/978-1-4419-1005-9_190
25. Clarke LH, Bennett EV. Constructing the moral body: Self-care among older adults with multiple chronic conditions. Health (London) [Internet]. 2013 May [cited 2025 Mar 24];17(3):211–28. Available from: https://journals.sagepub.com/doi/10.1177/1363459312451181
26. Masini A, Cherasco N, Conti A, Pighini I, Barone-Adesi F, Panella M. Preventive Pathways for Healthy Ageing: A Systematic Literature Review. Geriatrics [Internet]. 2025 Feb 18 [cited 2025 Mar 24];10(1):31. Available from: https://www.mdpi.com/2308-3417/10/1/31
27. Kulakçı-Altıntaş H, Ayaz-Alkaya S. Fatalism tendency and health beliefs about medication use in older adults: A predictive correlational design. Geriatric Nursing [Internet]. 2024 Jan [cited 2025 Mar 24];55:29–34. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0197457223002653
28. DiLoreto R, Murphy CT. The cell biology of aging. Bement W, editor. MBoC [Internet]. 2015 Dec 15 [cited 2025 Mar 24];26(25):4524–31. Available from: https://www.molbiolcell.org/doi/10.1091/mbc.E14-06-1084
29. Kenyon CJ. The genetics of ageing. Nature [Internet]. 2010 Mar 25 [cited 2025 Mar 24];464(7288):504–12. Available from: https://www.nature.com/articles/nature08980
30. National Institute on Aging. What do we know about Healthy Aging? [Internet]. 2022. Available from: https://www.nia.nih.gov/health/healthy-aging/what-do-we-know-about-healthy-aging
31. Kornadt AE, Kessler EM, Wurm S, Bowen CE, Gabrian M, Klusmann V. Views on ageing: a lifespan perspective. Eur J Ageing [Internet]. 2020 Dec [cited 2025 Mar 24];17(4):387–401. Available from: http://link.springer.com/10.1007/s10433-019-00535-9
32. Unsworth K, McKee K, Mulligan C. When does old age begin? The role of attitudes in age parameter placement. 2001 Jan 1;
33. Cote JE. Arrested Adulthood [Internet]. NYU Press. 2000 [cited 2025 May 29]. Available from: https://nyupress.org/9780814715987/arrested-adulthood/
34. Maung HH. What's my age again? Age categories as interactive kinds. HPLS [Internet]. 2021 Mar [cited 2025 May 29];43(1):36. Available from: http://link.springer.com/10.1007/s40656-021-00388-5
35. Previtali F, Spedale S. Doing age in the workplace: Exploring age categorisation in performance appraisal. Journal of Aging Studies [Internet]. 2021 Dec [cited 2025 May 29];59:100981. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0890406521000712
36. Edelstein S. Louisa May Alcott's Age. American Literature [Internet]. 2015 Sep 1 [cited 2025 May 29];87(3):517–45. Available from: https://read.dukeupress.edu/american-literature/article/87/3/517/5095/Louisa-May-Alcott-s-Age
37. Laslett P. The Third Age and the Disappearance of Old Age. In: Heikkinen E, Kuusinen J, Ruoppila I, editors. Preparation for Aging [Internet]. Boston, MA: Springer US; 1995 [cited 2025 May 29]. p. 9–16. Available from: http://link.springer.com/10.1007/978-1-4615-1979-9_2
38. Lianos M. 'OK Boomer.' European Societies [Internet]. 2020 Feb 1 [cited 2025 May 29];22(1):1–3. Available from: https://direct.mit.edu/euso/article/doi/10.1080/14616696.2020.1706886
39. Baltes PB, Smith J. New Frontiers in the Future of Aging: From Successful Aging of the Young Old to the Dilemmas of the Fourth Age. Gerontology [Internet]. 2003 [cited 2025 May 29];49(2):123–35. Available from: https://karger.com/article/doi/10.1159/000067946
40. Laslett P. A fresh map of life: the emergence of the Third Age. 1st Harvard University Press pbk. ed. Cambridge, Mass: Harvard University Press; 1991. 213 p.
41. World Health Organization, Health Care Team. World report on ageing and health. [Internet]. 2015. Available from: World Report on Ageing and Health - World Health Organization - Google Books

42. Michel JP, Dreux C, Vacheron A. Healthy ageing: Evidence that improvement is possible at every age. European Geriatric Medicine [Internet]. 2016 Jul [cited 2025 May 29];7(4):298–305. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1878764916300699
43. Weiland ven. Erik Erikson: Ages, Stages, and Stories on JSTOR [Internet]. 1993 [cited 2025 Mar 24]. Available from: https://www.jstor.org/stable/44878414
44. Warren L. John Rowe and Robert Kahn. 1997. Successful ageing. *The Gerontologist* , **37** (4), 433–440. Ageing and Society [Internet]. 1998 May [cited 2025 Mar 24];18(3):371–8. Available from: https://www.cambridge.org/core/product/identifier/S0144686X98236932/type/journal_article
45. Pruchno R, Heid AR, Genderson MW. Resilience and Successful Aging: Aligning Complementary Constructs Using a Life Course Approach. Psychological Inquiry [Internet]. 2015 Apr 3 [cited 2025 Mar 24];26(2):200–7. Available from: http://www.tandfonline.com/doi/full/10.1080/1047840X.2015.1010422
46. Ong AD, Bergeman CS, Boker SM. Resilience Comes of Age: Defining Features in Later Adulthood. Journal of Personality [Internet]. 2009 Dec [cited 2025 Mar 24];77(6):1777–804. Available from: https://onlinelibrary.wiley.com/doi/10.1111/j.1467-6494.2009.00600.x
47. Cosco TD, Kok A, Wister A, Howse K. Conceptualising and operationalising resilience in older adults. Health Psychology and Behavioral Medicine [Internet]. 2019 Jan 1 [cited 2025 Mar 24];7(1):90–104. Available from: https://www.tandfonline.com/doi/full/10.1080/21642850.2019.1593845
48. Cosco TD, Cooper R, Kuh D, Stafford M. Socioeconomic inequalities in resilience and vulnerability among older adults: a population-based birth cohort analysis. International Psychogeriatrics [Internet]. 2018 May [cited 2025 Mar 24];30(5):695–703. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1041610224016387
49. Marmot M, Wilkinson R, editors. Social Determinants of Health [Internet]. Oxford University Press; 2005 [cited 2025 May 29]. Available from: https://academic.oup.com/book/9987
50. Braveman P, Egerter S, Williams DR. The Social Determinants of Health: Coming of Age. Annu Rev Public Health [Internet]. 2011 Apr 21 [cited 2025 May 29];32(1):381–98. Available from: https://www.annualreviews.org/doi/10.1146/annurev-publhealth-031210-101218
51. National Academies of Sciences, Engineering, and Medicine (U.S.), Institute of Medicine (U.S.), Institute of Medicine (U.S.), editors. A framework for educating health professionals to address the social determinants of health. Washington, DC: National Academies Press; 2016. 1 p.
52. Suchecka J, Urbaniak B. Determinants Of Healthy Ageing For Older People In European Countries – A Spatio-Temporal Approach. CER [Internet]. 2017 Mar 30 [cited 2025 Mar 24];19(5):157–78. Available from: https://czasopisma.uni.lodz.pl/CER/article/view/1711
53. Baron M, Riva M, Fletcher C. The social determinants of healthy ageing in the Canadian Arctic. International Journal of Circumpolar Health [Internet]. 2019 Jan 1 [cited 2025 Mar 24];78(1):1630234. Available from: https://www.tandfonline.com/doi/full/10.1080/22423982.2019.1630234
54. Office of Disease Prevention & Health Promotion. Older Adults: Evidence-Based Resources [Internet]. Available from: https://odphp.health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults/evidence-based-resources
55. Abud T, Kounidas G, Martin KR, Werth M, Cooper K, Myint PK. Determinants of healthy ageing: a systematic review of contemporary literature. Aging Clin Exp Res [Internet]. 2022 Jun [cited 2025 May 29];34(6):1215–23. Available from: https://link.springer.com/10.1007/s40520-021-02049-w
56. World Health Organization. A conceptual framework for action on the social determinants of health. 2010 [cited 2025 May 29];76. Available from: https://iris.who.int/handle/10665/44489
57. Heller JC, Givens ML, Johnson SP, Kindig DA. Keeping It Political and Powerful: Defining the Structural Determinants of Health. Milbank Quarterly [Internet]. 2024 Jun [cited 2025 May 29];102(2):351–66. Available from: https://onlinelibrary.wiley.com/doi/10.1111/1468-0009.12695
58. Mikton C, De La Fuente-Núñez V, Officer A, Krug E. Ageism: a social determinant of health that has come of age. The Lancet [Internet]. 2021 Apr [cited 2025 Mar 24];397(10282):1333–4. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0140673621005249
59. Perez FP, Perez CA, Chumbiauca MN. Insights into the Social Determinants of Health in Older Adults. JBiSE [Internet]. 2022 [cited 2025 Mar 24];15(11):261–8. Available from: https://www.scirp.org/journal/doi.aspx?doi=10.4236/jbise.2022.1511023
60. Peel N, Bartlett H, McClure R. Healthy ageing: how is it defined and measured? Australas J Ageing [Internet]. 2004 Sep [cited 2025 Mar 24];23(3):115–9. Available from: https://onlinelibrary.wiley.com/doi/10.1111/j.1741-6612.2004.00035.x
61. Menassa M, Stronks K, Khatami F, Roa Díaz ZM, Espinola OP, Gamba M, et al. Concepts and definitions of healthy ageing: a systematic review and synthesis of theoretical models. eClinicalMedicine [Internet]. 2023

Feb [cited 2025 Mar 24];56:101821. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2589537022005508

62. Jackson SE, Hackett RA, Steptoe A. Associations between age discrimination and health and wellbeing: cross-sectional and prospective analysis of the English Longitudinal Study of Ageing. The Lancet Public Health [Internet]. 2019 Apr [cited 2025 Mar 24];4(4):e200–8. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2468266719300350
63. Allen J, Sikora N. Aging Stigma and the Health of US Adults Over 65: What Do We Know? CIA [Internet]. 2023 Dec [cited 2025 Mar 24];Volume 18:2093–116. Available from: https://www.dovepress.com/aging-stigma-and-the-health-of-us-adults-over-65-what-do-we-know-peer-reviewed-fulltext-article-CIA
64. Cesari M, Canevelli M, Amuthavalli Thiyagarajan J, Choi SE, Grushevska P, Kumar S, et al. Identification of research gaps to improve care for healthy ageing: **a scoping review**. Fam Med Com Health [Internet]. 2024 Oct [cited 2025 Mar 24];12(4):e003116. Available from: https://fmch.bmj.com/lookup/doi/10.1136/fmch-2024-003116
65. Longino CF, Murphy JW. The Old Age Challenge to the Biomedical Model: Paradigm Strain and Health Policy [Internet]. 1st ed. Hendricks J, editor. Routledge; 2020 [cited 2025 Mar 24]. Available from: https://www.taylorfrancis.com/books/9781351862837
66. World Health Organization, Health Care Team. WHO's work in the UN Decade of Heathy Aging [Internet]. Available from: https://www.who.int/initiatives/decade-of-healthy-ageing
67. Calder PC, Carding SR, Christopher G, Kuh D, Langley-Evans SC, McNulty H. A holistic approach to healthy ageing: how can people live longer, healthier lives? J Human Nutrition Diet [Internet]. 2018 Aug [cited 2025 Mar 24];31(4):439–50. Available from: https://onlinelibrary.wiley.com/doi/10.1111/jhn.12566
68. Rivadeneira MF, Mendieta MJ, Villavicencio J, Caicedo-Gallardo J, Buendía P. A multidimensional model of healthy ageing: proposal and evaluation of determinants based on a population survey in Ecuador. BMC Geriatr [Internet]. 2021 Nov 1 [cited 2025 Mar 24];21(1):615. Available from: https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-021-02548-5
69. Australian Government Department of Health and Aged Care. Positive ageing is ageing well [Internet]. Australian Government Department of Health and Aged Care; 2025 [cited 2025 Mar 24]. Available from: https://www.health.gov.au/topics/positive-ageing-is-ageing-well
70. Beard JR, Jotheeswaran AT, Cesari M, Araujo De Carvalho I. The structure and predictive value of intrinsic capacity in a longitudinal study of ageing. BMJ Open [Internet]. 2019 Nov [cited 2025 Mar 24];9(11):e026119. Available from: https://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2018-026119
71. World Health Organization, Health Care Team. Integrated care for older people: realigning primary health care to respond to population ageing [Internet]. 2018. Available from: https://iris.who.int/handle/10665/326295
72. Huang YCK, Braun KL. Elderhood and Healthy Aging from an Indigenous Perspective. IJERPH [Internet]. 2025 Jan 18 [cited 2025 Mar 24];22(1):123. Available from: https://www.mdpi.com/1660-4601/22/1/123
73. Whetung C. Undoing Structural Racism Among Indigenous Older Adults to Promote Health Equity [Internet]. 2024. Available from: https://generations.asaging.org/health-equity-undoing-structural-racism-ioas
74. Mace R, Vranceanu AM, Heffner K. Bridging Health Equity Gaps: cultural tailoring and community-based approaches with diverse older adults. Innovation in Aging [Internet]. 2024 Dec 31 [cited 2025 Mar 24];8(Supplement_1):269–269. Available from: https://academic.oup.com/innovateage/article/8/Supplement_1/269/7936887
75. Radermacher H, Feldman S. Cultural Diversity, Health and Ageing. In: O'Loughlin K, Browning C, Kendig H, editors. Ageing in Australia [Internet]. New York, NY: Springer New York; 2017 [cited 2025 Mar 24]. p. 83–101. (International Perspectives on Aging; vol. 16). Available from: http://link.springer.com/10.1007/978-1-4939-6466-6_6
76. Australian Institute of Health and Welfare. Older Australians [Internet]. 2024. Available from: https://www.aihw.gov.au/getmedia/73a6a317-b508-4ecc-834a-cb0a54378b9d/older-australians.pdf?v=20240702075543&inline=true.
77. ABS. Retirement and Retirement Intentions [Internet]. 2022. Available from: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/retirement-and-retirement-intentions-australia/latest-release>.
78. ABS. Causes of Death, Australia [Internet]. 2022. Available from: https://www.abs.gov.au/statistics/health/causes-death/causes-death-australia/2022
79. ABS. National Health Survey [Internet]. 2022. Available from: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey/2022

80. Australian Institute of Health and Welfare. Australian Institute of Health and Welfare. 2024 [cited 2025 Mar 24]. Older Australians, Health – status and functioning. Available from: https://www.aihw.gov.au/reports/older-people/older-australians/contents/health/health-status-and-functioning
81. ABS. Australian Institute of Health and Welfare. 2024 [cited 2025 Mar 24]. People with disability in Australia, Summary. Available from: https://www.aihw.gov.au/reports/disability/people-with-disability-in-australia/contents/summary
82. ABS. Disability, Ageing and Carers, Australia: Summary of Findings. [Internet]. 2022. Available from: https://www.abs.gov.au/statistics/health/disability/disability-ageing-and-carers-australia-summary-findings/latest-release.
83. ABS. Microdata,TableBuilder: National Aboriginal and Torres Strait Islander Health Survey, Australia [Internet]. 2025 [cited 2025 Mar 24]. Available from: https://www.abs.gov.au/statistics/microdata-tablebuilder/available-microdata-tablebuilder/national-aboriginal-and-torres-strait-islander-health-survey-australia
84. Australian Institute of Health and Welfare. Aged care in rural and remote Australia : Factsheet 2022-23 [Internet]. Available from: Aged-care-in-rural-and-remote-Australia_2022–23.pdf
85. Wakerman J, Humphreys JS. Sustainable workforce and sustainable health systems for rural and remote Australia. Medical Journal of Australia [Internet]. 2013 Jul [cited 2025 Mar 24];199(S5). Available from: https://onlinelibrary.wiley.com/doi/abs/10.5694/mja11.11639
86. Australian Institute of Health and Welfare. Australian Institute of Health and Welfare. 2021 [cited 2025 Mar 24]. Australian Burden of Disease Study: Methods and supplementary material 2018, About. Available from: https://www.aihw.gov.au/reports/burden-of-disease/abds-methods-supplementary-material-2018/contents/about
87. Australian Institute of Health and Welfare. Australian Institute of Health and Welfare. 2024 [cited 2025 Mar 24]. Chronic respiratory conditions: Chronic obstructive pulmonary disease. Available from: https://www.aihw.gov.au/reports/chronic-respiratory-conditions/copd
88. Australian Institute of Health and Welfare. Rural and remote health [Internet]. 2024 [cited 2025 May 29]. Available from: https://www.aihw.gov.au/reports/rural-remote-australians/rural-and-remote-health
89. ABS. Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2011 to 2031 [Internet]. 2024 [cited 2025 Mar 24]. Available from: https://www.abs.gov.au/statistics/people/aboriginal-and-torres-strait-islander-peoples/estimates-and-projections-australian-aboriginal-and-torres-strait-islander-population/latest-release
90. Australian Institute of Health and Welfare. Australian Institute of Health and Welfare. 2015 [cited 2025 Mar 24]. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples: 2015, Overview. Available from: https://www.aihw.gov.au/reports/indigenous-australians/indigenous-health-welfare-2015/contents/table-of-contents
91. ABS. Census of Population and Housing: Reflecting Australia - Stories from the Census, 2016 [Internet]. c=AU; o=Commonwealth of Australia; ou=Australian Bureau of Statistics; 2018 [cited 2025 Mar 25]. Available from: https://www.abs.gov.au/ausstats/abs@.nsf/mf/2071.0
92. ABS. Twenty years of population change [Internet]. 2020 [cited 2025 Mar 25]. Available from: https://www.abs.gov.au/articles/twenty-years-population-change
93. Elderly population | OECD [Internet]. [cited 2025 Mar 24]. Available from: https://www.oecd.org/en/data/indicators/elderly-population.html
94. Australian Government Department of Health and Aged Care. Primary care [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2025 Mar 25]. Available from: https://www.health.gov.au/topics/primary-care
95. Australian Institute of Health and Welfare. Feature Article: Ageing and the health system: challenges, opportunities and adaptations [Internet]. 2014. Available from: https://www.aihw.gov.au/getmedia/19dbc591-b1ef-4485-80ce-029ff66d6930/6_9-health-ageing.pdf.aspx
96. Owusu-Addo E, Ofori-Asenso R, Batchelor F, Mahtani K, Brijnath B. Effective implementation approaches for healthy ageing interventions for older people: A rapid review. Archives of Gerontology and Geriatrics [Internet]. 2021 Jan [cited 2025 Mar 24];92:104263. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0167494320302600
97. Calder R, Dunkin R, Rochford C, Nichols T. Australian health services: too complex to navigate: a review of the national reviews of Australia's health service arrangements. [Internet]. 2019. Available from: https://vuir.vu.edu.au/38684/1/Australian-Health-Services-Too-Complex-To-Navigate.pdf

98. Department of Health. Future focused primary health care: Australia’s Primary Health Care 10 Year Plan 2022-2032 [Internet]. 2022. Available from: https://www.health.gov.au/sites/default/files/documents/2022/03/australia-s-primary-health-care-10-year-plan-2022-2032.pdf
99. Coventry P, Lovell K, Dickens C, Bower P, Chew-Graham C, McElvenny D, et al. Integrated primary care for patients with mental and physical multimorbidity: cluster randomised controlled trial of collaborative care for patients with depression comorbid with diabetes or cardiovascular disease. BMJ [Internet]. 2015 Feb 16 [cited 2025 Mar 24];350(feb16 3):h638–h638. Available from: https://www.bmj.com/lookup/doi/10.1136/bmj.h638
100. The Commonwealth Fund. Healthcare Access for Older Adults Survey [Internet]. 2025 [cited 2025 May 29]. Available from: https://www.commonwealthfund.org/publications/surveys/2025/apr/access-quality-care-older-adults-10-countries-2024-survey
101. Henderson DAG, Donaghy E, Dozier M, Guthrie B, Huang H, Pickersgill M, et al. Understanding primary care transformation and implications for ageing populations and health inequalities: a systematic scoping review of new models of primary health care in OECD countries and China. BMC medicine [Internet]. 2023 Aug 24;21(1):319. Available from: https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=mnh&AN=37620865&site=ehost-live&custid=s1145751
102. Vidiawati D, Turana Y, Sundjaya T. The Role of Primary Health Care Toward Healthy Aging. AMNT [Internet]. 2021 Feb 5 [cited 2025 May 29];4(1SP):10. Available from: https://e-journal.unair.ac.id/AMNT/article/view/24168
103. Starfield B, Shi L, Macinko J. Contribution of Primary Care to Health Systems and Health. Milbank Quarterly [Internet]. 2005 Sep [cited 2025 May 29];83(3):457–502. Available from: https://onlinelibrary.wiley.com/doi/10.1111/j.1468-0009.2005.00409.x
104. Expert advisory panel. Review of General Practice Incentives. [Internet]. 2024. Available from: https://www.health.gov.au/our-work/review-of-general-practice-incentives
105. RACGP. the Guidelines for preventive activities in general practice (Red Book) 10th Edition [Internet]. 2024 [cited 2025 Apr 29]. Available from: https://www.racgp.org.au/getattachment/52e81aef-5dec-4cf3-a903-fd202246c65f/Guidelines-for-preventive-activities-in-general-practice.aspx
106. RACGP. RACGP aged care clinical guide (Silver Book) [Internet]. 2025 [cited 2025 May 29]. Available from: https://www.racgp.org.au/silverbook
107. Australian Government Department of Health and Aged Care [Internet]. Australian Government Department of Health and Aged Care; 2019 [cited 2023 Feb 20]. Managing chronic conditions. Available from: https://www.health.gov.au/topics/chronic-conditions/managing-chronic-conditions
108. PHN Cooperative. Supporting Healthy Ageing: The role of PHNs - White Paper [Internet]. [cited 2025 May 5]. Available from: https://www.wapha.org.au/wp-content/uploads/2022/04/Supporting-Healthy-Ageing.pdf
109. Federal Finanical Relations. Strengthening Medicare Supporting Older Australians [Internet]. 2024 [cited 2025 Jun 23]. Available from: https://federalfinancialrelations.gov.au/agreements/strengthening-medicare-supporting-older-australians
110. Australian Government Department of Health and Aged Care [Internet]. Australian Government Department of Health and Aged Care; 2019 [cited 2023 Feb 22]. National Strategic Framework for Chronic Conditions. Available from: https://www.health.gov.au/resources/publications/national-strategic-framework-for-chronic-conditions?language=en

Chapter 2: Literature search on healthy ageing in primary health care

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Aims and objectives of literature review

This literature review was undertaken to explore how primary care can support healthy ageing across the adult lifespan. The review investigated relevant published material available in the academic and grey literature to identify the systems, tools and interventions that enable older adults to maintain health, function and wellbeing over time. Informed by the World Health Organization's definition of healthy ageing as "the process of developing and maintaining the functional ability that enables wellbeing in older age" (1), the review adopts a lifespan approach (2) that prioritises prevention, early intervention and coordinated care delivery.

The scope of this review extends beyond individual clinical interventions. It includes analysis of the broader components necessary to embed healthy ageing within general practice. The findings of the literature search were structured into chapters on *screening***,** *interventions***,** *technology***,** *consumer and carer engagement, models of care***,** *workforce and measurement,* each contributing to an integrated approach in primary health care to maintaining and supporting the health and wellbeing of adults as they age. In writing these chapters, the underlying literature search results were then augmented with targeted supplementary searches, following a workshop with primary and integrated care practitioners hosted by Inala Primary Care.

The literature search is undertaken to answer the following key questions:

1. From a primary care (and/or community health) perspective, what are considered effective (clinically and cost effective) implementable best practice models of care to support healthy ageing in early, middle and older adult life stages?
2. What measures are used to evaluate these models of care?
3. What are the funding mechanisms required to implement these models of care?
4. What does success look like for these models of care?

The literature review was intended to reflect a comprehensive, inclusive and effective approach, from the perspective of primary care, to promoting healthy ageing across the adult life course. This involved understanding the multifaceted nature of ageing and the role of primary health care, including multidisciplinary team care, in promoting health and wellbeing and treating and managing health conditions that occur throughout adult life.

The intention of the literature search was to:

- incorporate both Australian and international research to identify contemporary best practice and emerging evidence;
- prioritise models of care aligned with primary care and current policy and health system drivers;
- lay the foundation for future implementation, including tools, workflows and evaluation frameworks.

Literature review strategy

This literature review followed an iterative strategy:

- define research questions using a Settings, Perspective, Intervention, Comparison and Evaluation (SPICE) framework (3);
- break down the key questions defined in the scope of the review into searchable concepts;
- search strategies were built using Boolean operators on literature databases;
- inclusion and exclusion criteria were applied to extract data and synthesise findings;

- secondary searches were undertaken for academic peer-reviewed literature and grey literature, acknowledging the distinct nature, strengths and limitations of each;
- a centralised citation database was established to manage retrieved sources and facilitate organisation, screening and referencing;
- references recommended by the project's steering group were used to supplement formal search results, incorporating practitioner and expert insight;
- reference tracing (backward citation tracking) was conducted when significant findings led to additional relevant sources that may not have been captured in the initial search.

This strategy ensured a robust approach, allowing the search process to evolve in response to gaps or additional search questions that emerged during the review.

Initially we used the PICO framework (4) as it is widely used in evidence-based medicine to structure clinical questions and guide literature searches, especially for quantitative and intervention-focused research as it helps break down a complex clinical question into searchable parts. However, given the extensive nature of the literature relevant to the purpose of this review, (including models of care, evaluation, workforce, funding and outcomes) and the centrality of the primary care setting, we adapted the SPICE framework (3) for our search. SPICE is also more appropriate to construct search strategies for qualitative and mixed-methods research questions, where frameworks like PICO (used for clinical trials) are less applicable.

Table 2.1. Definition of the SPICE framework and application to the literature search

SPICE Element	**Description**	**Applied to Healthy Ageing in Primary Health Care**
S – Setting	The physical, institutional, or contextual location of the intervention or study	Primary health care settings, such as GP clinics, community health centres, or family medicine practices
P – Perspective	The population or stakeholders affected or involved	Older adults, or primary care providers such as GPs, nurses, or allied health professionals
I – Intervention	The program, service, or issue being introduced or studied	Healthy ageing interventions– e.g., preventive care, physical activity, nutrition, or chronic disease management.
C – Comparison	An alternative to the intervention	Usual care, no intervention, or comparison with specialist or hospital-based care
E – Evaluation	The outcome(s) used to assess the intervention	Health-related outcomes such as physical function, independence, quality of life, or reduced frailty. Health-systems related outcomes such as cost-savings

Academic literature search and strategy

The following key concepts and search terms (Table 2.2) were the starting point before they were adapted to the corresponding MeSH and keywords internally used by various literature resources.

Table 2.2. Key concepts and search terms used

Concepts	**Search terms**
Primary care	"primary health care" OR "general practice" OR "family practice" OR "community health services" OR "integrated care" OR "multidisciplinary care" OR "team-based care" OR "patient-centered care"
Healthy ageing	"healthy ageing" OR "healthy aging" OR "ageing in place" OR "active ageing" OR "successful ageing" OR "geriatric care"
Screening/intervention	"screening" OR "risk assessment" OR "health screening" OR "early detection" OR "assessment tools" OR "preventive health services" OR "health promotion" OR "chronic disease prevention" OR "frailty prevention" OR "falls prevention" OR "dementia prevention"OR “Multimorbidity Management” OR “Social Prescribing” OR “Frailty Prevention”
Models of care	“models of care” OR "care delivery models" OR "integrated care" OR "coordinated care" OR "shared care" OR " cross collaboration" OR "multidisciplinary care" OR "team-based care" OR "primary-specialist integration"
Population	"older adults" OR "older people" OR "aged" OR "elderly" OR "senior citizens" OR "early older age" OR "middle older age" OR "advanced older age"
Evaluation and outcomes	"health outcomes" OR "clinical outcomes" OR "patient-reported outcomes" OR "quality of life" OR "program evaluation" OR "service evaluation" OR "effectiveness" OR "cost-effectiveness" OR "health impact" OR "health equity"

Databases and sources utilised

- PubMed/MEDLINE – Clinical research on ageing and primary care.
- Scopus – Broad multidisciplinary research, including policy and health systems.
- CINAHL – Nursing and allied health models of care.
- PsycINFO – Behavioural and psychological approaches to healthy ageing.
- Cochrane Library – Systematic reviews and evidence-based care models.
- Web of Science – High-impact research across public health and policy domains.
- Google Scholar – Supplementary academic source.

Inclusion and exclusion criteria

Included:

- Peer-reviewed journal articles, systematic reviews, meta-analyses.
- Studies published within the last 15 years.
- Focus on primary care-based interventions for ageing populations.

Excluded:

- Studies focusing only on institutional care (e.g., nursing homes).
- Articles not relevant to primary care models.
- Does not fit the SPICE framework

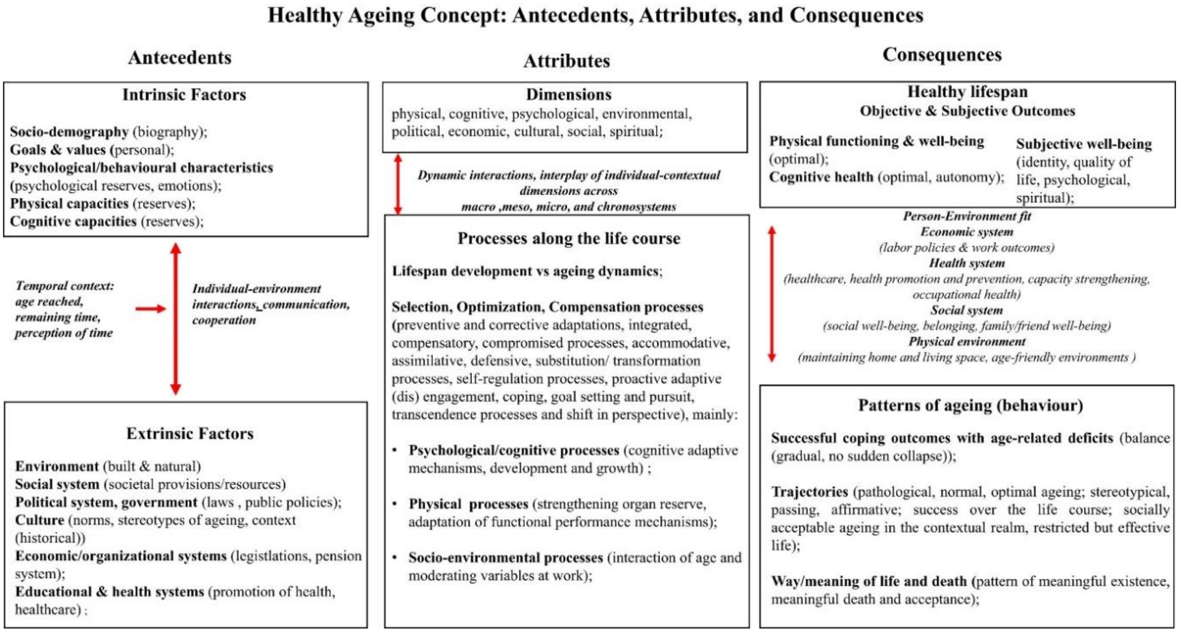
Challenges in conducting a literature review on Healthy Ageing

A literature review focused on the *evidence of how to promote and support healthy ageing* is inherently complex, largely because healthy ageing is not merely the avoidance of disease, it embodies a multifaceted, evolving concept shaped by biological, psychological, social and environmental dimensions. There are several aspects of this that made this literature search challenging from the outset:

Multidimensionality and conceptual ambiguity of healthy ageing

Healthy ageing is characterised by a multiplicity of dimensions spanning physical, cognitive, psychological, social and environmental domains with no universally accepted definition. A systematic review noted the vast heterogeneity in how "healthy ageing" is defined and operationalised, highlighting the absence of clarity in its theoretical foundations (5). Additionally, another recent synthesis organised empirical evidence into three core dimensions - intrinsic capacity, functional ability and the environment - revealing substantial variability and methodological gaps, particularly in environmental measures (6). Figure 1 shows what leads to ageing and what results from it, highlighting that ageing is shaped by how people adapt and develop through life in interaction with their surroundings (5). This breadth of interpretation makes it exceedingly difficult to identify and include all relevant studies into a coherent review framework.

Figure 2.1. Antecedents, attributes, and consequences of ageing



Rich diversity of models and frameworks

Scholarly models of healthy or positive ageing are diverse and, like health, might not be fully unified under a single model (7). A systematic review identified 65 models across 59 papers, covering a range of dimensions including cognitive, psychological, physical, social, environmental, spiritual, economic, cultural, political, and demographic factors (5). The authors summarised these models into 3 types with 2 subtypes:

Box 2.1. Types of Healthy Ageing Models (5)

Type 1: Health outcomes model

Healthy ageing as a multidimensional concept is the outcome of dynamic interactions between intrinsic (individual) and extrinsic (contextual) resources to prolong healthy life expectancy and well-being described at one point in life.

Type 2: Adaptations throughout the life course

Healthy ageing as a multidimensional concept is based on lifelong dynamic interactions between intrinsic (individual) and extrinsic (contextual) resources, employing adaptive processes to changes occurring with ageing to maintain an optimal quality of life and well-being at the personal, family, and social levels.

Sub-Type 2.1 Person-environment congruence

Healthy ageing as a multidimensional concept is based on lifelong dynamic interactions between intrinsic (individual) and extrinsic (contextual) resources, employing adaptive processes to changes occurring with ageing to maintain an optimal quality of life and well-being at the personal, family, and social levels, manifested through person-environment congruence.

Type 3: Adaptations throughout the life course and health outcomes

Healthy ageing as a multidimensional concept is based on lifelong dynamic interactions between intrinsic (individual) and extrinsic (contextual) resources, employing adaptive processes to changes occurring with ageing to prolong healthy life expectancy and maintain an optimal quality of life and well-being at the personal, family, and social levels.

Sub-Type 3.1: Health Promotion

Healthy ageing as a multidimensional concept is based on lifelong dynamic interactions between intrinsic (individual) and extrinsic (contextual) resources, employing adaptive processes through health promotion activities and empowerment to changes occurring with ageing to prolong healthy life expectancy and maintain an optimal quality of life and well-being at the personal, family, and social levels.

Whilst healthy ageing in primary care might be viewed initially under the health outcomes (Type 1) model, interventions to promote healthy ageing are better conceptualized under the health promotion (Type 3.1) model. Similarly, integrative reviews of “successful ageing” have identified five core categories, social well-being, psychological well-being, physical health, spirituality/transcendence and environmental/economic security - further emphasising the concept’s expansiveness (8). This diversity of frameworks complicates synthesis, as studies frequently rely on different conceptual underpinnings and outcome measures and often don’t disclose explicitly their understanding of healthy ageing.

Inconsistent measures and operationalisation

Even when studies target similar dimensions, they often employ disparate measurement tools or forms of operationalisation. For instance, recent work employing the World Health Organization’s framework organised healthy ageing into 84 thematic sub-domains across intrinsic capacity, functional ability and environment. It also highlighted that environmental factors are especially under-represented in current measures (6). Moreover, across longitudinal datasets, intrinsic capacity is captured through varied constructs (psychological, sensory, cognitive, vitality, locomotor) while functional ability and its interplay with environment are inconsistently defined (9). Such inconsistency makes cross-study comparisons and ultimately synthesis methodologically challenging.

Cross-disciplinary nature and heterogeneous methods

Research into healthy ageing draws from gerontology, public health, psychology, sociology, epidemiology and policy studies - each with its own methodological norms. Some studies utilise quantitative biomarkers or functional tests, while others rely on subjective wellbeing measures or qualitative insights. Integrative reviews suggest optimal definitions would include functional capacities, psychosocial abilities, environmental factors and subjective assessments. However, these are rarely simultaneously addressed in a single empirical study (10).

Increasingly, ageing scores are being used in epidemiological studies to characterise the health status of a population. These scores typically include, in addition to chronological age, sex, some measure of ethnicity, lifestyle factors, body composition and the presence of chronic diseases as well as other quantifiable phenotypical or clinical data (11). However, low equivalence among biological ageing measures observed in some studies indicates that each captures distinct aspects of the ageing process. (12). This disciplinary fragmentation complicates efforts to integrate findings into a comprehensive literature review.

Dynamic, life course and contextual complexity

Healthy ageing is profoundly shaped by lifelong trajectories, contextual adaptations and social determinants. Conceptual frameworks increasingly stress person–environment interactions across the life course, adaptations and empowerment processes. Longitudinal work using Bayesian network methods to represent the probabilistic relationships between various healthy ageing variables has shown how health behaviours dynamically influence multiple dimensions (health, social, mental domains) and life satisfaction over time (13). Capturing such dynamic, temporal interdependencies in a literature review adds another layer of complexity beyond static, cross-sectional analyses.

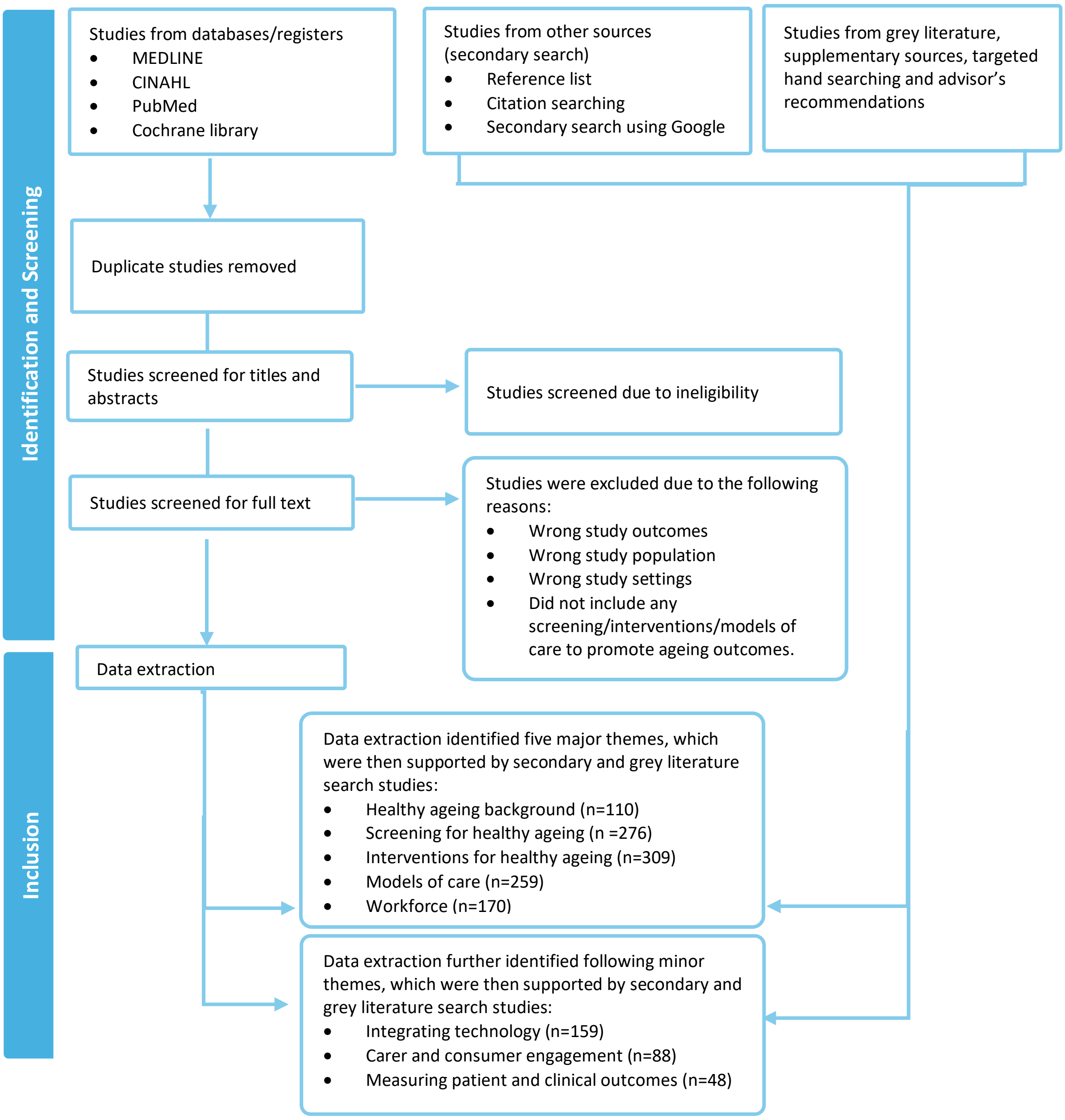
Academic literature search process and output

All citations retrieved from the selected databases were imported into the reference management software *Zotero,* where they were screened for duplicates. Following de-duplication, the study team used *Covidence,* a web-based software to streamline research process, to manage the initial screening process. Titles and abstracts were independently reviewed by two authors against the inclusion criteria, followed by full-text screening of potentially relevant articles. Discrepancies were resolved through discussion among the reviewers. A central database of eligible studies was established within Covidence to facilitate a systematic approach to data extraction and thematic synthesis, ensuring consistency and rigour throughout the review process.

After several refinements of the search terms and Boolean combinations, the search retrieved a very large body of literature for final data extraction. However, because of the complexities described above, despite the size of the literature pool already retrieved, significant gaps were becoming evident when analysing the output. Following the workshop in which results of the first search were presented, together with feedback from the expert advisors to the project team, a strategy was implemented to stratify (compartmentalise) extensive secondary searches within the main topics of interest that formed the various chapters of this literature review (as listed in figure 2.2). These supplementary strategies helped in identifying academic studies/research that may not be indexed in traditional databases; or are difficult to locate due to inconsistent terminology; or exist in formats outside of peer-reviewed journals.

The number of records retrieved, screened and included at each stage was documented using an article selection flow chart (Figure 2.2)

Figure 2.2. Article selection process - flow chart



Studies from databases/registers
- MEDLINE
- CINAHL
- PubMed
- Cochrane library

Studies from other sources (secondary search)
- Reference list
- Citation searching
- Secondary search using Google

Studies from grey literature, supplementary sources, targeted hand searching and advisor's recommendations

Duplicate studies removed

Studies screened for titles and abstracts

Studies screened due to ineligibility

Studies screened for full text

Studies were excluded due to the following reasons:
- Wrong study outcomes
- Wrong study population
- Wrong study settings
- Did not include any screening/interventions/models of care to promote ageing outcomes.

Data extraction

Data extraction identified five major themes, which were then supported by secondary and grey literature search studies:
- Healthy ageing background (n=110)
- Screening for healthy ageing (n =276)
- Interventions for healthy ageing (n=309)
- Models of care (n=259)
- Workforce (n=170)

Data extraction further identified following minor themes, which were then supported by secondary and grey literature search studies:
- Integrating technology (n=159)
- Carer and consumer engagement (n=88)
- Measuring patient and clinical outcomes (n=48)

Grey literature search and strategy

Grey literature is an extensive but valuable resource for understanding the system design and policy landscape of healthy ageing in Australia. Unlike peer-reviewed sources, grey literature is aptly defined as 'that which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers, i.e., where publishing is not the primary activity of the producing body' (14). These sources, including but not limited to government reports, policies, newsletters, frameworks, strategies, community programs, commissioned research, conferences and evaluations often provide practical perspectives, lived experiences and real-world insights that formal academic literature may overlook (15,16).

Synthesising grey literature in evidence reviews for policy development and national strategies plays a crucial role in strengthening the overall quality, relevance and applicability of findings with the added benefit of providing more timely and current published information (16). By incorporating diverse sources that are less likely to be published in peer-reviewed journals, including those with null or non-significant results, grey literature helps to reduce publication bias and present a more balanced and complete evidence base. It can assist academics, policymakers and health professionals to gain a comprehensive understanding of available interventions and their outcomes, while also highlighting areas requiring further development (15,16). Moreover, grey literature often offers valuable contextual insights into how, why and for whom interventions are effective, ensuring that public health decision-making is based on a complete and inclusive body of knowledge (16).

Academic literature is often acknowledged to lag behind contemporary innovation in primary care by several years, underscoring the critical role of grey literature in capturing emerging practices, policy shifts and real-world applications as they unfold (16). Recognising this, the specific objective of the search strategy for this review was to capture non-academic resources produced and/or implemented within the last ten years from both national and international sources. This approach aligned with the overarching objective of identifying, synthesising and appraising models, frameworks and strategies supporting healthy ageing across the life course.

Grey literature is multifaceted in nature, requiring a structured yet flexible approach for the search strategy that was carefully refined throughout the process. Within Australia, there are several established grey literature databases, notably TROVE, an online, free to access, research portal provided by the National Library of Australia and Australian Policy Online (APO) formerly the Analysis and Policy Observatory (17,18). These databases, whilst extensive, are very broad in their coverage. This search therefore applied a customised Google Advanced Search method utilising targeted search terms. This was complemented with two additional approaches: supplementary searching and reverse searching to ensure comprehensive coverage.

Primary search method: Google advanced search (Australian and International)

A structured and targeted grey literature search was conducted using Google Advanced Search, applying predefined search terms, Boolean operators, and filters to maximise the relevance of results.

Table 2.3. Google Advanced Search terms and filters applied

Search parameter	Applied terms/filters
All these words	"healthy ageing" "health promotion" "primary care"
Exact phrase	"Integrated care"
Any of these words	ageing OR aging OR older OR adults OR prevention
None of these words (international only)	gov.au, org.au, edu.au, .au

Table 2.4. Google Advanced Search filters by region

Filter	***Australia only***	***International only***
Region	Australia	Any region
Site/domain	gov.au, org.au, edu.au, .au	None
File type	PDF	PDF
Language	Any	English
Date Range	2015- 2025	2015-2025

Secondary search method: supplementary sources and reverse search

Although Google Advanced Search is a powerful tool for grey literature retrieval, it has known limitations, including difficulties in surfacing deeply embedded content and inconsistent indexing of government and NGO publications. To address these limitations, supplementary and reverse searches were conducted to ensure comprehensive coverage and inclusion of documents from known authoritative sources.

Supplementary Search and Sources

This refers to non-peer reviewed materials that are identified outside of a systematic database or structured search methods. These sources are discovered through expert recommendations, handsearching, media reports, professional networks and organisational websites rather than formal indexing in academic databases.

Supplementary grey literature includes:

- expert recommendations;
- scanned reports from academic or institutional repositories;
- handsearching organisational websites and government portals;
- clinical Guidelines (i.e. RACGP Silver Book and Red Book);
- reverse searching (citation chasing).

Inclusion and exclusion criteria

Eligible grey literature included government reports, policy briefs, white papers, conference proceedings and unpublished reports produced within the past ten years (2015–2025). These included resources focused on healthy ageing initiatives within primary care settings, specifically addressing preventative health, risk identification, chronic disease management, ageing-in-place care, integrated care models, screening processes and interventions supporting healthy ageing.

Eligible sources targeted adult populations approximately 45 years and older, with an emphasis on individuals living independently at home and serviced by primary care providers. Outcomes of interest included evidence of clinically and cost-effective primary care practices promoting healthy ageing.

Sources were excluded if they were peer-reviewed academic articles (unless presented in a grey literature format such as a non-peer-reviewed thesis or report), focused exclusively on institutional aged care settings (e.g., nursing homes), targeted populations under 35 years, or focused narrowly on specific diseases or end-of-life care models.

Given the breadth and complex nature of grey literature, a set of guiding questions was developed to assist with the search and selection process:

1. *How does grey literature contribute to our understanding of healthy ageing within the context of primary healthcare services?*
2. *Specifically, what insights do government reports, public health strategies, and white papers provide on the integration of screening, intervention, and models of care that support healthy ageing?*
3. *How is this effective within a primary healthcare setting?*

These questions provided a framework for refining the search strategy and filtering retrieved sources, ensuring a focused and systematic approach to the identification of relevant literature.

Grey literature search output

A total of 825 grey literature records were identified through Google Advanced Search, comprising 574 national and 251 international sources. After removing duplicates, non-grey literature and sources that did not meet the inclusion criteria, 296 records remained for screening. An additional 75 documents were retrieved via supplementary and reverse search methods, including expert recommendations and targeted handsearching. These supplementary sources did not require the same level of de-duplication and were added directly for eligibility assessment.

Challenges and reflections on grey literature searching

Despite a structured approach, several methodological challenges were encountered during the grey literature search process, particularly in using Google Advanced Search and navigating grey literature repositories.

Google Advanced Search limitations

A Google Advanced Search may indicate that thousands of results have been found; however, results are usually presented as capped at 10 per page. While there is a technical option within the *Advanced Search* or standard Search Settings menus to increase results to 100 per page, this was not readily applied through the user interface. This limited Data Miner's ability to extract high-volume records and contributed to constraints in batch exporting.

Although Google Search is a valuable tool for identifying grey literature sources, particularly web content and reports, it is not an objective platform. It personalises search results, covertly using the user's computer-inked information on location and search history (19), potentially limiting the depth of the search and missing relevant literature. However, Google's search algorithms are designed to prioritise the most relevant, high-quality content through factors such as the relevance of keyword search terms, source authority, user engagement and content quality. In practice, this means that the pertinent grey literature is usually identified within the search parameters.

Absence of a centralised repository for grey literature

The second challenge was the absence of dedicated grey literature repositories. While Australia has platforms such as TROVE and the APO, there is no comprehensive, centralised repository that functions like an academic database, with targeted filters and structured indexing to support a thorough and efficient search process. While this issue presented a clear frustration during the search process, it also highlights an opportunity for development of a dedicated, user-friendly grey literature repository of the healthy ageing literature. Such a platform could improve accessibility, transparency and evidence-informed policy by providing a central hub for non-academic yet policy and practice relevant resources.

Non-indexed and unsearchable material

A significant amount of potentially relevant grey literature is not indexed in searchable formats, meaning even targeted Boolean or domain-specific searches may miss valuable documents. Resources buried in PDFs or behind website navigation menus often remained hidden unless manually uncovered.

Strategies to reduce bias and increase comprehensiveness

To mitigate these limitations, multiple complementary strategies were used. This included a structured Google Advanced Search with refined filters, handsearching of relevant organisational websites, expert consultations, and reverse citation tracking. The inclusion of supplementary sources aimed to capture documents missed by algorithmic limitations.

References

1. World Health Organization. World report on ageing and health [Internet]. Geneva: World Health Organization; 2015 [cited 2025 May 29]. Available from: https://iris.who.int/handle/10665/186463
2. Beard JR, Officer A, De Carvalho IA, Sadana R, Pot AM, Michel JP, et al. The World report on ageing and health: a policy framework for healthy ageing. The Lancet. 2016 May;387(10033):2145–54.
3. Booth A. Clear and present questions: formulating questions for evidence based practice. Cleyle S, editor. Libr Hi Tech. 2006 July 1;24(3):355–68.
4. Richardson WS, Wilson MC, Nishikawa J, Hayward RS. The well-built clinical question: a key to evidence-based decisions. ACP J Club. 1995;123(3):A12-13.
5. Menassa M, Stronks K, Khatami F, Roa Díaz ZM, Espinola OP, Gamba M, et al. Concepts and definitions of healthy ageing: a systematic review and synthesis of theoretical models. eClinicalMedicine. 2023 Feb;56:101821.
6. Piriu AA, Bufali MV, Cappellaro G, Compagni A, Torbica A. Conceptualisation and measurement of healthy ageing: Insights from a systematic literature review. Soc Sci Med. 2025 June;374:117933.
7. Haverkamp B, Bovenkerk B, Verweij MF. A Practice-Oriented Review of Health Concepts. J Med Philos Forum Bioeth Philos Med. 2018 July 9;43(4):381–401.
8. Zanjari N, Sharifian-sani M, Hosseini-Chavoshi M, Rafiey H, Mohammadi-Shahboulaghi F. Successful aging as a multidimensional concept: An integrative review. Med J Islam Repub Iran. 2017 Dec 30;31(1):686–91.
9. Gao J, Xu J, Chen Y, Wang Y, Ye B, Fu H. Development and Validation of a Multidimensional Population-Based Healthy Aging Scale: Results From the China Health and Retirement Longitudinal Study. Front Med. 2022 Feb 14;9:853759.
10. Zamudio-Rodríguez A, Dartigues JF, Amieva H, Pérès K. A Literature Review of Healthy Aging Trajectories Through Quantitative and Qualitative Studies: A Psycho-Epidemiological Approach on Community-Dwelling Older Adults. J Frailty Aging. 2021 July;10(3):259–71.
11. Silva N, Rajado AT, Esteves F, Brito D, Apolónio J, Roberto VP, et al. Measuring healthy ageing: current and future tools. Biogerontology. 2023 Dec;24(6):845–66.
12. Vetter VM, Kalies CH, Sommerer Y, Spira D, Drewelies J, Regitz-Zagrosek V, et al. Relationship Between 5 Epigenetic Clocks, Telomere Length, and Functional Capacity Assessed in Older Adults: Cross-Sectional and Longitudinal Analyses. Le Couteur D, editor. J Gerontol Ser A. 2022 Sept 1;77(9):1724–33.
13. Zhang J, Zhang Y, Wu Z, Fu X. Enhancing understanding of healthy aging based on time-varying dependencies among multidimensional health, life satisfaction, and health behaviors of older adults aged 60 years and over. BMC Public Health. 2024 Jan 16;24(1):192.
14. Finding and Using Health Statistics [Internet]. [cited 2025 May 19]. Available from: https://www.nlm.nih.gov/oet/ed/stats/03-600.html
15. Paez A. Gray literature: An important resource in systematic reviews. J Evid-Based Med. 2017 Aug;10(3):233–40.
16. Adams J, Hillier-Brown FC, Moore HJ, Lake AA, Araujo-Soares V, White M, et al. Searching and synthesising ‘grey literature’ and ‘grey information’ in public health: critical reflections on three case studies. Syst Rev. 2016 Sept 29;5(1):164.
17. Search - Trove [Internet]. [cited 2025 May 20]. Available from: https://trove.nla.gov.au/search
18. Analysis & Policy Observatory | APO [Internet]. [cited 2025 May 20]. Available from: https://apo.org.au/
19. Heavey N. LibGuides: Grey Literature Guide: Google Advanced Search [Internet]. [cited 2025 Aug 18]. Available from: https://guides.lib.sussex.ac.uk/grey-literature/google

Chapter 3: Screening and assessment tools for healthy ageing across the adult life course

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Background

Identifying pre-conditions and onset of chronic diseases at an early stage is crucial for slowing or stopping disease progression, avoiding preventable complications and enabling earlier, more effective treatment. However, the current health system remains largely focused on managing acute and existing illnesses, with less emphasis on promoting prevention, risk assessment and early detection (1).

Early detection strategies, including screening or case finding, contribute to improved health outcomes and reduced mortality rates (2). Screening refers to a routine procedure or medical examination undertaken for individuals, regardless of whether they show signs of illness. The World Health Organization defines screening as “the presumptive identification of unrecognised disease in an apparently healthy, asymptomatic population by means of tests, examinations or other procedures that can be applied rapidly and easily to the target population” (2). Case finding (mostly referred to as opportunistic screening in this chapter) is the examination of an individual or group suspected of having, or at risk of, a condition. Case finding is a targeted approach to identifying conditions in a select group of patients who may or may not already have symptoms (3).

In Australia, general practice and associated primary care services are the primary settings responsible for delivering most screening programs (4). To support best practice, the Royal Australian College of General Practitioners (RACGP) has developed three clinical guidelines, the *Red Book 10th edition (2024)*, the *Silver Book 5th edition*. (2019) *and the Green Book Third edition. (2018*). The *Red Book* (*Guidelines for Preventive Activities in General Practice*) provides evidence-based recommendations for preventive screening, case finding and prevention across the life course, with emphasis on the early identification and management of risk factors and chronic conditions in older adults (5). The *Silver Book* (*Guidelines for the Care of Older Persons in General Practice*) complements it by offering practical guidance on managing older people’s complex and multi-dimensional health needs (6). The Green Book (*Putting Prevention into Practice*) serves as a practical implementation guide, helping general practices integrate preventive activities into their routine care (7). Together, these resources support proactive, preventive approaches that promote healthy ageing and early disease detection.

An international study identified persistent barriers in implementing screening services in primary care, such as inadequate reimbursement, limited training and concerns from clinicians about the added strain on staff time and resources (8). Australian primary care providers identified similar barriers affecting their implementation of comprehensive screening or health assessments within their practices (9). The most reported barriers to screening practices among general practitioners are a lack of time, financial and structural factors, high workloads and competing clinical demands. These pressures often result in comprehensive assessments being de-prioritised in favour of addressing more acute clinical needs (9,10). Additional challenges include limited training, weak referral networks, concerns over high false-positive rates of screening tools and the fear that screening may negatively affect patient relationships (8).

Evidence suggests that primary care practices require screening tools that are valid, reliable, brief, easy to administer, free and readily accessible (11). When such tools are used effectively, they enable early detection of health issues, allowing for timely intervention that can prevent or reduce symptoms and complications. This approach not only enhances individual and population health outcomes but also offers a cost-effective strategy for healthcare delivery (12).

This chapter reviews a selection of practical screening tools and health assessments drawn from both international and national academic and grey literature. These tools are for managing and early identification of widespread age-related conditions, such as cardiovascular diseases, cancer, dementia and COPD and under-recognised physiological ageing transitions that can affect health and quality of life, such as hearing and vision loss, menopause and nocturia. These tools also screen for complex age-related conditions identified by the World Health Organization as "geriatric syndromes" that do not align with single-disease categories but are major drivers of disability, physical function and care needs in older adults (13). These tools have been developed, validated and implemented across various countries and settings and are shown to be easy to administer, patient- and clinician-friendly and can be easily integrated into workflows, including in waiting areas or prior to consultations, however the clinical application of these tools needs to be decided by the clinician, based on evidence, their experience, clinical workflows and patient needs.

This chapter also identifies relevant guidelines for general practice provided by the RACGP Red and Silver Books. The broader landscape of available international evidence on screening practices and tools relevant to preventive health assessments, where applicable, is compared with current RACGP recommendations to identify alignment and potential divergence. This evidence-informed approach is intended to support discussion on the utility, feasibility and clinical relevance of contemporary screening tools and resources.

Screening for immunisation

Older people are particularly vulnerable to serious illness and death from vaccine-preventable diseases such as influenza, pneumococcal disease and herpes zoster (shingles) (14). The AIHW has shown that, in 2015, premature death accounted for around 80% of the total burden from vaccine-preventable diseases in Australia, with influenza alone responsible for over one-third (36%) of this burden. The highest rates of vaccine-preventable disease burden were observed in infants and in adults aged 85 years and older, reflecting the vulnerability of both ends of the age spectrum. Indigenous Australians accounted for 10% of the total burden (15).

A growing number of vaccines are now recommended for use in adults and older people, as outlined in the Australian Immunisation Handbook (14). These include vaccines funded through the National Immunisation Program (NIP), workplace programs or state and territory health services. Recommended vaccines include (16), but are not limited to:

- influenza and COVID-19;
- pneumococcal disease;
- shingles;
- tetanus;
- pertussis.

Immunisation in later life plays a critical role in maintaining independence and quality of life (17). General practitioners and primary care workers are key to identifying missed vaccinations and providing opportunistic immunisation during routine consultations.

Electronic immunisation register and recall systems

The Australian Immunisation Register (AIR) maintains vaccination records. This register contains childhood vaccination records dating back to 1996, when it was first established. However, it did not begin recording adult immunisation data until 2016, when it was expanded into a whole-of-life register. As a result, AIR generally does not include adult vaccination records given prior to 2016 unless they were manually entered by a healthcare provider (18).

General practitioners can access and update immunisation records via Health Professional Online Services (HPOS) or Provider Digital Access (PRODA). Many clinical software systems, such as Best Practice, integrate with AIR, allowing providers to review real-time immunisation histories; receive automated prompts for due or overdue vaccines and print Immunisation History Statements (18,19). It is also possible for GPs to request patients to provide their immunisation statement, which the individual can access via their myGov account (18).

Despite these capabilities, immunisation record keeping and recall processes remain fragmented across general practices, with inconsistent use of digital tools and limited coordination. The involvement of multiple providers, such as workplace programs and pharmacies, has contributed to gaps in patient records. According to the Immunisation Coalition, *"a decentralised healthcare system makes it difficult to collect data,"* which highlights the need for better coordination and integration of immunisation information (20). Mandatory reporting of all NIP-funded vaccinations to the AIR commenced in July 2021, prior to this, reporting was mandatory for childhood vaccines but voluntary for adults, resulting in underreporting of up to 50% for adult immunisation histories (16). To address this gap, the *Immunisation Coalition White Paper* recommends a series of coordinated actions, including (16):

- Monitoring adult vaccination coverage through AIR data to inform policy development.
- Introducing key performance indicators for adult vaccination rates within the National Partnership Agreement on Essential Vaccines.
- Benchmarking adult vaccination coverage across Primary Health Networks, with tailored support to providers to overcome barriers.
- Encouraging the use of clinical tools such as My Health Record and PneumoSmart (vaccination tool for pneumococcal disease) to support vaccination decision-making and timely reminders.
- Expanding routine vaccination services, particularly for medically at-risk groups.
- Providing flexible funding to support local program design by states, territories, and PHNs.
- Launching a national public health campaign to promote adult immunisation as a core component of preventive health.

Improved reporting and monitoring of immunisation data, coupled with systematic recall and provider support, is essential to increasing adult vaccination rates. These system-level improvements will help inform strategies, set targets for vaccination rates and evaluate the effectiveness of new initiatives (16).

HALO Principle

The Australian Immunisation Handbook has established the HALO principle - *Health, Age, Lifestyle, Occupation,* which encourages healthcare professionals to systematically assess immunisation needs based on individual factors and risks rather than age-based schedules alone (21). The HALO framework is especially useful in primary care, where time is limited and opportunistic assessments (e.g. during check-ups or chronic disease reviews) can ensure eligible patients are provided with:

- catchup vaccinations and
- risk-based immunisations.

GPs are encouraged to use the National Immunisation Program Schedule to guide these assessments and interventions (22).

Laboratory testing

Where there is no clear immunisation record, laboratory testing can help determine if a person has immunity from past infection or vaccination and guide catch-up vaccination. This may include serology, antigen detection or PCR, depending on the disease However, immunity testing is only reliable for certain diseases. GPs are recommended to consult the Australian Immunisation Handbook for disease-specific guidance (23).

Screening for overall health and wellbeing

Preventive health assessments

Countries such as Australia and the United Kingdom (UK) have implemented publicly funded health assessments to identify risk factors in priority populations, enhance preventative care and promote healthy ageing (9).

In Australia, there are several health assessments (HAs), funded through the Medicare Benefit Schedule (MBS), enabling general practitioners to provide comprehensive health checks for all adults through the ageing lifecycle (9).

For non-Indigenous Australians aged over 75, this includes the annual 75+ Health Assessment (75+HA) and the Aboriginal and Torres Strait Islander Health Assessment (ATSIHA) for Indigenous Australians of all ages (9). To enable earlier identification of chronic disease risks, a once-only 45–49-year-old Medicare-funded health check was introduced in 2006, targeting early detection of cardiovascular risk factors in middle-aged adults (24). Additionally, the Type 2 Diabetes Risk Evaluation is available for eligible patients aged 40–49, involving diabetes risk assessment and intervention when needed (25). A Heart Health Check is claimable every 12 months and is undertaken in a 20-minute GP consultation to assess individual risk of a heart attack or stroke in the next five years (26).

There are other time-tiered health assessments specific to priority groups, such as refugee health assessments that are designed to identify physical, emotional and social needs arising from the refugee experience and to facilitate appropriate healthcare interventions (27), and the residential aged care facility's Comprehensive Medical Assessment (CMA), which is an annual Medicare-funded health check for permanent aged care residents, supporting proactive care planning through a comprehensive review of physical, cognitive and social health (28).

To support time-tiered health assessments and promote the early detection of modifiable risk factors and chronic diseases, the RACGP's suite of preventive care guidelines, including the *Red Book*, *Green Book* and *Silver Book*, remain the most prominent and widely used resources in Australian general practice.

The RACGP also developed SNAP guidelines focused on Smoking, Nutrition, Alcohol and Physical activity, which help identify key lifestyle-related risk factors (smoking, obesity, poor nutrition, hazardous drinking and poor physical activity). These modifiable risks often overlap throughout the life course and are strongly linked to chronic disease and premature mortality (29). The SNAP guidelines employ the 5As framework (Ask, Assess, Advise, Assist, Arrange) to guide GPs and practice staff in supporting patients to make sustainable lifestyle changes (30). The SNAP guidelines remain available as a standalone resource from the RACGP, with the most recent edition published in 2015. This guideline remains a useful tool for addressing specific lifestyle risk factors within general practice (30). However, for comprehensive, up-to-date preventive care guidance, the RACGP Red Book serves as the primary reference.

Evidence supports the role of regular holistic preventive assessments in improving health outcomes. A 2021 study found regular comprehensive health check-ups were associated with improved recognition and treatment of chronic conditions, better risk factor management, greater uptake of preventive services and enhanced patient-reported outcomes (31). Despite these benefits, participation rates remain low, with fewer than 40% of eligible older people accessing a health assessment (9).

Given Australia's ageing population and the rise in rates of multimorbidity, experts suggest broadening preventive screening to adults aged 40 to 70 years (13). Early identification and intervention in this group may delay or prevent the onset of complex conditions, reducing future healthcare burden and supporting healthier ageing (32).

The following are some commonly used comprehensive health assessments and checklist tools that have been developed and implemented both nationally and internationally. Evidence suggests that these structured health tools, particularly those targeting midlife and older adults, can support the early detection of chronic conditions, enable timely intervention and contribute to improved long-term health outcomes.

Comprehensive Geriatric Assessment

Comprehensive Geriatric Assessment (CGA) is a widely used multi-dimensional diagnostic evaluation tool used to assess the medical, psychological and functional capabilities of middle and older age adults, particularly those who are frail or at risk of frailty and helps develop a coordinated and integrated care plan (33).

In Australia, CGA is available annually under the MBS for individuals aged 65 and over who are referred by a GP or Nurse Practitioner. The assessment is carried out by a consultant physician or geriatric specialist and involves a thorough evaluation of the patient's medical, physical, psychological and social health, using validated assessment tools when needed. After the assessment, a detailed management plan is created, highlighting key health issues, setting short- and long-term goals and recommending appropriate actions or interventions. This plan is discussed with the patient and, if appropriate, their family or carers and is provided in writing to the referring GP. The service aims to improve the quality of care for older adults with complex health needs (34).

While the advantages of Comprehensive Geriatric Assessment (CGA) are well documented in hospital settings, its effectiveness in primary care remains less clear (35). A 2019 systematic review of four studies (36) suggested that CGA conducted in primary care may not significantly affect mortality or institutionalisation rates among community-dwelling older adults, but it could potentially lower the risk of unplanned hospital admissions.

However, evidence from a Swedish randomised trial study found that CGA, when implemented in primary care, not only reduced hospital care days and visits compared to the control group, but healthcare costs were also lower for those who received the intervention (37). In this study, CGA was led by practice nurses, who used standardised questionnaires to assess social networks, vision, hearing, falls, incontinence, weight loss and psychological issues, alongside a medication review and physical measurements. The process culminated in a multidisciplinary team review, usually with a physician and nurse, to review findings, evaluate frailty and health status and develop an appropriate care plan (37).

75+ Health Assessment (75+HA)

The 75+HA is an annual Medicare-funded assessment designed to evaluate older person's medical, physical, psychological and social health and wellbeing (38). It covers areas such as medication use, blood pressure, continence, immunisation status, falls risk, activities of daily living and physical, psychological, cognitive and social functioning (39). These assessments may be easily conducted by general practitioners or practice nurses, in either consulting or waiting rooms (40). However, there is no core template or set of indicators that are required for this assessment, or recommendations regarding specific screening tools (40). While the use of a specific form to conduct and record the results of the 75 + HA is not mandatory, several 75 + HA templates have been developed and made available, for example, via Medicare and Primary Health Networks (40).

According to an evidence brief by a team at Monash University, several studies evaluated the effect of 75+ HA, reporting that this assessment improves early detection and management of health issues in older Australians: one study reported that these assessments were more effective than standard GP visits in identifying conditions such as diabetes, sensory impairments, vitamin D deficiency and elevated lipids, leading to more revised management plans and specialist referrals. Another study reported a 5% reduction in mortality but a 5% increase in transitions to permanent aged care among recipients receiving 75+HA. A similar study found that this assessment was linked to lower mortality, better physical function and increased health service use, particularly benefiting those with good baseline health (39).

However, a qualitative study has shown that many older people are unclear about the purpose of this assessment. Patient understanding and experiences varied based on how the assessment was conducted and whether it supported person-centred care delivery and shared decision-making and their experiences affected the care and guidance that patients had sought for their health (41). An effective 75+HA requires collaboration between practitioners and older adults, using a person-centred approach to support informed decision-making, identify relevant services and encourage active participation in care (41). To improve uptake and relevance, older people recommend incorporating discussions on pain, sleep, grief, bereavement, cancer screening and oral health into the 75+HA (9).

Notably, functional impairment and age-related diseases have a significant impact on oral health, leading to poor quality of life (42). A 2018 South Australian study found that patients aged 75 and above who had attended health assessments had a high degree of nutritional risk and a clear need for oral health treatment, with poor self-rated oral health being three times higher than that of other older Australians. Including nutritional and oral health screening in the 75+HA would enable timely intervention and referral (43).

45-49 Health Check

The 45–49 years health check facilitates early detection of chronic diseases and promotion of healthy lifestyle behaviours among middle-aged adults. General practitioners are encouraged to identify early-stage risk factors, particularly cardiovascular disease (CVD). However, follow-up interventions are generally limited to pathology referrals and additional consultations if risk factors are detected, with no systematic protocols

This preventive health assessment includes (44):

- A comprehensive patient history focused on key lifestyle and health risk factors such as smoking, nutrition, alcohol consumption, physical activity, possible signs of depression, and osteoporosis risk.
- A physical examination to assess weight, height, body mass index (BMI), blood pressure, and skin health.
- Recommended investigations that typically include lipid profile, fasting blood glucose or HbA1c testing, and cervical screening where clinically appropriate.
- Calculation of the individual's risk of developing type 2 diabetes using the **AUSDRISK** (Australian Type 2 Diabetes Risk Assessment Tool)**;** fracture risk for osteoporosis in women aged 45 years or older using the **FRAX** (Fracture Risk Assessment Tool) and absolute cardiovascular risk using **AUSCVDRISK** (Australian CVD Risk Assessment Tool).

A 2018 economic analysis found that the program reduced the incidence of CVD by 13% for males and 9% for females over a five-year period but resulted in only modest gains in Quality Adjusted Life Years (QALYs) and overall improvement in participants' quality of life was minimal (24). The study found that overall cost-effectiveness of the 45–49 years health check was limited due to the lack of structured follow-up interventions and care pathways. This lack of formalised protocols contributed to uncertainties around the effectiveness of the health check and cost outcomes. Without systematic follow-up, the potential for long-term benefits from this assessment, such as sustained risk factor management and health improvement, may be substantially reduced (24).

NHS Health Check

Since 2009, England's NHS Health Check has offered adults aged 40 to 74 a five-yearly cardiovascular and chronic disease risk assessment to identify their likelihood of developing coronary heart disease, stroke, diabetes or chronic kidney disease (45). The check includes basic physical assessments, blood tests and questions about health behaviours. Based on the results, participants are offered care plans inclusive of support and services to help prevent or delay the development of these conditions (46).

Unlike other health assessments that are commonly offered later in life, the NHS Health Check strategically targets the *silent risk years* in midlife, when proactive assessment and intervention can significantly delay or prevent chronic disease, reduce long-term health costs, and improve quality of life.

Evidence consistently shows that the NHS program improves detection of diabetes mellitus, hypertension, raised blood pressure, cholesterol and chronic kidney disease (47). A case-control study of 48,602 participants found that, in the two years following an NHS Health Check, diagnosis rates for hypertension, high cholesterol and chronic kidney disease were higher among recipients. Over the long term, these participants had lower risks of multiorgan disease and reduced cardiovascular and all-cause mortality (46)

Red Book Lifecycle Chart

The RACGP's *Red Book* provides a lifecycle-based preventive health framework for adults, detailing evidence-based recommendations for screening and risk assessment in primary care. The "Preventive activities over the lifecycle – Adults" section outlines age-specific preventive health priorities. These guidelines are widely used across Australia to support GPs in systematically implementing preventive health assessments (5).

For adults, preventive care is stratified by age groups, typically 18-49 years, 50–64 years and 65 years and older and includes screening for chronic conditions (e.g. cardiovascular disease, diabetes, cancer), risk factor assessment (e.g. smoking, alcohol use, obesity), mental health checks, immunisations and lifestyle counselling. The guidelines also account for increased risk in specific populations such as Aboriginal and Torres Strait Islander peoples, culturally and linguistically diverse groups and those with low socioeconomic status. The checklist also includes links to relevant chapters within the guideline for further reading, allowing practitioners to access more detailed recommendations and supporting evidence on specific health topics (5).

By embedding these age-specific and risk-based interventions into routine practice, general practice can play a vital role in reducing preventable illness and promoting long-term health outcomes across the adult population.

Preventive Care Checklist form

The Preventive Care Checklist (PCC), developed in 2006 by the University of Toronto, is a validated clinical tool to help GPs and primary care teams deliver consistent, evidence-based preventive care aligned with national guidelines (48). It is endorsed by the College of Family Physicians of Canada and is designed for adults aged 18+ who are generally well but may be at risk of developing chronic conditions (49).

The PCC was initially validated in a 2006 randomised controlled study that showed a significant increase in the number of preventive services delivered in Canada. The Checklist helped GPs offer more of the right kind of care at the right time, improving early detection and improving quality of life (48,49). The PCC helps ensure that key areas such as health history, physical checks, lifestyle advice, screening tests and vaccinations are not overlooked during appointments. There are tailored versions for men and women. The Checklist is intended to be used during regular health checks to prompt conversations and actions around early detection and prevention (49).

Since its validation and endorsement, the PCC has been regularly updated to reflect changes in Canadian preventive health guidelines and the latest evidence. The most recent update in 2019 included new recommendations from the Canadian Task Force on Preventive Health Care, covering: hepatitis C screening; lung and bowel cancer screening; cognitive impairment screening; abdominal aortic aneurysm; heart disease risk (dyslipidaemia) screening; folic acid advice for women; vitamin D and calcium intake and routine immunisations.

Updated PCC forms are easy to use and freely available as fillable PDFs on the College of Family Physicians of Canada website and are compatible with electronic medical record systems, making the PCC practical for primary care practices and helping to promote holistic care as a regular part of routine examinations.

Whole PERSON Health Score (WPHS)

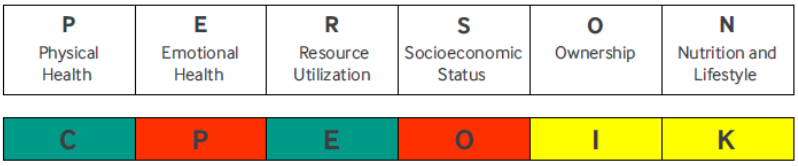
To support a more holistic paradigm of health, Riverside University Health System, based in California, developed the WPHS measurement tool, which quantifies a person's health in six domains (50):

- Physical health (P)
- Emotional health (E)
- Resource utilisation (R)
- Socioeconomics (S)
- Ownership (O)

- Nutrition and lifestyle (N).

The PERSON health score for individuals is derived from the 28-question Whole PERSON Health Score survey which gives each person an alphabetical letter grade for each question, with the assigned grade reflecting an estimate of the potential impact of that item on life expectancy. The results are shown using a colour system: green for good (A–F letter assignment), yellow for fair (G–O), and red indicating needs improvement (P–Z). The colors help clinicians quickly spot areas that need attention and make it easier for patients to understand where they may need support (50).

Figure 3.6 Example of WPHS scoring



P Physical Health	E Emotional Health	R Resource Utilization	S Socioeconomic Status	O Ownership	N Nutrition and Lifestyle
C	P	E	O	I	K

The colour-coded letter scores prompt discussions about key issues and can track health changes over time from clinician-initiated care plans or interventions such as referrals, counselling, medication therapy, procedures or patient-initiated interventions such as lifestyle changes, meditation, stress reduction etc.) (50). When healthcare teams review WPHS results with patients, it helps patients feel heard, especially about nonmedical concerns, and encourages future conversations.

Preliminary data suggest that clinics incorporating the WPHS in consultations are associated with higher patient satisfaction ratings (50). Authors who developed this tool also state that using WPHS may boost patient satisfaction and can help teams to prioritise care, coordinate services and engage patients in their care through shared decision making (50).

Screening for modifiable risk factors

Nutrition and hydration

As people age, medical, physiological and psychosocial changes can impact their ability to maintain adequate nutrition and hydration. For instance, ageing can lead to difficulties in chewing and swallowing, or diminished senses of taste and smell that may reduce appetite and interest in food (51,52). Additionally, musculoskeletal decline, which is commonly associated with advanced age, may limit mobility and make eating independently more difficult. Other medical conditions can interfere with both the intake and absorption of essential nutrients and fluids (51,52). Psychosocial factors such as the loss of a partner, relocation or transitioning into residential care, poverty and depression can also lead to under-nutrition, dehydration and serious health consequences (51,52). In Australia, up to 50% of older adults, both in residential aged care and community, are either at risk of malnutrition or are malnourished, leading to poor health outcomes (53).

Although malnutrition becomes more prevalent with advanced ageing, earlier screening throughout the ageing journey enables timely identification, reduces complications and improves outcomes.

Malnutrition Universal Screening Tool (MUST)

MUST is a widely used, rapid screening tool that identifies adults at risk of malnutrition. It uses three criteria:

- Body Mass Index (BMI);

- unplanned weight loss and
- effect of acute illness on food intake (54)

A UK study evaluated the impact of the malnutrition pathway, an intervention where patients at risk of malnutrition were identified using the MUST and received dietary advice and guidance on the appropriate use of oral nutritional supplements from healthcare providers. The study found that this approach led to significant reductions in hospital admissions, length of hospital stays, GP visits and antibiotic prescriptions (54,55). Also, the costs associated with implementing the pathway were offset by the resulting reductions in healthcare use, leading to substantial per-patient cost savings (54). The efficacy of this tool has also been demonstrated through a series of field-testing studies in more than 200 centres across the UK (56).

However, MUST's limitations include its focus on late indicators (e.g. low BMI, weight loss). It may not detect early warning signs such as poor appetite, taste changes or nausea, which could delay interventions in the early stages of malnutrition (57).

The MUST tool kit is freely available in several languages, including French, German, Italian and Portuguese (58). An Iranian study translated and validated the toolkit in Persian, this study also highlighted that the translation process involved multiple steps, including translation, back-translation and expert review to ensure accuracy and cultural relevance of the translated tool (59).

Mini Nutritional Assessment (MNA)

The MNA is a validated and comprehensive screening tool for assessing nutrition in older adults across various settings and also aligns with broader geriatric assessment criteria (60). It assesses multiple domains, including (61).

- physical indicators: BMI, weight loss and limb measurements;
- functional status: mobility, independence in eating;
- psychological and cognitive status;
- Lifestyle and dietary habits: meal frequency, fluid intake, eating difficulties;
- self-perception of health and nutrition.

An observational study has shown that the MNA can effectively screen malnutrition and frailty, offering a broader geriatric perspective than single-dimension tools (62). Additionally, MNA forms (including MNA-SF) are available in over 20 languages as self-completion questionnaires, called SF-MNA, for patients' use (63).

MNA Short Form (MNA-SF)

Since MNA-SF is a condensed version of the full MNA, it retains strong diagnostic validity while taking under 5 minutes to complete (61). The MNA-SF assesses six key areas (64):

- reduced food and fluid intake;
- recent weight loss;
- reduced mobility;
- psychological stress or acute;
- cognitive impairment and
- BMI (or calf circumference when BMI is unavailable)

Its brevity and practicality make MNA-SF well-suited to time-poor clinical environments, such as general practices or residential aged care settings (63).

Table 3.1. RACGP recommendations for nutrition and hydration assessment

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Silver Book 5th Ed	All patients admitted to a residential aged care facility should be screened for risk of malnutrition and, if at risk, a dietitian referral is needed. The following tools are considered useful in screening for malnutrition: • **Malnutrition Screening Tool (MST)** is a two-item simple to use questionnaire, asking patients whether they have experienced recent unintentional weight loss (and how much), and whether they have been eating poorly due to a decreased appetite (65). • **Malnutrition Universal Screening Tool (MUST)** • **MNA-SF** • **Subjective Global Assessment (SGA),** includes a physical assessment of lean body mass and fat mass; useful for patients with fluid retention in whom BMI may not reflect nutritional status (this test can be completed by an accredited dietitian).	Not specified	65+ years	Practice point

Sleep

Sleep is a key pillar of health, with strong evidence linking quality sleep to better cognitive function, cardiovascular health, metabolic regulation, emotional stability, mental health and overall longevity in older age (66). Sleep also reduces the risk of accidents and injuries caused by tiredness and fatigue (66). Evidence shows that healthy sleep is linked to better markers of healthy ageing in later life (67).

However, sleep disturbances are highly prevalent. Nearly half (48%) of Australian adults report experiencing at least two sleep-related problems, including poor sleep quality or diagnosed sleep disorders (5). These problems may arise from a range of causes, including underlying conditions like obstructive sleep apnoea (OSA) and insomnia, which can also co-exist (5). Sleep disturbances may also be influenced by predisposing, triggering and ongoing factors like work, lifestyle behaviours, environmental factors or stress (68).

Given their regular contact with patients, general practitioners are ideally placed to detect sleep issues early, provide education on sleep hygiene and initiate appropriate screening. However, the RACGP (5) and international bodies such as the US Preventive Services Taskforce (69) advise against population screening for sleep disorders such as OSA and insomnia due to limited evidence of its benefits in asymptomatic patients. Instead, opportunistic screening is encouraged in patients who are at high risk, including patients with sleep related signs and symptoms (e.g. daytime sleepiness, fatigue, snoring, disrupted sleep) and in people with predisposing risk factors (age >50 years, overweight or obesity, excessive alcohol intake) or chronic conditions associated with sleep disorders (5,70).

The Epworth Sleepiness Scale (ESS)

The Epworth Sleepiness Scale (ESS) is a widely used, self-administered tool that is a simple and practical screening tool for excessive daytime sleepiness (EDS). The Scale was developed by Murray Johns at Epworth Hospital in Australia and first reported in 1991 (71). Patients rate their likelihood of dozing in eight everyday situations, with scores ranging from 0 (“would never doze”) to 3 (“high chance of dozing"), yielding a score between 0 and 24. A higher score indicates greater sleepiness (71). This tool is quick to complete, taking about two minutes on average. It is freely available but is best used alongside clinical history and other assessments to confirm excessive daytime sleepiness.

Sleep Condition Indicator (SCI)

The SCI is an 8-question, self-administered questionnaire that screens for insomnia symptoms and their impact on daily life, such as mood, energy and concentration (72). Studies indicate SCI is a reliable and consistent tool that can also detect changes with treatment (72). For busy general practice settings, a shortened version, the SCI-02 has been developed. This two-item version assesses how often sleep issues occur and how much they bother the patient. SCI-02 has been found to have strong predictive value and is useful for quick screening in primary care (73).

Insomnia Severity Index (ISI):

The ISI is a brief, seven-item tool designed to assess the severity of both night-time and daytime symptoms of insomnia. It is available in multiple languages and is increasingly used in clinical research to evaluate treatment response (74). The ISI assesses key aspects of an individual's sleep experience, including the severity of insomnia symptoms, satisfaction with sleep patterns, the impact of poor sleep on daily functioning, perceived visibility of sleep issues to others and the overall distress caused by sleep difficulties (75).

Evidence supports the ISI as a quick, reliable and valid screening tool for identifying clinically significant insomnia, particularly in primary care settings. Its ease of administration, combined with a favourable balance of sensitivity and specificity, makes it a well-suited tool to flag patients who may benefit from further sleep assessment (76). A shortened version, the ISI-3, has also been developed and validated in older adults in primary care to serve as a rapid screening option that can prompt more comprehensive diagnostic evaluation (77).

Berlin Questionnaire

The Berlin Questionnaire was developed for use in primary care to help identify individuals at high risk of obstructive sleep apnoea (OSA) (78). It groups 11 questions into three categories:

- snoring and witnessed apnoeas;
- daytime sleepiness and fatigue;
- risk factors such as hypertension and obesity (77).

The Berlin Questionnaire has a high sensitivity of 82%, meaning it correctly identifies 82% of those who demonstrably have OSA (78). However, it has lower specificity of 39%, indicating that it may produce more false positives. Due to this, follow-up diagnostic tests are often required if the patient screens positive (78).

OSA50 Questionnaire

The OSA50 Questionnaire was developed in Australia for assessing OSA in primary care (82). It assesses four factors:

- obesity (waist circumference);
- snoring;
- observed apnoeas and
- age 50 years or older (77).

A score of 5 or more on the OSA50 has shown 94% sensitivity and 31% specificity for detecting moderate to severe OSA, indicating that while OSA50 is good for screening and identifying potential cases, it may need follow-up testing to confirm OSA (78).

While both the OSA50 and Berlin questionnaires were developed and validated for primary care use, the OSA50 is often preferred for its ease of use and straightforward scoring (78). Also, unlike the Berlin questionnaire, the OSA50 was specifically developed using data from an Australian primary care population for better accuracy and relevance (78).

STOP-Bang Questionnaire

The STOP-Bang questionnaire is a brief, self-administered screening tool used to assess an individual's risk of obstructive sleep apnoea (OSA). It can be completed in 1-2 minutes (79) and includes eight items (80):

- Four symptom-based questions (STOP – Snoring, Tiredness, Observed apnoea, and high Blood pressure).
- Four demographic risk factors (BANG – Body mass index, Age, Neck circumference, and Gender).

A score of three or more indicates an increased risk of OSA.

Evidence shows this tool as valuable due to its practicality and efficiency in clinical settings, including general practice. A 2015 meta-analysis reported that STOP-Bang demonstrates high diagnostic performance in sleep clinic and surgical populations (81), while more recent evidence from a 2021 meta-analysis supports its validity for use in the general population and among commercial drivers (79). A small US-based primary care study further confirmed its validity in primary care, recommending its use at least annually for asymptomatic high-risk patients, particularly those with obesity or hypertension (82).

Sleep Study Testing

Sleep studies are diagnostic tests used to confirm sleep disorders and they are categorised into four levels based on the number of measurements recorded and whether the test is conducted in a sleep lab or at home (78).

Medicare rebates are only available for Level 1 and Level 2 sleep studies. For a GP to directly refer patients for a full Polysomnography (Level 1 or 2), the patient must be at high risk of moderate to severe obstructive sleep apnoea, indicated by OSA questionnaires along with ESS scores (78).

Table 3.2. RACGP recommendations for assessment of sleep disorders

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Red Book 10th Ed	Screening for OSA and insomnia is not recommended in the general population	N/A	N/A	Generally not recommended
	Case finding for OSA is recommended in high-risk patients: Questionnaires to identify OSA: • **Epworth Sleepiness Scale** • **OSA50** questionnaire. • **STOP-Bang Questionnaire**	Opportunistically	Aged 50+ Patients at high risk (those with symptoms and/or commercial drivers and pilots)	Practice point

	Questionnaires to identify symptoms of insomnia disorder: - **Insomnia Severity Index (ISI):** Daytime Insomnia Symptom Scale (DISS): It's an eight-item self-report rating scale developed to assess daytime impairments associated with nocturnal sleep complaints (e.g. concentration difficulties, physical or mental lethargy, poor mood or reduced motivation and energy). - **Sleep Condition Indicator:** Dysfunctional beliefs and attitudes about sleep (DBAS) scale: The Original BDAS tool is a 30-item questionnaire to assess sleep related cognition (sleep related cognitions, e.g., faulty beliefs and appraisals, unrealistic expectations, perceptual and attention bias. A more user-friendly version of this tool is DBAS-16. - **Flinders Fatigue Scale:** This tool clinically evaluates fatigue in patients with insomnia complaints.			

Mental health

There is a growing awareness that mental health is a critical component of healthy ageing (83). Mental wellbeing in older adults is shaped by a combination of psychological, biological, social and cultural factors, as well as timely access to appropriate services and support (82). Later life often brings unique mental health stressors such as losing independence, the death of a partner or reduced income after retirement. These changes can increase the risk of loneliness, social isolation, increased emotional distress and mental health decline, particularly for those without strong support networks (83).

Mental disorders in older adults are a significant and often under recognised contributor to global disability. These conditions can reduce treatment adherence, impair social and economic functioning, increase hospitalisations and accelerate functional decline (84).

Australian peak bodies including the RACGP recommend that GPs remain clinically alert to signs of anxiety and depression, particularly in high-risk patients and to identify those at risk in annual health assessments (5). The RACGP encourages a targeted opportunistic approach to screening and advises against blanket routine mental health screening for all adults or adolescents, citing insufficient evidence to support its use in settings where appropriate case management and follow-up care are not in place (5).

However, if poor mental health is suspected, literature reports the use of the following validated instruments to prompt diagnostic evaluation, early referral and timely intervention:

Geriatric Anxiety Inventory-Short Form (GAI-SF)

The GAI-SF is a five-item self-report tool designed specifically for older adults, including those with mild cognitive impairment (85) and was derived from the 20- item GAI long form (85).

An Australian study tested the feasibility of general practice nurse (GPN)-led screening for clinically significant symptoms of anxiety (CSSA) in older people by integrating GAI-SF into the 75+HA. Results showed that the application of the GAI-SF into the 75+ HA was feasible to administer (2 mins) and readily accepted by patients and clinicians (86).

Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a validated and widely used tool for screening, diagnosing and monitoring depression in adults. It assesses the frequency of depressive symptoms over the past two weeks. This tool has good sensitivity and specificity, making it effective for identifying patients who may be experiencing depression. This test takes less than 5 minutes to administer (11). Some of the abbreviated versions of this tool include the PHQ-4 and PHQ-2, which combine depression and anxiety screens for broader coverage with administration time being less than 2 minutes and still maintaining good diagnostic capabilities (11). These shorter forms are ideal for use in time-constrained consultations.

Generalised Anxiety Disorder 7-item scale (GAD-7)

The GAD-7 is a short, self-administered tool used to identify symptoms of generalised anxiety disorder. It also has strong utility in detecting panic disorders, social anxiety and post-traumatic stress disorder (PTSD).

This is a self-administered form that takes less than 5 minutes to complete and has high clinical utility in both diagnosis and monitoring (11). An ultra-quick variation of GAD-7 is the validated two-item tool, GAD-2, for rapid screening, often used alongside PHQ-2 as a combined mental health screener in primary care (87).

Table 3.3. RACGP recommendations for mental health assessment

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Red Book 10th Ed	Be alert to possible anxiety disorders in those aged 18–64 years, including pregnant and postpartum women (particularly in people with a history of an anxiety disorder, possible somatic symptoms of an anxiety disorder, in those who have experienced traumatic or adverse childhood events or in those with insomnia). • If present, it is conditionally recommended to consider asking patient about their feelings of anxiety and their ability to stop or control the worry using **GAD-2 scale.** Be alert for the various symptoms of depression (e.g. low mood, substance use, insomnia, anhedonia, suicidal thoughts, fatigue and persistent somatic complaints) in the adult population.	Opportunistically	18-64 years	Conditional

	- If present, use one of the validated mental health assessment tools to undertake further assessment Universal screening for Aboriginal and Torres Strait Islander peoples is not recommended; instead GPs are encouraged to in Aboriginal and Torres strait Islanders to use, using one of the 'social and emotional wellbeing' or mental health assessment tools (such as Here and Now Aboriginal Assessment (HANAA) tool or PHQ-9) to guide the conversation. For further information, refer to the Mental health and substance use - Red Book and the Prevention of depression - National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people.			
Silver Book 5th Ed	Depression screening tools: - **Geriatric Depression Scale** to identify depression in older people in hospitals, residential aged care and community settings. - **Cornell Scale for Depression in Dementia**, designed for the assessment of depression in older people with dementia who can at least communicate basic needs. - **Psychogeriatric Assessment Scales**, designed to gather information on the major psychogeriatric disorders: dementia and depression. Anxiety disorder screening tools: - **Depression Anxiety Stress Scales-21 (DASS21),** a shorter version of the 42-item DASS that was designed to measure three related negative emotional states of depression, anxiety and tension/stress. - **Kessler 10 (K10) questionnaire**, a 10-item questionnaire to measure distress based on questions about anxiety and depressive symptoms in the past four weeks. Questions to consider during suicidal risk assessment should include: - If suicidal thinking is present, how frequent and persistent is it? - If the person has a plan, how detailed and realistic is it? - What method has the person chosen and how lethal is it? - Does the person have the means to carry out the method? - Has the person ever planned or attempted suicide? - Has someone close to the person attempted or completed suicide?	Opportunistically	Not specified	Practice point

	For further information on assessing and managing mental health conditions, refer to the part. A Mental Health section in the Silver Book			

Alcohol, tobacco and other drugs

Health professionals across all settings play a pivotal role in identifying and addressing the harms associated with alcohol, tobacco and other drug use. In Australia, screening and brief interventions, particularly in primary care, form a cornerstone of early intervention and are key components of the *National Framework for Alcohol, Tobacco and Other Drug Treatment 2019–2029* (88). These early intervention strategies aim to provide individuals with timely access to information, advice, support and referrals to specialised services when needed.

Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)

The ASSIST, developed by the World Health Organization, is a comprehensive screening tool used to assess substance use across a range of categories, including tobacco, alcohol, cannabis, opioids and other substances.

The ASSIST comprises eight questions, producing risk scores for each substance, categorised into low, moderate or high risk (89). These scores guide appropriate next steps and the level of intervention - from brief intervention or referral to specialist care. This screening test takes 5 to 10 minutes to complete and can be easily administered by a nurse or general practitioner, either on paper or digitally using eASSIST (89).

Recent Australian research has confirmed that the ASSIST tool demonstrates moderate to excellent reliability for most substances except tobacco, making it a practical and evidence-based tool for alcohol and substance use screening in busy practices (90).

Tobacco, Alcohol, Prescription Medication and Other Substance Use (TAPS) Tool

Another tool in increasing use is the *Tobacco, Alcohol, Prescription Medication and Other Substance Use* (TAPS) screening tool. The TAPS tool is a two-step screening instrument designed to assess use of both licit and illicit substances

- TAPS-1: A brief 4-question screen to identify possible substance use concerns (91).
- TAPS-2: A follow-up assessment used when TAPS-1 results are positive, exploring frequency, risk level and problematic use (91).

While TAPS is effective in distinguishing between licit and illicit drug misuse, its two-step nature may be too time-consuming for some primary care workflows (92). TAPS-1 alone has been validated as a standalone rapid screen in a study involving 2,000 participants. This 4 item screen can be self-administered or conducted in interview format, making it a flexible option for early identification of tobacco, alcohol and substance use in general practice consultations or that can also be completed in waiting areas (91).

Table 3.4. RACGP recommendations for tobacco, alcohol and substance use screening

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Red book 10th Ed	Alcohol use: • It is conditionally recommended to screen adults aged over 18, including pregnant women for alcohol use. • The **Alcohol Use Disorder Identification Test – Consumption (AUDIT-C)** is a brief screening tool to identify frequency and amount of alcohol consumption over the past year., it consists of the consumption questions from the full alcohol use disorders identification test (AUDIT). For more information, refer to the Mental health and substance use section - Red Book	Every 2 years (practice point)	18+ years	Conditional
	Smoking and vaping: • It is strongly recommended to ask patients whether they are currently smoking and document their smoking status. Also ask about and document the use of vaping products. For more information, refer to the Mental health and substance abuse section - Red Book	Every opportunity	10+ years	Strong

Polypharmacy

Polypharmacy, defined as the concurrent use of five or more medications, is common among older adults and individuals managing multiple chronic conditions (93). As people age, the risk of polypharmacy increases, especially among those living with multimorbidity, cancer or functional decline (93).

Although often necessary, polypharmacy is associated with significant risks, including:

- adverse drug events;
- falls and fractures;
- frailty and cognitive impairment;
- hospitalisations and
- increased mortality (93).

Proactive screening for polypharmacy and potentially inappropriate medications could help reduce these risks, improve quality of life and reduce health care costs – particularly in older patients with cancer or complex conditions (94).

Medication Appropriateness Index (MAI)

The MAI is a comprehensive, clinician-driven tool used to evaluate the quality and appropriateness of each prescribed medication (95). It includes 10 criteria covering:

- indication and effectiveness;
- dosage and duration;
- drug–disease and drug–drug interactions;

- cost-effectiveness;
- duplication of therapy;
- patient instructions and adherence factors (94, 95).

The MAI is highly patient centred and considers not only prescribed medications but also over-the-counter and complementary therapies. It supports a nuanced review of each drug but does not assess medication underuse (94). However, its application can be time-consuming and requires considerable clinical judgement (94).

STOPP/START

The STOPP (Screening Tool of Older Person's Prescriptions) and START (Screening Tool to Alert to Right Treatment) criteria are complementary tools designed to improve medication regimes in older adults (95). STOPP identifies potentially inappropriate medications that may increase the risk of harm while START criteria highlight medications that are essential for managing specific conditions (95).

These tools are valued for their clear, structured criteria which support quick and effective clinical decision-making, particularly in identifying drug interactions and inappropriate prescribing (95). One of their key advantages is efficiency; screening typically takes up to two minutes per review (94) and offers a strong focus on drug-drug and drug-disease interactions (94, 95). However, like the MAI, the STOPP/START tools have limited capacity to assess medication underuse comprehensively and their accuracy depends on regular updates to reflect current evidence (94, 95).

Beers Criteria

The Beers Criteria, developed and updated by the American Geriatrics Society, is one of the most widely adopted tools for identifying potentially inappropriate medications in older adults, particularly those 65 and over (96).

The updated 2023 Beers Criteria offers a clear, evidence-based list of potentially inappropriate medications that should generally be avoided in older adults, except in specific cases such as hospice or end-of-life care (96). While being user-friendly and evidence-based, the Beers Criteria does not account for the individual's complexities in the decision making process and should be used as part of a broader clinical judgement that considers patient-specific goals, values and comorbidities (96).

Table 3.5. RACGP recommendations for assessing polypharmacy

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Silver Book 5th Ed	To identify inappropriate prescribing, these tools are recommended (6), however, it is recommended to not substitute these tools for good clinical decision making, they are only prompts for potentially identifying inappropriate prescribing: • **Beers criteria** • **McLeod criteria,** provides a list of medications where the risks may outweigh the benefits for elderly patients. However, evidence suggests that its sensitivity is lower than Beer (97). • **STOPP/START**	Not specified	Older adults (age group not specified)	Practice point

	- **Australian Inappropriate Medication Use and Prescribing Indicators tool,** this tool is based on specific indicators like drug choice, dosage, and duration to evaluate the appropriateness of prescribed medications (6). - **Medication Appropriateness Tool for Comorbid Health conditions during Dementia (MATCH-D),** this criteria provide expert consensus guidance about medication use for people with dementia (98). For further information, refer to part A. Polypharmacy - Silver Book			

Screening for wider determinants of health

Social determinants of health

Medical professionals are well trained in the biological aspects of health but may have limited understanding of how social factors influence health outcomes. Most medical education and practice tends to overlook the role of social determinants of health on overall health and wellbeing (99). There is increasing awareness that healthcare providers should recognise how factors such as housing, income, education and social support can affect both physical and mental health of an individual (99).

Screening for social determinants of health can help identify patients who may need additional support. This allows clinicians to provide more effective care, including timely referrals to legal, housing or social services (99,100). By doing so, health services can deliver more holistic, person-centred care, especially for those who are marginalised or underserved (100).

PRAPARE

The Protocol for Responding to and Assessing Patients' Assets, Risks and Experiences (PRAPARE) is a US based screening tool that has been identified in international literature for gathering information on social determinants of health (101). It includes 15 core questions and 5 optional questions, covering questions related to race and ethnicity, veteran status, emotional and social wellbeing, living conditions, income, education and access to health care and other essential services (102). This tool has been translated in over 25 languages to extend accessibility.

Social determinants data from PRAPARE was specifically designed to be entered directly into electronic health record systems as structured data (101). The questionnaire is typically completed by clinical or non-clinical staff during a patient visit; a paper version is also available for patients to complete (101).

Studies assessing the use of PRAPARE in general practice or large hospital settings have reported that integrating PRAPARE into electronic health record systems can provide valuable insights into patients' social needs and has resulted in better-targeted support and improved referrals to community and social services (103,104).

While this tool has been extensively validated for reliability and accuracy in large-scale studies across diverse populations, evidence supporting its validation, cultural suitability and integration within Australian general practice remains limited.

Social Determinants of Health Screening Tool (SDoHST)

Developed in Adelaide, SDoHST is the first validated tool designed to measure social determinants of health in Australia (105). It consists of a 12-item questionnaire that focuses specifically on identifying health-related social needs such as housing instability, food insecurity, transport difficulties, utility support, and personal safety (105). The tool is brief, easy to use, and provides a standardised way to assess these needs in clinical settings (105).

SDoHST has undergone validation via focus group discussion and interviews with patients and key stakeholders, ensuring its relevance and practicality in Australia (105). Based on stakeholder feedback, it also includes questions addressing cultural, linguistic, and spiritual needs, making it more inclusive and responsive to diverse Australian populations (105). However, this tool has not yet been tested in large-scale quantitative studies to confirm its statistical reliability and validity.

Health literacy

Health literacy describes the capacity of an individual to access, understand, navigate and use information about their health and wellbeing, including information about maintaining their health and wellbeing and information about health treatment and managing health conditions (106). The Australian Commission on Safety and Quality in Health Care identifies two components of health literacy: individual health literacy and the health literacy environment – that is, the infrastructure, policies, processes, materials, people and relationships that make up the healthcare system and affect the way that people gain access to, understand, appraise and apply health-related information and services.

Health literacy is a critical component of patients' capacity to make informed decisions and to manage their health and work with their health care providers to optimise their health and wellbeing. This capacity is influenced by the awareness and understanding of health literacy of health care professionals and clinical service settings, particularly by the ways in which clinical information and advice is communicated and by the enablers or barriers imposed on patients' capacity to navigate health service needs and system arrangements for their health care.

Age, education, disability, culture and language and Aboriginal and Torres Strait Islander status all influence individual health literacy capability (106,107).). The Safety and Quality Commission says that health service organisations have a responsibility to build a health literacy environment that supports effective partnerships with consumers.

In primary care services, screening for health literacy has not been widely considered in research or literature. Whilst there have been a number of tools to assess the health literacy of patients developed in recent decades, these have commonly assessed comprehension of written information without inclusion of verbal communication and information and with little attention to capacity to recall and use information, either written or verbal. There has been limited take-up of these in practice.

The Brief Health Literacy Screen (BHLS)

BHLS was developed some years ago for use in both acute and community health care settings to identify patients affected by limited health literacy (108). The screening tool was designed to be comprehensive, including questions about both written and verbal information and about subsequent recall of information provided in a consultation. A small comparative trial of the BHLS and another assessment tool, the Test of Functional Health Literacy in Adults (TOFHLA) was conducted across four primary care clinics in West Virginia (109). This study found that the BHLS took much less time to administer and score and did not require the patient to be able to read and that it provided useful indications of a patient's limitations and needs.

The Centre for Health Literacy Research and Practice at Tufts Medicine (110), a health service in Massachusetts, provides an online Health Literacy Tool Shed with a large number of health literacy measurement tools. Many of these are not easily accessible and not validated in Australia. The Centre provides the Brief Health Literacy Screen as a four-question test:

- How often do you have somebody help you read hospital materials?
- How confident are you filling out medical forms by yourself?
- How often do you have problems learning about your medical condition because of difficulty understanding written information?
- How often do you have a problem understanding what is told to you about your medical condition?

Health Literacy Questionnaire (HLQ)

In Australia, health literacy assessment tools have been developed to support organisational assessments of support for health literacy for consumers. One of the tools that assesses individual health literacy capacity is the Health Literacy Questionnaire (HLQ) (111). This tool was used in the National Health Literacy Survey undertaken in 2018 (112).

Health Literacy Universal Precautions Toolkit

An Australian online health literacy information service, the Canberra Health Literacy Hub (113), considers that health assessment tools in clinical practice are rarely useful or practical and can be counter productive. The Hub advocates that a universal precautions approach be taken in clinical settings, focusing on helping all patients understand health information. This approach is supported by the *Health Literacy Universal Precautions Toolkit,* produced by the Agency for Healthcare Research and Quality (AHRQ) (114). The Toolkit is designed for 'busy healthcare providers'. It includes 23 separate tools and a guide providing 'Practical Ideas for Primary Care Practices' The Guide provides a step-by-step- resource to improving health literacy capacity within a primary care practice team, to working with patients to identify health literacy needs and support patient engagement and includes advice on linking patients to non-medical and community support (also often referred to as social prescribing) and to medicine, literacy and math resources to support their engagement in their health needs and health care (115).

Screening for common age-related changes and conditions

Hearing and vision loss

Older adults living with dual sensory impairment, which refers to combined hearing and vision loss, are especially vulnerable to fragmented care, often facing systemic barriers when accessing health services (116). Research shows that 50 to 60 % of hearing and vision impairments are preventable or treatable, highlighting the importance of early detection (117).

Chadha et al. recommend that adults aged over 50 have their vision screened at least once a year and their hearing screened every five years for those aged 50 to 64, and every one to three years for those 65 and older (118). However, the RACGP Red Book advises against population-based vision screening in adults, citing insufficient evidence and does not recommend screening for hearing loss in asymptomatic adults aged ≥50 years. Instead, the Red Book recommends opportunistic case finding for hearing and vision loss, limited to patients who present with perceived symptoms or observable signs of impairment (5).

Early detection of hearing and vision loss can be easily carried out in community, home or clinical settings by any health professional using simple equipment (118), as discussed below:

Severe Dual Sensory Loss screening tool.

The Severe Dual Sensory Loss screening tool was developed to support nurses and care assistants in identifying hearing, vision and dual sensory impairments in older adults (119). Developed by Lyng and Svingen (120), this tool is a nurse-completed checklist that includes six questions each on hearing and vision-related behaviours. A 2014 Norwegian study found the tool to be valid, reliable, brief and easy to use in practice. It can be used alone or alongside other diagnostic tools or treatment programs, such as those for cognitive impairment or depression (119). The study also reported that 20% of aged care clients had dual sensory loss. However, no recent studies have evaluated the tool's current use in primary care settings (119).

Electronic whisper test

The whisper test is commonly used as a quick hearing check before conducting pure-tone audiometry (121). It is simple to perform, doesn't require formal training and can be done easily in everyday clinic settings. However, the electronic whisper test (EWT) provides a more standardised and objective alternative. Unlike the traditional whisper test, which can vary depending on the examiner's voice intensity, the EWT uses pre-recorded sounds played at a consistent intensity, making the results more reliable and easier to compare (121). The validity of the electronic test has been proven in older adults (121) and as well as in children (122). These studies have shown that EWT is quite reliable for ruling out hearing loss, though slightly less accurate in confirming it when compared with the gold standard pure-tone audiometry test, highlighting that EWT can be useful in initial screening but is not recommended for definitive diagnosis.

App-based visual acuity assessment

The assessment of distance visual acuity (vision sharpness and clarity) is a core diagnostic measure of visual function, which is traditionally measured using a Snellen wall chart (123). While commonly used, the Snellen chart requires a 6 metre viewing distance, which isn't always practical in clinical settings. A smaller 3-metre version is also available and often used in primary care but its use remain challenging as these charts are usually fixed to walls, are bulky and lack portability (123).

In busy settings such as hospital wards or primary care clinics, limited space and resources often result in visual acuity being assessed informally or missed altogether, even when its clinically necessary (123).To address these issues and to reduce reliance on eye care professionals, mobile technology is being studied for vision screening (124). A NSW study assessed two free visual acuity apps: Eye Chart Pro (version 1.3 by Dok LLC) and Snellen (version 1.2 by Dr Bloggs Limited) on iPhones and iPads, comparing them with the traditional 3-metre Snellen chart. The results supported the validity of these mobile tools, showing consistent performance across devices with different screen sizes, making them suitable for use in primary care (123). A meta-analysis of 22 studies examining the diagnostic value of mobile apps for testing visual acuity further supported the use of app-based tests and considered them to be effective tools for detecting visual impairment when needed, offering a convenient option for on-demand screening within busy practices (124).

Table 3.6. RACGP recommendations for assessing hearing and vision loss

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Red Book 10th Ed	Screening for hearing loss is not recommended in asymptomatic adults aged ≥50 years.	N/A	N/A	Generally not recommended
	Screening for hearing can be done in patients who present with conditions that may be associated with aw455hearing loss or those with questions, concerns or perceived hearing loss in adults, assessment tools recommended are: - **Audiometry** - considered best practice for thorough hearing assessment. - Using a single question - **"do you have difficulty with your hearing?"** **Handicap hearing inventory screening tool** – a 25-item extensive screening tool which assesses the perceived impact of hearing difficulties on daily life For specific recommendations for Aboriginal and Torres Strait Islander people, refer to Hearing loss - National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people.	Opportunistically	Adults	Practice point
	Visual acuity and Glaucoma screening is not recommended in the general population (adults)	N/A	N/A	Generally not recommended
	Opportunistic case finding is recommended to identify people aged >50 years at high risk of glaucoma and refer to an optometrist/ophthalmologist for further assessment. For more information, refer to Miscellaneous, Vision - Red Book and Chapter 6: Eye health - National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people	50+ years	As required	Conditional

Menopause

The average age for Australian women to reach menopause is between 51 and 52 years (125). However, the experience of menopause and perimenopause varies widely between individuals, with symptoms lasting from a few months to several years (126). 80% of women report experiencing physical and/or emotional symptoms during this transition (126). Despite this, these symptoms are often overlooked in general practice settings (127,128). GPs are well-positioned to identify the early signs of perimenopause and menopause, helping to improve quality of life for women (127).

A comprehensive assessment can help the management of acute symptoms associated with menopause and perimenopause (such as hot flushes); address complications like osteoporosis; reduce risk factors for related issues (including fractures and thromboembolism) and ensure that broader preventive health needs are met (129).

Starting July 1, 2025, new Medicare-funded health assessment item 695 will be available for perimenopause and menopause health assessments to support patients experiencing premature ovarian insufficiency, early menopause, perimenopause and menopause. These assessments aim to improve access to care and symptom management for women going through these life stages (130). The assessments can be billed annually for eligible patients and will typically include collection of patient history (menopausal status, wellbeing and treatment contraindications), basic physical exam (BP, BMI), clinical investigations/referrals as needed, e.g. cervical screening, mammography, bone densitometry and discussion of pharmacological and non-pharmacological management options and creating management plans (130).

Although structured assessment is essential for effective care, relatively few tools have been developed and integrated into these assessments to assist in identifying and managing menopausal and perimenopausal symptoms. Among the more commonly identified tools in the literature are the Menopause-Specific Quality of Life Questionnaire and the Greene Climacteric Scale, however, these tools are often lengthy and may not be practical for use in busy general practice settings (128). Other tools that are quick to administer and that have been gaining some traction are:

Menopause Quick 6 Tool (MQ6)

This tool was developed for use by both healthcare providers and women attending primary care clinics, particularly those presenting for chronic disease management (131). It is a short, six-item questionnaire that is freely available and easily fillable either online or in the waiting room prior to a consultation. The tool uses a binary format, focusing on the presence or absence of symptoms rather than rating their severity, allowing for a quick and practical assessment (131,132). It takes approximately two minutes to complete and is written in plain language, making it suitable for use during any clinical encounter, including routine health checks (128). The MQ6 includes common menopause-related questions such as changes in menstrual patterns, hot flushes, vaginal dryness, bladder issues or incontinence, sleep disturbances, and mood changes (128). Several international studies have found this tool to be valid and effective for use in primary care settings (132).

AMC Menopause Assessment

The AMC Menopause Assessment Tool, developed by the Australian Menopause Centre, is a user-friendly, web-based screening tool designed to help women identify potential menopausal or perimenopausal symptoms (133). Adapted from the Practitioner's Toolkit for Managing Menopause by Monash University and the Greene Climacteric Scale, the tool provides a practical starting point for women to reflect on their symptoms (133). While it is not a substitute for a comprehensive medical evaluation, it can support more informed and focused conversations between patients and their primary care providers (133).

Table 3.7. RACGP recommendations for assessing menopause

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Red Book 10th Ed	The onset of menopause is an opportunity for a routine health assessment, education and primary prevention in regard to general health and wellbeing, including cardiovascular, bone and mental health.	Not specified	45+ years	Practice point

	Blood tests for the diagnosis of menopause are typically not required.			
	If early or premature menopause is suspected, blood tests to exclude other causes of oligomenorrhoea or amenorrhoea are appropriate For further information on menopause management, refer to the Reproductive and Women's Health - Red Book	Not specified	Before 45 years	Practice point

Nocturia

Nocturia is defined as a type of low urinary tract symptom where an individual needs to regularly wake during the night to urinate (134). This condition can significantly affect a person's physical and emotional quality of life, including their ability to function or perform at work, due to disrupted sleep patterns (135). While the prevalence of nocturia increases with age - affecting over 70% of people aged 70 and older, it is not limited to older adults. Up to 30% of individuals aged 20 to 40 also report waking at least once per night to urinate (136).

Patients rarely present to their GP with nocturia as the primary concern, instead, they may report symptoms such as fatigue-related symptoms (137) or some may avoid mentioning it due to embarrassment, lack of awareness about treatment options, or the belief that it is simply a normal part of ageing (136). For this reason, proactive screening may support more targeted and effective treatment approaches (138).

Voiding/Bladder Diaries

A bladder diary is the most common tool used to record how much urine a person passes or leaks during the day and overnight. It is typically completed by the patient over three days period and then reviewed by a clinician to identify patterns or contributing factors to nocturia and determine appropriate management strategies (139). Bladder diaries provide relatively objective information about a patient's fluid intake and voiding habits and are valuable for identifying potential causes of lower urinary tract symptoms and informing behavioural modifications and evaluating treatment outcomes (140). However, their effectiveness relies heavily on the accuracy and completeness of the data provided. Completing a bladder diary requires significant patient effort, which may lead to incomplete entries (140). International research has shown that a three-day bladder diary is a feasible, reliable, and valid assessment tool for both men and women with low urinary tract symptoms, including nocturia (141,142). A Spanish study also assessed the reliability of the first day of the three-day diary for evaluating symptoms in women with nocturia, confirming its readability and supporting its potential use as a simplified follow-up tool (140).

TANGO-SF

As nocturia can be a symptom of multiple underlying conditions and is encountered across various healthcare disciplines, effective management requires a comprehensive assessment to identify all potential causes, both within and beyond the lower urinary tract (143). The 57-item patient-completed screening questionnaire known as Targeting the Individual's Aetiology of Nocturia to Guide Outcomes (TANGO), has been developed (144) which supports GPs in evaluating possible contributors to nocturia such as increased overnight urine production, sleep disturbances, overactive bladder (OAB) and voiding dysfunction, while also helping to assess the impact of nocturia on a patient's quality of life

(138). However, due to its length and complexity, completing the full TANGO tool can be time-consuming in busy practices. To address this, TANGO was modified as a short form (TANGO-SF) by Bower et al. (144) which consists of 22 questions grouped across four key domains:

- Cardio/metabolic - conditions contributing to 24-hour polyuria and nocturnal polyuria.
- Sleep – sleep quality, time to first void, other causes of night-time waking and sleep-disordered breathing.
- Urinary tract – relevant lower urinary tract symptoms.
- Wellbeing – general health, falls, daytime fatigue, and reduced motivation (143).

A Melbourne study (145) confirms the reliability of TANGO-SF and acceptable content validity, supporting its practical use in clinical settings (145,146).

Age-related musculoskeletal diseases

Sarcopenia, osteoporosis and osteoarthritis are among the most prevalent musculoskeletal disorders that negatively impact healthy ageing (147,148). Each condition independently contributes to declining musculoskeletal health, leading to limited movement, reduced functional capacity]. and an increased risk of physical decline and frailty (149,150). These disorders are common with age and women tend to be disproportionately affected, showing higher rates of osteoporosis and osteoarthritis, along with lower average muscle mass and strength, compared to men (148). These conditions can occur together, as they share overlapping risk factors such as ageing, hormonal imbalances, genetic predispositions and unhealthy lifestyle habits that promote chronic systemic inflammation (150).

Sarcopenia is characterised by loss of muscle function with ageing and is a major component of frailty (151). This condition not only involves reduced muscle mass but also poor mobility and lower strength, especially in the arms and legs (152), leading to disability and increased risk of mortality (151), prompting the need for early detection and management.

Osteoporosis is characterised by a reduction in bone density and strength, which increases the likelihood of fractures, especially in older individuals and postmenopausal women (150).

Osteoarthritis (OA), a progressive joint disease, causes cartilage breakdown, changes in bone structure, and inflammation that result in pain, stiffness and loss of joint mobility (153,154). OA has also been linked to an increased risk of falls, fractures (155) and frailty (156,157). While commonly seen in people over 50, OA can also develop in younger individuals, especially those with prior joint injuries such as ligament or meniscus damage (154). Early recognition and management of OA symptoms are essential for preserving mobility, alleviating pain and preventing further physical decline (158).

Given the ageing global population, addressing these musculoskeletal disorders through early prevention and management is vital to support healthy ageing and reduce associated health and economic burdens (150).

Physical performance assessment

Sarcopenia is often diagnosed by measuring lean muscle mass (e.g. values below the 20th percentile for young, healthy adults) (152). However, muscle strength and mass don't always match, so it's also important to assess physical performance and muscle function (152), such as gait speed (walking speed) or grip strength (152). These physical functions are also commonly assessed to screen and predict frailty, falls and fracture risk (151).

FRAX

To assist GPs, who are often the first point of contact for patients with osteoporosis, the RACGP provides *Guidelines for osteoporosis management and fracture prevention in postmenopausal women and men over 50 years* (updated in 2024) (159). These recommend that adults over 50 who experience a minimal trauma fracture should be presumed to have osteoporosis and assessed for fracture risk to guide timely bone mineral density testing and treatment (159).

RACGP recommends using the FRAX tool to calculate absolute fracture risk.

The FRAX tool estimates an individual's 10-year risk of experiencing a hip fracture or a major osteoporotic fracture (160). It has undergone extensive validation through calibration and discrimination across 26 studies in nine different countries. Compared to other risk assessment tools such as QFracture and the Garvan Score, FRAX is more widely validated, making it the most frequently used tool for assessing fracture risk in clinical practices (160).

DXA scanning

RACGP's osteoporosis guidelines further recommend bone mineral density (BMD) assessment for adults over the age of 50 who have chronic conditions, specific medical diagnoses, or take medications associated with increased fracture risk, using dual-energy X-ray absorptiometry (DXA) (158).

The FRAX tool is often used as an initial step to estimate a person's 10-year probability of hip or major osteoporotic fractures based on clinical risk factors alone (159). If the initial FRAX score suggests moderate or high fracture risk, a DXA scan is recommended to obtain BMD measurements. Once the BMD score is available, the FRAX score can be recalculated to provide a more accurate estimate. This updated score, incorporating both clinical and BMD data, supports more informed decisions regarding the need for osteoporosis treatment (159).

Referral for DXA scanning is advised, ideally at two skeletal sites, the lumbar spine and hip, unless contraindicated (e.g., hip prosthesis) (159).

Osteoarthritis screening and management resources

OA is typically diagnosed through a combination of a comprehensive patient history, physical examination and imaging (158). Some resource tools have been developed to guide clinicians on early detection and management of OA, such as the RACGP clinical guidelines for managing knee and hip OA (161) and the Canadian-based Osteoarthritis (OA) Tool.

Osteoarthritis Tool is a freely available comprehensive, visual clinical resource developed by the Arthritis Alliance of Canada, the Centre for Effective Practice (CEP) and the College of Family Physicians of Canada (CFPC) to support primary care providers in the diagnosis and management of patients with hip, knee, or hand osteoarthritis. Designed to promote evidence-based, patient-centred care, the Tool guides clinicians through a structured assessment process, including (162):

- comprehensive patient history to understand symptom onset, progression, and impact on daily activities;
- basic measurements, including BMI, height, weight and blood pressure, to inform diagnosis and treatment decisions;

- hip and knee examination assessing joint alignment and deformities, gait patterns, functional strength (e.g., sit-to-stand test), range of motion (flexion and rotation), joint swelling and potential leg length discrepancies;
- meniscus testing using the Thessaly test, a recommended physical exam to detect potential meniscal tears in the knee; a positive result warrants further imaging and full meniscal evaluation, which may alter the pain management approach accordingly (162).

These assessments help determine the clinical stage of OA (early, moderate or advanced) and inform appropriate management pathways based on severity and joint location. The Tool also provides criteria for diagnostic imaging, specialist referrals and methods for evaluating treatment response, ultimately facilitating effective and goal-oriented osteoarthritis care (162).

Similar to the OA Tool, the RACGP Guideline emphasises a symptom- and sign-based clinical diagnosis focused on identifying characteristic features of OA, such as activity-related joint pain and morning stiffness. It also places greater reliance on clinical judgement and recommends against routine imaging unless the diagnosis is unclear or red flags are present, warranting further investigations.

Table 3.8. RACGP recommendations for management of knee and hip osteoarthritis

Guidelines	**Recommendations**	**Frequency**	**Target population**	**Recommendation grade**
Guideline for the management of knee and hip osteoarthritis (2nd Ed) (161)	Take a holistic health history covering: symptom impact on daily life and function, pain assessment, red flags (e.g. infection, cancer history, weight loss), medication use, sleep quality, psychological factors, health beliefs, modifiable risk factors (e.g. obesity, inactivity), and comorbidities. Perform a targeted physical examination to assess for joint malalignment or deformity, bony enlargement, effusion, tenderness, restricted movement, crepitus, gait abnormalities, and limited range of motion in the hip and knee. Order additional tests if symptoms are atypical: X-rays for alternative diagnoses, MRI or ultrasound for suspected serious pathology, and lab tests if inflammatory or autoimmune conditions are considered.	Not specified	Not specified	Not available
	If a patient meets all three of OA criteria (age 45 years or older; activity-related joint pain, morning stiffness lasting no more than 30 minutes), a GP can: • Diagnose OA clinically (without needing X-rays, MRIs, or blood tests). • Begin treatment and education based on that clinical assessment. • Reserve imaging or specialist referral only if there are atypical features or red flags (e.g., trauma, rapid swelling, systemic symptoms).			Not available
Red Book 10th Ed	Screening for osteoporosis with bone mineral density (BMD) measurement in the general population is not recommended at any age.	N/A	N/A	Not recommended

🟥	Use FRAX® to assess fracture risk in adults aged 50+ with relevant risk factors (e.g. family history of hip fracture). • If risk of major osteoporotic fracture is greater than 10%, refer to DXA screening • If risk of major osteoporotic fracture is less than 10%, DXA is not recommended	Do not routinely repeat BMD and FRAX® within 2 years except in special circumstances	50+ years	Conditional

Frailty

Frailty is a complex, multidimensional syndrome characterised by a decline in physical and cognitive reserve and capacity to maintain function, leading to increased vulnerability to stressors and adverse health outcomes (163). Physical decline is a key predictor of frailty, which is why musculoskeletal conditions are important to consider (152).

Frailty becomes increasingly prevalent with age and is associated with higher risk of falls, prolonged hospital stays, poor recovery from illness or surgery and increased mortality (163). In Australia up to half of older adults are considered frail, with prevalence expected to rise as the population ages (164). Early identification of frailty in primary care is critical for initiating timely interventions, preventing progression from pre-frailty to frailty, and optimising healthy ageing trajectories (165).

Various screening tools have been developed to assess frailty in older adults, ranging from simple, quick assessments to more comprehensive evaluations. However, there is no universally recommended screening tool for use in primary care and hospital settings (165). National frailty guidelines for Australian clinical practice are currently in development.

Frailty Index and Electronic Frailty Index (eFI)

The Frailty Index has demonstrated good predictive ability, acceptable validity and diagnostic accuracy (166). It can be calculated electronically using records and a small set of questions or measures (166).

Its electronic version, the eFI, leverages routinely collected data in electronic health records to automatically generate frailty scores (167). It uses 36 variables to classify individuals into either fit, mild, moderate or severe frailty (168). These variables include:

- clinical signs (e.g. tremors);
- symptoms (e.g. vision impairment);
- chronic diseases;
- disabilities;
- laboratory abnormalities (104, 105).

This method not only streamlines the screening process but has also been found to identify more cases of frailty compared to traditional screening tools. Nurses can implement eFI by extracting patient information from medical records, a process that is generally considered practical and straightforward. However, challenges can arise in more complex cases, particularly when patients have multiple chronic conditions or when relevant information is scattered across different sections of the medical record, making it harder to locate in a summary form (167). Despite this challenge, eFI has shown strong predictive validity for outcomes of hospitalisation, residential aged-care admission and mortality in older adults (168).

FRAIL Scale (FS)

The FRAIL Scale is one of the most widely used frailty screening tools in Australian primary care. It assesses five core domains:

- fatigue;
- physical strength (resistance, ability to climb stairs);
- mobility (ambulation);
- illnesses (5 or more chronic conditions);
- loss of weight (170).

This simple questionnaire is quick to administer during routine consultations and demonstrates predictive accuracy comparable to more complex tools, including the Tilburg Frailty Indicator (171). It has also shown predictive value for 12-year mortality risk (172), making it a practical first-line screening option.

Gait speed and hand grip

These two measures are part of the Fried Frailty Phenotype (FFP), which classifies individual as frail if they meet at least three out of five physical criteria:

- low grip strength (weakness);
- slow gait speed (slowness);
- unintentional weight loss (≥5% over the past year);
- low physical activity (173).

Gait speed and hand grip strength are particularly valuable due to their strong individual predictive power (173). Both these measures are quick and practical to use in clinical settings. Grip strength can be assessed in about 2 minutes using a dynamometer, and gait speed takes less than 5 minutes to measure (173). These tools are both simple and scalable for early frailty screening in primary care.

Edmonton Frail Scale (EFS) and Reported Edmonton Frail Scale (REFS)

The Edmonton Frail Scale (EFS) is a brief, feasible, screening tool and is well-suited to non-geriatric providers (172). EFS evaluates frailty across ten domains, including:

- cognition;
- social support;
- medication use;
- functional performance and
- timed up-and-go (mobility) (172).

A variation of EFS is the Reported Edmonton Frail Scale (REFS), which replaces the timed up-and-go mobility task in the EFS with three self- physical performance questions, allowing it to be administered in under 10-minutes by any trained healthcare professional (174).

Both EFS and REFS have demonstrated strong predictive validity for 12- and 24-year mortality (172).

Table 3.4. RACGP recommendations for frailty assessment

Guidelines	**Recommendations**	**Frequency**	**Target population**	**Recommendation grade**
Red Book 10th Ed	Consider frailty in health assessments for all elderly patients age of 75, using valid rapid assessment tool(s)Consider frailty as part of health assessments in patients aged 65-74, with one or more risk factors associated with frailty.	Annually 1-3 years	75+ years 65-74 years	Practice point
Silver Book 5th Ed	Common validated assessment tools for frailty include: - **Fried frailty indicators** (also known as Fried Phenotype or Hopkins tool): ○ Unintentional weight loss (≥4 kg/year) ○ Self-reported exhaustion ○ Weak grip strength ○ Slow walking speed ○ Low physical activity - **Frailty index** - **Clinical frailty scale** - **Edmonton frail scale** - **Speed gait** - **TUG test** For more information on frailty management, refer to part A. Frailty section - Silver Book	Annually	75+ years	Practice point

Falls risk

Falls are a leading cause of injury and death in older Australians. According to the AIHW, in 2022–23, falls were the most common cause of injury-related hospitalisations and in 2021–22, the leading cause of injury-related deaths, with adults aged 85 and over being the most affected (175).

Beyond physical harm, falls have long-term impacts on an older person’s confidence, independence and quality of life (176). Approximately 20% to 39% of people who experience a fall develop a fear of falling, which can lead to activity avoidance, further physical decline and social isolation (176).

Primary care providers play a vital role in early risk identification, implementing evidence-based screening and referring to appropriate falls prevention programs to help maintain safety and independence in older adults (176).

Timed Up and Go (TUG) Test

The TUG test is a commonly used, quick, screening tool to assess mobility and balance in community-dwelling older adults (87). It involves timing how long it takes for a person to:

- stand up from a standard chair;
- walk three metres;
- turn around;
- walk back and (177).

The test is simple and quick to perform, typically taking just a few minutes and only requires a stopwatch and a clear space of at least four metres (177). Completing this test in 12 seconds or more generally indicates an increased risk of falling.

While the TUG test is widely used due to its time-efficiency, evidence shows varied accuracy for TUG to predict fall risk (177).

Gait Speed Test

Gait speed is a validated indicator of overall functional status and fall risk in older adults. It involves timing how quickly a person walks a set distance (e.g. 4 or 6 metres) (177).

Studies show that the decline in gait speed, over a period of 12 months, increases the likelihood of adverse health outcomes (increased risk of falls, hospitalisation, disability and mortality). This highlights that gait speed can be a valuable indicator of overall function and mobility in older adults, particularly when integrated into broader frailty or mobility assessments (178).

However, contrasting studies have found that the test offers only moderate accuracy when used on its own and also has some practical challenges, such as limited physical space in smaller clinics or community settings can make it difficult to carry out the test consistently (177).

Falls History (FH)

The FH is a simple, two-question screening tool (179). It asks about the person's own perception of their fall risk and whether they have experienced any recent falls (179).

The tool is quick and easy to administer during routine consultations and requires no physical equipment or testing. Studies have shown that this tool offers strong predictive validity as a first-line screen (177,179), making it a useful starting point for identifying people who may be at higher risk.

This tool is ideal for opportunistic screening in time-pressured or resource-limited settings, helping people who require more detailed falls risk assessment or referrals (177).

Table 3.10. RACGP recommendations for falls risk assessment

Guidelines	**Recommendations**	**Frequency**	**Target population**	**Recommendation grade**
Red Book 10th Ed	• GPs should routinely ask about falls in interactions with community-dwelling older adults, asking whether they have experienced a fall in the past year. Screening for falls in Aboriginal and Torres Strait Islander people is from the age of **≥50** years. • Older adults who had a single, non-severe fall but also have gait and or balance problems should be considered as being at 'intermediate risk' • Older adults at high risk should be offered a multifactorial falls risk assessment. Tools that assess more than one fall risk factor, such as the **3 Key Questions (3KQ),** have higher sensitivity. The 3KQ are: ○ Have you fallen in the past year? ○ Do you feel unsteady when standing or walking? ○ Do you have worries about failing? For further information on falls prevention, refer to section Injury Prevention - Red Book.	Annually Annually Annually	65+ years	Strong

Silver Book 5th Ed	Several office tests can help assess fall risk. If available, a physiotherapist is ideal for tests like gait and balance assessment, These tests include: ○ observing the patient's gait ○ Romberg test which is a test for proprioception. ○ TUG test ○ Single-leg stance in which patient stands on one leg on a firm surface with their eyes open for 10 seconds. ○ Sternal push which evaluates the ability of the patient to respond to an external stress. ○ Shoulder tug test involves the patient standing with feet close together and eyes open. The examiner, standing behind, gives a warning and briefly tugs both shoulders backward. ○ tandem gait or heel–toe walking ○ functional reach ○ ability to multitask: 1) Walk and talk: Does the person need to stop walking to engage in conversation? 2) Perform simple arithmetic while walking: Does gait speed slow significantly? For further information on assessing falls risk and prevention, refer to part A. Falls - Silver Book	Not specified	65+ years	Practice point

Cognitive impairment

Cognitive impairment is a common and growing concern in older adults, encompassing a spectrum from mild cognitive impairment (MCI) to more severe conditions such as dementia (180). It is a leading contributor to disability and dependency in later life, impacting quality of life, decision-making and the ability to manage other health conditions.

While there is ongoing debate about when cognitive abilities begin to decline, long-term studies have shown that decline can begin as early as middle age and it typically accelerates with advancing age (180). In Australia, an estimated 7.7% to 33.3% of adults aged 65 and over are living with some level of cognitive impairment (180).

The RACGP advises against population-based cognitive screening, citing limited evidence of clinical benefit and highlighting potential harms, including overdiagnosis, unnecessary anxiety and inappropriate follow-up (5). Chambers et al. (181) further suggest that dementia testing in asymptomatic patients could lead to potential consequences including risk of inaccurate labelling, stigma and unintended impacts on a person's daily life, such as early loss of employment, restrictions on driving, reduced independence and diminished ability to manage financial or healthcare decisions. The RACGP encourages a case-finding approach, where cognitive assessment is considered if there are concerns raised by the patient, family, or clinician, or if the person has known risk factors such as memory loss, behavioural changes, concerns raised by family members, a history of repeated head trauma, Down syndrome, elevated cardiovascular risk, or depression (5).

In such cases, validated screening tools may be used as part of a broader clinical assessment, including in the 75+ health check.

Clock Drawing Test (CDT)

The Clock Drawing Test (CDT) is a well-established and easy-to-administer cognitive screening tool (182). The test involves asking the person to draw a clock face showing a specific time, testing memory, planning, spatial awareness and executive function (182). The CDT takes only a few minutes, requires minimal equipment or training and is particularly useful in detecting moderate to severe cognitive impairment (119, 120).

The CDT is less sensitive to early or mild cognitive impairment and can give false positives in patients where performing CDT may be affected by poor vision or motor issues (183).

General Practitioner Assessment of Cognition (GPCOG)

The GPCOG is a validated screening tool designed for use in primary care. It comprises two parts: a brief cognitive test for the patient and, if necessary, an informant questionnaire is completed by someone who knows the patient (184). The patient assessment takes less than five minutes, while an informant interview takes about 2 minutes to complete (184). This test has been validated and can be easily administered by any primary care worker (183,184).

The GPCOG has a high diagnostic accuracy and is well-suited for general practitioners due to its time efficiency (183). However, because most of the assessment tasks rely on writing or drawing, similar to CDT, the tool's effectiveness can be influenced by the patient’s physical capabilities, such as vision or hand dexterity (arthritis or tremor) (183).

6-item Cognitive Impairment Test (6-CIT)

The 6-Item Cognitive Impairment Test (6-CIT) is a concise, verbally administered six-question screening tool that evaluates memory, orientation and attention in older adults (183).

The 6-CIT takes under 5 minutes, is suitable for telephone or face-to-face settings, making it well-suited for busy clinical settings. This test is well-validated across multiple settings and is practical and effective, particularly for rapid screening of cognitive dysfunction in busy practices (183).

Mini-cog

The Mini-Cog is a freely available screening tool that combines a three-item recall test with a clock drawing test (CDT), offering a quick and effective screen for dementia as it takes about three minutes to complete (185). It has demonstrated high sensitivity and specificity for dementia detection, meaning it is effective in identifying individuals who may have cognitive decline, while minimising false positives (186).

This tool is both quick and practical and does not require extensive training or licensing, making it ideal for busy or resource-limited healthcare settings (186).

Mini-Mental State Examination (MMSE)

MMSE is the most widely used standardised tool for global cognitive screening, taking about 5-10 minutes and useful for baseline and serial assessments. MMSE assesses the following aspects of cognitive function:

- orientation;

- immediate and delayed recall;
- attention and calculation;
- language and visuospatial skills (187).

Evidence supports the validity and clinical use of MMSE, however, some studies suggest the tool is not able to diagnose changes in specific cognitive domains and, therefore, should not replace a complete neuropsychological assessment (187). The MMSE is also subject to copyright restrictions.

Standardised Mini-Mental State Examination (SMMSE)

The RACGP Red Book recommends the use of the Standardised Mini-Mental State Examination (SMMSE) as a cognitive screening tool for assessing dementia (5). This recommendation replaces the Mini-Mental State Examination (MMSE) due to copyright restrictions (5). The SMMSE offers a structured, consistent format for evaluating dementia symptoms but should be used in conjunction with comprehensive history-taking and functional assessment (188).

Table 3.11. RACGP recommendations for cognitive and dementia assessment

Guidelines	**Recommendations**	**Frequency**	**Target population**	**Recommendation grade**
Red Book 10th Ed	Screening for dementia in general population is not recommended	N/A	Older adults	Not recommended (strong)
	GPs should be alert to the symptoms and signs of dementia,	Opportunis-tically	Not specified	Conditional
	If any symptoms are found over several consultations, performing a comprehensive physical examination or administering one of the following cognitive tests is recommended: • **Standardised Mini-Mental State Examination;** • **General Practitioner assessment of Cognition;** • **Clock drawing test;** • **Rowland Universal Dementia Assessment Scale (RUDAS):** for detection of dementia across cultures); • **Kimberley Indigenous Cognitive Assessment (KICA)** tool as a component of dementia assessment for Aboriginal and Torres Strait Islander peoples living in remote areas; • **Modified KICA**, which may be used as a component of dementia assessment in more urban Aboriginal and Torres Strait Islander peoples. For more information on assessing and managing dementia, refer to Mental health and substance use, Dementia – Red Book. Dementia section - National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people and the Best-practice guide to cognitive impairment and dementia care for Aboriginal and Torres Strait Islander people attending primary care.	N/A	Not specified	Practice point

Silver Book 5th Ed	The following six steps should be included in consultation with symptomatic patients: • Cognitive function test (as listed above) • Pathology tests: routine haematology, biochemistry, including electrolytes, calcium, glucose, renal and liver function tests, thyroid function test and B12 and folate levels. • Imaging including chest x ray may also be necessary to exclude chest pathology causing delirium. • Assessment for depression (assessment tools discussed above) • Medication review (assessment tools discussed above) • Functional assessment (assessment tools discussed above)	Not specified	65+ years	Conditional

Cancer

Cancer remains a major cause of illness and death in older Australians. In 2024, about 2,800 out of every 100,000 people in their 80s are expected to be diagnosed with cancer. Nearly 9 in 10 (about 88%) diagnoses occur in people aged 50 and over (189). However, incidence is also rising in younger age groups, particularly those aged 30 to 49 years (189).

Cancer screening plays a crucial role in detecting disease at an early stage, often before any symptoms appear, leading to more effective treatment, higher survival rates and better quality of life (190). While free national screening programs are available in Australia, GPs play a critical role in cancer detection, as they are often the first point of contact for patients with potential symptoms (191).

National Cancer Screening Register (NCSR)

The National Cancer Screening Register (NCSR) provides a central, secure, digital platform that supports Australia's cervical and bowel cancer screening programs. The national lung cancer screening program is to be integrated from July 2025 (192).

Linked with key national health infrastructure, including Medicare, the Healthcare Identifiers Service, myGov and major pathology laboratories, the NCSR allows GPs to:

- access patients’ screening histories and test results;
- receive prompts for follow-up;
- identify patients due or overdue for screening (56).

Clinicians can access the register via a secure provider portal or compatible clinical software, streamlining workflows and enabling opportunistic screening during routine consultations (192,193).

National Bowel Screening Program Kits (iFOBT)

Healthcare providers can now order and distribute free bowel screening (iFOBT) kits in bulk from the National Cancer Screening Register (NCSR) to give directly to eligible patients. This "alternative access to kits" model complements the usual mail-out system and aims to improve awareness, increase participation and reduce barriers to participating in the bowel cancer screening program (194).

NHMRC recommends the following for iFOBT screening (195):

- Average risk: Begin iFOBT screening from age 50–74 years.

- Moderately risk: Screening age 40 years.
- High risk: Screening from 35 years.

Electronic Cancer Decision Screening Tools (eCDSTs)

eCDSTs help GPs make informed decisions by providing recommendations, prompts or alerts using patient-specific data entered into the system or pulled from the electronic health record. These tools can be used during consultations or run continuously in the background to support more personalised, data-driven decisions (196). They include:

CRISP

The Colorectal Cancer Risk Predictor (CRISP) is a web-based tool that estimates an individual's absolute risk of developing colorectal cancer over 5 years (197). A Melbourne study evaluated the impact of colorectal cancer risk assessment using the CRISP tool and found that the use of this risk assessment and decision support tool led to higher overall colorectal cancer screening rates, especially for those who were due for screening (197).

Despite CRISP's strong accuracy in predicting cancer risk, an Australian simulation study with GPs, practice nurses and practice managers found that GPs generally viewed integration pf CRISP into routine screening was time-consuming and often preferred other screening methods, such as colonoscopy for average-risk patients, considering them more effective. However, CRISP's potential in colorectal screening was recognised and there was overall agreement among participants that practice nurses have more capacity and time to use CRISP effectively (198).

iPrevent

iPrevent is an evidence-based breast cancer risk assessment tool that provides personalised risk estimates and management advice aligned with Australian Guidelines. Unlike BreastScreen, which targets women aged 50-74, iPrevent is particularly useful for women under 50, addressing a known screening gap in this age group (199). This tool shows good accuracy in predicting 10-year and lifetime breast cancer risk by gathering information on lifestyle, medical and family history to deliver a series of appropriate risk management options for women depending on their risk level (199).

iPrevent is a user-friendly online tool that allows patients to complete a questionnaire (~30 mins) prior to consultation, generates a personalised report including personalised risk estimates and a management plan. The report is then reviewed during follow up (200).

First Primary Melanoma Risk Tool

This tool was developed by the Melanoma Institute Australia to assist clinicians in shared decision-making with patients about sun protection behaviours, skin surveillance and preventive strategies for melanoma (201). It is intended for individuals who have not previously been diagnosed with a primary melanoma (201).

The tool is based on a published risk prediction model (202) which uses a range of risk factors such as age, sex, skin type, number of moles, family history, sun exposure and history of sunburn to predict the likelihood of developing a first primary invasive melanoma (201).

By providing a quantitative risk estimate, the tool can help clinicians identify patients at higher risk, guide tailored prevention advice, support more appropriate scheduling of skin checks or referrals to dermatology and promote risk-appropriate sun protection strategies (201).

RACGP endorses the use of risk prediction tools developed by Melanoma Institute Australia, as well as the Melanoma Risk Predictor and Keratinocyte risk score developed by QIMR Berghofer Medical Research Institute (5).

Table 3.12. RACGP recommendations for breast, cervical, colorectal, skin and prostate cancer screening

Guidelines	**Recommendations**	**Frequency**	**Target population**	**Evidence grade**
Red Book 10th Ed	Breast cancer - For asymptomatic, average-risk or slightly higher-risk women, screening mammograms and active recalls for 50-74 year old women is recommended. - For women at potentially high risk or carrying a mutation, offer referral to a familial cancer clinic for risk assessment, possible genetic testing and a risk reduction management plan. For quick risk prediction of breast cancer, RACGP has recommended the use of **iPrevent.** For more information on assessing and managing breast cancer, refer to Breast Cancer – Red Book and Prevention and early detection of breast cancer chapter- National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people.	Every 2 years	50-74 years	Conditional
	Cervical cancer - Women and people with a cervix who have ever had sexual contact and are eligible should have a screening test, either self-collected or clinician-collected. Women aged 75+ who have never been screened or not screened in the past five years can request a cervical screening test. For more information on cervical cancer assessment and management, refer to Cervical Screening– Red Book and Prevention and early detection of cervical cancer chapter - National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people,	Every 5 years	25-74 years 75+	Strong
	Colorectal (bowel) cancer - **iFOBT** is recommended for those at average risk of colorectal cancer. - For people at moderately increased risk of colorectal cancer colonoscopy should be offered starting either at age 50 or **10 years** before their first-degree relative was diagnosed. For more information on colorectal cancer assessment and management, refer to Colorectal Cancer – Red Book and Prevention and early detection of colorectal (bowel) cancer chapter - National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people.	Every 2 years Every 5 years	Not specified	Conditional

	Prostate Cancer Offer men the opportunity to discuss the potential benefits and harms of PSA testing as a screening test for prostate cancer. If consent is obtained, PSA testing is conditionally recommended to: • men at average risk, aged 50-69, every 2 years; • men at moderate risk, due to their family history, aged 45-69, every 2 years; • men at high risk, due to their family history, aged 40-60, every 2 years. For more information on screening and managing prostate cancer, refer to the Prostate Cancer - Red Book and the National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people, Chapter 19: Prevention and early detection of cancer – Early detection of prostate cancer.	Every 2 years		Conditional
	Skin cancer: • For individuals with average and below risk, skin checks are not recommended. • Opportunistic examination of the skin is recommended for individuals at above-average risk of developing melanoma or keratinocyte cancer. • Regular skin checks for those at high risk. Individuals at very high risk of developing a new primary melanoma should be checked regularly by a clinician with six-monthly full skin examination supported by total body photography and dermoscopy. For more information on scare cancer screening and management, refer to Skin Cancer – Red Book, and for specific recommendations for Aboriginal and Torres Strait Islander people, refer to the national guide to a preventive health assessment for Aboriginal and Torres Strait Islander people.	No more than once every 12 months Every 12 months Every 6 months (practice point)	Not specified	Conditional

Cardiovascular diseases

Cardiovascular disease (CVD) remains one of the leading causes of morbidity and mortality in Australia (203). Data from the 2022 National Health Survey conducted by the Australian Bureau of Statistics indicate that approximately 1.3 million adults, or 6.7% of Australians aged 18 years and over, reported living with heart, stroke or vascular conditions, while 3.0% reported having coronary heart disease, including angina and myocardial infarction (204).

The prevalence of CVD increases with age, affecting nearly 28% of adults aged 75 years and older (204). This age-related increase is attributed to structural and functional changes in the cardiovascular system, which collectively elevate CVD risk and related complications. As a result, older adults bear a significant burden of disease, disability, hospitalisation and poor quality of life due to cardiovascular disease (205).

Tailoring cardiovascular risk screening to a person's age, clinical profile and social context during routine health checks can improve detection and promote timely, comprehensive preventive care and improve heart health outcomes (206). Tools that integrate individual data into risk models, such as digital decision support tools, can help primary care clinicians quickly assess a patient's CVD risk and guide personalised care (207). Two notable tools in Australian primary care include the Framingham Risk Score (FRS) and the Australian CVD Risk Calculator (AusCVDRisk).

Framingham Risk Score (FRS)

The Framingham Risk Score is one of the earliest and most widely validated tools for assessing cardiovascular risk. Developed from the Framingham Heart Study cohort in the United States, it estimates the 10-year probability of a cardiovascular event such as myocardial infarction or stroke. The model includes conventional risk factors: such as

- age and sex;
- total and high-density lipoprotein, cholesterol;
- systolic blood pressure (treated or untreated);
- smoking status and
- presence of diabetes (208).

The FRS is supported by a Class I recommendation in the American College of Cardiology (ACC) and American Heart Association (AHA) guidelines for risk assessment in asymptomatic adults (209). The Framingham Risk Score can be efficiently administered as it is integrated into many clinical software programs, enabling automated calculations using existing patient data, enhancing both the accuracy and efficiency of risk stratification in routine care (209).

AusCVD Risk Calculator

In Australia, GPs have traditionally used a heart disease risk calculator based on the Framingham Risk model, which came from an older U.S. study of mostly white participants, using data from the 1960s to 1980s. This tool has since been found to underestimate cardiovascular risk in today's Australian population and to miss important factors like socioeconomic disadvantage, which increases the risk of heart attack and stroke (210). To address these issues, the National Heart Foundation of Australia, on behalf of the Australian Chronic Disease Prevention Alliance, led the development of the 2023 Australian Guidelines for Assessing and Managing Cardiovascular Disease Risk, with a new risk calculator: the Australian CVD Risk Calculator (AUSCVD Risk) (210).

The updated tool is based on the PREDICT equation from New Zealand (209), which includes additional risk modifiers such as:

- ethnicity;
- social deprivation index;
- atrial fibrillation;
- diabetes-specific markers and
- use of current cardiovascular medications (210).

The AUSCVD Risk Calculator estimates a person's five-year risk of hospitalisation or death due to heart disease, stroke, or other cardiovascular events. It provides a percentage risk score and includes optional inputs to refine risk estimates for people with type 2 diabetes (211). AUSCVDRISK is also used as part of Medicare-funded Heart Health Checks, a 20-minute consultation designed to assess a patient's likelihood of developing cardiovascular disease (212). These checks are recommended every two years for both men and women aged 45 years and over, or 30 years and over for Aboriginal and Torres Strait Islander peoples (212).

AUSCVD Risk calculator is endorsed by the RACGP and recommended by the Australian guideline for assessing and managing cardiovascular disease risk (211). However, the AUSCVD risk calculator is only designed for individuals aged up to 79 years. Since its risk estimates are based on data from a younger age group (30–79 years), it may not provide accurate predictions for those aged 80 and above. For people in this older age group, cardiovascular risk should be assessed and managed based on individual clinical judgment.

The calculator is easy to use in clinical practice and is readily available online. However, unlike previous calculators that were integrated into most clinical software systems, this tool requires manual entry of patient information, which may increase the administrative burden in busy primary care practices and limit its uptake unless better integration into clinical workflows is achieved (213).

Table 3.5. RACGP and National CVD screening recommendations

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Red book 10th Ed (5)	Opportunistic screening for hypertension in the general population from age 18 years is recommended.	Opportunis-tically	18+	Strong
	Assessing cardiovascular disease (CVD) risk in all people using the **AUSCVD Risk Calculator**	Every 5 years	45-79	Strong-
	In adults with low CVD risk, blood tests (for lipid levels) results within five years may be used for review of CVD risk, unless there are contrary reasons to review more regularly.		Not specified	N/A
	Routine measurement of cholesterol before the age of 45 is not recommended.			Generally not recommended
CVD risk assessment guidelines (214)	Assess CVD risk for all people without known CVD using AUCVD RISK		45-79 years	Conditional
	Assess CVD risk in people with diabetes without known CVD using AUSCVDRISK		35-79 years	Conditional
	For First Nations people without known CVD: • assess individual CVD risk factors from age 18 to 29 years; • assess CVD risk using the AUSCVD RISK from age 30 to 79 years.			Practice point

Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) is more prevalent among older Australians, with rates rising significantly with age. While the overall prevalence of COPD in Australia is estimated at around 2.5%, data from the Australian Bureau of Statistics show that 7.0% of people aged 65 and over have COPD (215). Older age is a recognised risk factor for COPD, largely because the disease develops gradually over time. Long-term exposure to risk factors such as cigarette smoke, biomass fuels and certain occupational hazards contributes to its onset (216). Emerging evidence also suggests that biological ageing processes may interact with, or even accelerate, the cellular mechanisms that lead to COPD, indicating that normal ageing itself may play a role in disease development (216).

Despite its burden, COPD often remains underdiagnosed or misdiagnosed in primary care (217). This is largely due to inconsistent use of spirometry, ‘a universally advocated tool’ recommended in clinical guidelines for confirming COPD and enabling timely intervention (217). Barriers to the routine use of spirometry include limited time during consultations, staffing shortages, variability in equipment quality, insufficient training and a lack of clinician confidence in interpreting results (218).

While spirometry remains the gold standard, alternative symptom-based questionnaires, which can assess COPD risk factors such as smoking history and symptoms commonly associated with COPD, may be helpful as an initial screening tool to identify patients who may be at risk, particularly in settings where access to spirometry and other respiratory function test devices are limited. These symptoms-based screening tools could also be readily implemented as self-administered questionnaires or as part of nurse-led screening in primary care settings.

COPD Population Screener Questionnaire (COPD-PS)

A Clinician Working Group, based in the US, developed a simple, self-administered tool called the COPD-PS to help identify people in the general community who may be at higher risk of developing COPD (219). The tool includes five short questions:

- one related to age;
- one related to smoking habits;
- three about common COPD symptoms such as breathlessness, a persistent phlegmy cough, and difficulty with physical activity (219).

The tool has been tested in various countries and has shown moderate to good accuracy in identifying people who are likely to have or develop COPD (219–221). However, the use of COPD-PS has not yet been validated in younger adults as it has been studied only in patients 50 and older (221,222).

The COPD Diagnostic Questionnaire (CDQ)

CDQ is one of the most widely used screening tools in clinical practice (223). It consists of eight questions covering demographics, smoking history and respiratory symptoms and is designed for use in people aged 40 and over who have a history of smoking but no previous diagnosis of a respiratory condition. The aim of the CDQ is to help identify individuals in the general population who may have airflow limitation, facilitating early detection of COPD (224).

Participants receive a score out of 38 and are then grouped into three risk categories: decreased likelihood (score <16.5), intermediate likelihood (≥16.5–<19.5) and increased likelihood (≥19.5) of having airflow obstruction (224). Research suggests that individuals in the increased likelihood group should be referred for spirometry while those in the decreased likelihood group are unlikely to need further testing in most cases (224).

Although the CDQ showed high accuracy in its initial development, later studies have reported mixed results (225). A 2022 study found the tool to be reasonably good at identifying people who may have COPD, with sensitivity ranging from 79.7% to 93.9%. However, its specificity was low (24.4% to 46.8%) meaning it may produce false positives. Overall, the CDQ has demonstrated moderate accuracy and is best used as a preliminary screening tool to guide further investigation (224).

PRECURSOR (predicting your patient's risk of airway obstruction)

Developed in Australia, the PRECURSOR risk prediction model is based on a questionnaire for adults in their 40s that provides data to estimate their risk of developing COPD in their 50s (221). This model was developed and validated using data from two of the world's largest general population respiratory cohorts and is specifically designed for younger adults who may not yet show obvious symptoms (221). It is currently being adapted into a web-based format, to enable people in their 40s to complete it online, potentially via an invitation sent through SMS, email or post (221). Once completed, a summary report could be sent directly to their general practice for follow-up (221). This model offers a promising way to identify those at high risk of developing COPD over the next 10 years, enabling earlier monitoring and intervention long before symptoms become apparent (226). This tool has been proposed as a standardised risk assessment for COPD for 'younger' high-risk individuals that could be used in the 45- to 49-year-old health check or as a standalone tool for adults aged in their 40s (221).

Table 3.14. Recommendations for primary care on COPD by Lung Foundation Australia

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
COPD-X Concise Guide, (endorsed by RACGP) (227)	Begin with a thorough history and examination for COPD, document history of: • respiratory symptoms (including exertional breathlessness, cough, sputum, chest infections, or exacerbations); • smoking and vaping; • occupational exposures environmental exposures; • premature birth childhood and respiratory problems; • asthma; • age of onset of symptoms; • family history.	N/A	N/A	Strong
	• Use the Lung Foundation Australia's 2-minute Lung Health Checklist to identify patients needing spirometry. • Share the link for completion at home, in the waiting room, or during consultations. • Incorporate the checklist into Health Assessments or Care Plan visits. • Consider identifying high-risk patients (e.g. over 35 with a smoking history and no spirometry) or link it to a CPD Measuring Outcomes audit.	Opportunistically	N/A	N/A
	Perform or arrange spirometry for people aged 35+ with any of the following: • current or past smoking; • new or persistent cough; • mucus production; • breathlessness; • chest tightness or wheeze; • recurrent chest infections; • or relevant occupational exposure.	N/A	35+	Strong

🟦	For more information on COPD assessment and management, refer to COPD-X Handbook			🟩

Palliative care needs

As patients reach the advanced stages of chronic or life-limiting illnesses, they often experience a high burden of pain, physical and psychological and spiritual symptoms. At this stage, individuals with any progressive condition may benefit from palliative care (228). The goal of palliative care is to prevent and relieve suffering and help people live as fully and as comfortably as possible with a life-limiting or terminal illness (228,229).

Early identification of palliative care needs and timely initiation of supportive interventions are associated with:

- improved symptom control;
- better care coordination;
- enhanced patient and caregiver satisfaction;
- reduced unplanned hospital admissions (89).

Advance care planning (ACP) discussions, which are a key part of palliative care, should be routinely integrated into general practice, particularly during structured health assessments such as the 75+health Assessment (75+HA).

A qualitative study exploring the barriers and enablers to implementing ACP in primary care found that practice nurses and GPs see real value in incorporating these conversations into existing consultations. Embedding ACP into Medicare-funded assessments like the 75+HA not only creates a natural touchpoint for these discussions but also helps address financial barriers by allowing the activity to be reimbursed under current item numbers (230).

Routine screening for palliative care needs can support early recognition of functional, decline, frailty, and disease progression, allowing for timely referrals to specialist services and ensuring more older adults engage in advance care planning and receive appropriate end-of-life care (231).

Surprise Question (SQ)

The SQ (Surprise Question) is a quick, intuitive screening prompt that asks the clinician: “Would you be surprised if the patient were to die in the next 6-12 months?”. If the answer in “no”, this may indicate a need for further palliative assessment.

The SQ has been found to identify unmet palliative care needs in 41% to 79% of patients with advanced progressive diseases (232). However, the tool’s subjectivity and variability in clinician judgment can limit its standalone accuracy (232).

SPICT (Supportive and Palliative Care Indicator Tool)

The SPICT is a more structured and evidence-based tool used to identify people with deteriorating health and one or more life-limiting conditions who may benefit from a palliative approach to care (231). SPICT helps clinicians assess:

- functional decline;
- escalating illness burden;
- increased need for care or support and

- clinical indicators of poor prognosis (e.g. frequent hospitalization, weight loss and multimorbidity) (91).

Compared to the SQ, SPICT offers greater accuracy and encourages a patient-centred, multifactorial assessment (232). SPICT is freely available online, along with a detailed user guide and is widely used internationally across primary, aged care and community settings (231).

Table 3.15. RACGP recommendations for palliative care needs assessment

Guidelines	Recommendations	Frequency	Target population	Recommendation grade
Silver book (5th Ed)	Assess general features of decline: • deteriorating health status; • increasing care needs; preference for no further life-prolonging treatments Assess clinical indicators: • disease progression (e.g., cancer, heart failure, dementia, COPD) and • its clinical manifestations. Assess palliative care needs using: **SPCIT and/or Surprise Question** For more information on identification, assessment and management of palliative care needs, refer to part A. Palliative and end-of-life care – Silver Book	N/A	Age not specified	Practice point

Carer needs assessment

Carers provide an estimated 75% to 80% of care to older adults living in the community (233). In Australia, around 2.65 million people (about 11% of the population) act as informal carers (234). These are people who care for someone within an existing relationship, such as a family member, friend or neighbour (235). Most informal carers are unpaid, although some may receive income support or access other assistance services (235).

While much of the research on caregiving focuses on the carer role in helping a person with activities of daily living, a less explored but critical part of the carer role is navigating the healthcare system (233). Recognising the vital contribution carers make, several professional organisations have called for greater support and formal inclusion of carers within healthcare settings (233).

A UK study exploring the views of health and social care providers for older adults found that, although the role of primary care in supporting carers is recognised, most participants felt that current support is lacking (236). Some positive practices were identified by the participants of this study such as the use of carer champions, carer registers, quicker referrals to social care and more carer-aware cancer and dementia services. However, overall support for carers was seen as inconsistent, with much of the burden falling on social care services. Stakeholders agreed that primary care, in collaboration with other health and care services, has an important role in more proactively identifying and supporting carers (236).

Some of the brief and validated carers' needs assessment tools identified in literature are:

Zarit Burden Interview (ZBI)

The Zarit Burden Interview (ZBI) is one of the most commonly used tools for assessing caregiver burden (237). Originally developed as a 29-item questionnaire, it was later shortened to 22 items, with further research supporting further shortened versions, including 12-item and 4-item formats (237,238). Higginson et al. validated the shorter ZBI versions in carers of people with advanced cancer, dementia, and acquired brain injury (239). A German study also tested the ZBI-7 and ZBI-1 in primary care and found both to be reliable and valid (238). These shortened versions, especially the ultra-short ZBI-1, offer a quick measure of caregiver burden and these versions can be self-administered by carers or completed by health professionals in clinical settings (238). According to the American Psychological Association, the ZBI has been translated into several languages, including Chinese, French, Japanese, German, Hebrew, Spanish, Korean, Hindi, and Portuguese. However, the Chinese version showed poor validity and the Hebrew version had lower reliability than the English version. Information on other translations is limited (240).

Carer Support Needs Assessment Tool (CSNAT)

CSNAT is a brief, evidence-based tool designed to directly measure the support needs of carers. A validation study has shown that CSNAT is easy to understand and shows content validity and that it effectively captures the key areas where carers may need help (241). The tool is suitable for both research and everyday use in palliative care due to its comprehensive yet easy-to-administer format. According to the CSNAT-I website, this tool is available in 19 languages (242) and encompasses 15 broad domains (broad areas of support needs) to help practitioners identify areas where carers require additional assistance, both in caring for someone at home and in managing their own health and wellbeing (243). This tool also serves as a prompt for meaningful, needs-based conversations between carers and practitioners, helping to tailor support to an individual’s situation (243).

Barriers and enablers to effective screening for healthy ageing

Implementing quality improvement strategies in primary care

Quality improvement (QI) is defined as “a process of approaching systemic problems in healthcare” (244). In general practice, care is delivered by a wide range of staff with different roles and training, all working within a system that utilises electronic medical records and other technologies – how staff, systems and patients interact with each other can directly shape the quality and outcomes of care (244). QI aims to improve these processes so that care becomes more reliable, consistent and patient-focused (244). QI strategies include academic detailing (evidence-based clinical education), practice facilitation, data analysis and reflective practices to promote shared responsibility for improved patient care (244–246). There is strong evidence that QI leads to safer, more effective care, especially when the whole practice team is involved (245). For example, to address low cancer screening rates in the United States, a study assessed the impact of QI strategies in primary care practices across multiple primary care clinics in New York. The study found that, when practices participated in academic detailing and project facilitation, rates of breast and colorectal cancer screening increased significantly after the intervention when compared with the pre-intervention screening data (extracted from primary care electronic medical records) (246).

The RACGP *Standards for General Practices* (5th edition) (5) encourage practices to regularly review their systems, processes and structures as part of QI efforts to help identify areas for change and support better, safer care (244). Additionally, practices can also participate in programs like the

Practice Incentives Program Quality Improvement, which provides financial support for ongoing QI activities (247).

Incorporating patient-centred tools

In primary care, Patient-Reported Measures (PRMs) and Patient Activation Measures (PAMs), play a significant role in facilitating person-centred care and can be used to benchmark quality improvement in healthcare.

Patient reported measures (PRMs) and activation measures (PAMs) are surveys/tools that collect information directly from patients about their healthcare experiences, health outcomes (248) and knowledge skills and confidence in managing their health (249).

PRMs are of two main types: Patient-Reported Experience Measures (PREMs), which capture patients' perceptions of their interactions with healthcare services (248) and Patient-Reported Outcome Measures (PROMs), which assess a person's views on their quality of life, daily functioning, symptoms and overall health and wellbeing (250).

In addition to standard screening tools, practices may benefit from incorporating validated patient measures to support proactive and person-centred care planning. Routinely collecting and integrating PROMs, PREMs and PAMs into electronic health records can enable clinicians to actively use this data in day-to-day practice to enhance clinical interactions, support shared decision-making and facilitate more tailored, patient-centred care (250). At a broader level, aggregated patient data can be used for systematic evaluation, quality improvement and benchmarking across and with other services (251). These activities support a shift toward value-based healthcare by driving improvements in care delivery and outcomes. Evidence shows that such mechanisms can help raise care standards within and across practices and healthcare institutions (251).

In primary care, these measures can be used at various stages of the care journey, such as before consultations (for example, via tablets in waiting rooms or online platforms), during assessments to guide discussions, or after visits to monitor outcomes and progress over time.

PREMS in primary care

The *RACGP Standards for general practices (5th edition)* (252) provides for practices to collect feedback from patients, carers and other relevant parties in line with the *RACGP's Patient Feedback Guide* (253). Practices are also expected to analyse and respond to this feedback and communicate back to patients how their input has been used to improve quality (253). As well, the Australian Commission on Safety and Quality in Health Care has developed the Australian Hospital Patient Experience Question Set as a free patient experience measure tool for hospital settings (250). However, there is currently no nationally endorsed or standardised PREM specifically designed for use in primary care in Australia.

The RACGP recommends several options for gathering patient experience data (253). These include the use of commercial tools approved by the RACGP, such as Insync's Patient Satisfaction Instrument (PSI) and CFEP Survey's Patient Accreditation Improvement Survey (PAIS), both of which are fee-based. Alternatively, practices may choose to develop their own feedback tools using the RACGP Toolkit for developing practice-specific questionnaires (253).

A validated PREM tailored for Aboriginal and Torres Strait Islander people accessing primary health care is also in development (254). The purpose of this PREM is to support primary healthcare services in delivering more culturally responsive, person-centred care and to improve health outcomes for Aboriginal and Torres Strait Islander people (254).

PROMS in primary care

To strengthen patient-clinician collaboration, the Australian Commission on Safety and Quality in Health Care has published a list of validated Patient-Reported Outcome Measures (PROMs) for assessing both general health and specific high-burden conditions (250). These tools are readily available on the Commission's website, allowing primary care clinicians to choose tools that best align with their clinical context and the specific needs of their patients. Additionally, the International Consortium for Health Outcomes Measurement (ICHOM), an independent non-profit based in Boston, has developed 46 concise, evidence-based standardised sets of patient-centred outcome measures (255). These sets prioritise both clinical and quality-of-life outcomes across the life course, from childhood through advanced age and include outcome measures for areas such as cardiometabolic health, cancer, mental health, urology, infectious disease, and vision. Examples of some of these sets are presented in Box 3.16. (255).

Box 3.1. ICHOM sets of patient-centred outcome measures

Life-Course Standard Sets

1. Overall Adult Health Standard Set

- **Population**: Adults aged 18+
- **Domains covered**: General health, functioning, mental health, social support, quality of life
- **PROMs used**: PROMIS Global Health v1.2, WHO-5 Well-being Index, WHO Disability Assessment Schedule 2.0.

2. Older Persons Standard Set

- **Population**: Adults aged 65+ or those with frailty or multimorbidity
- **Domains covered**: Functioning, cognition, falls, mobility, social isolation, carer needs
- **PROMs used**: UCLA 3-item Loneliness Scale, 36-Item Short Form Survey Instrument Version 1 (SF-36), Adult Social Care Outcomes Toolkit, Zarit Burden Interview 4-item screening questionnaire, Canadian Study on Health & Aging Clinical Frailty Scale

Condition-Specific Standard Sets

3. Dementia Standard Set

- **Population**: People living with dementia and their carers
- **Domains covered**: Cognitive decline, behavioural symptoms, mood, functional ability, carer impact
- **PROMs used**: Neuropsychiatric Inventory (NPI), Bristol Activity Daily Living Scale (BADLS). Clincal Dementia Rating

4. Diabetes Standard Set

- **Population**: Adults with type 1 or type 2 diabetes
- **Domains covered**: Glycaemic control, acute events, complications, service use, diabetes distress, depression
- **PROMs used**: WHO-5 Wellbeing Index, PHQ-9

PAMs in primary care

The active involvement of patients in medical discussions and decision-making has long been recognised as essential (255). Active involvement, or referred to as patient activation in literature, is the heart of personalised care, and is defined as “an individual's knowledge, skill and confidence for managing their health and health care” (256).

Research shows that people with higher activation levels tend to have better health habits, manage long-term conditions more effectively and have better overall health outcomes (257). Those with lower activation levels are less likely to follow healthy behaviours and are more likely to experience poorer health and frequent hospital visits (258).

Despite growing consensus on the value of patient activation and engagement in delivering high-quality, person-centred care, it remains limited and underutilised in primary care QI initiatives (258). A key barrier to this is the lack of experience and systems in place to support and measure activation effectively (258).

Whilst many patient activation tools have been developed and validated, there are no nationally consistent tools to measure the behaviours of patients in response to their care (259). Over 600 peer-reviewed, published studies worldwide support the use of PAM survey (the PAM) as a validated scale (259) to measure an individual’s self-efficacy skills (i.e. the confidence to exert control over motivation and behaviour) and subsequent capacity and willingness to engage in health and self-care (260).

There are two versions of the PAM, a 10 and a 13-item survey that provide a quick assessment of a person’s activation level (259). Based on survey responses, individuals are placed into one of four activation levels (259):

- Level 1: Disengaged and overwhelmed (low activation).
- Level 2: Becoming aware but still struggling.
- Level 3: Taking action.
- Level 4: Maintaining behaviours and striving for improvement (high activation).

The PAM has been used to inform clinical practice through the provision of information, tailored support, interventions and health coaching to patients based on their activation level (260).

Other tools to measure patient activation are discussed in Chapter 9 of this review.

Continuous care and improved referral pathways

Inadequate follow-up care or support after initial screening or treatment can leave patients feeling disengaged and unsupported (261). Evidence shows that coordinated and continuous care is associated with better health outcomes, including improved chronic disease management and lower hospitalisation rates (262). Fragmented care can lead to delayed diagnoses, medication errors, unnecessary repeat investigations and high healthcare costs (263). This fragmentation is commonly experienced by patients living in rural and remote areas (262) and those from culturally and linguistically diverse backgrounds (264).

Fragmented care occurs more often when healthcare professionals practice disease-centric care, work in silos (265) or have low engagement and confidence to explore the social determinants of health in their routine practice, missing the opportunity to collaborate with other care providers or to link at-risk patients with social services (266). Without clear, coordinated continuous care pathways, including referral to specialists or developing follow-up care plans, screening becomes a disconnected process, particularly for older adults or those with multiple health and social needs, leading to gaps in care and poorer health outcomes. Continuous care requires deliberate effort to guide patients through the complex healthcare system, from the first consultation through to follow-up (261). Clinical guidelines, such as the *RACGP Standards for General Practice (5th Edition)* (252) and the *Red Book* (5), recommend that, when a screening result is positive, GPs should promptly organise a follow-up appointment and clearly explain the result and the next steps. Using proactive strategies such as recalls and reminders increases the likelihood that patients will return to the practice, for example, to review test results or take part in preventive health activities like cancer screening (252). While a positive screening result does not confirm a diagnosis, it indicates the need for further investigation, such as referring a patient for a colonoscopy after a positive bowel cancer screen (5).

Referrals are part of continuous care, particularly for patients with complex health needs and, therefore, strengthening referral pathways is essential (267). Well-designed referral pathways can enhance multidisciplinary care planning, support consistent clinical standards, improve patient and provider communication, and reduce unnecessary variation in care delivery (268). The RACGP recommends early referral for formal assessment and specialist care where needed (5), as well as ongoing monitoring through routine consultations (252). GPs are further encouraged to connect patients with community-based services beyond general practice, such as aged care or allied health supports (252). Warm referrals, where a primary care clinician directly introduces the patient to another service provider, such as a behavioural health clinician, are also increasingly being incorporated for integrated care (269). This approach to care helps build patient trust, improves engagement within services and has been shown to increase attendance and overall satisfaction with behavioural and community health services (269,270).

Follow-up care should be tailored to each individual’s needs, taking into account gender, cultural background and social factors (252). The RACGP emphasises the importance of providing culturally safe care, which may include access to a clinician of the same gender and for Aboriginal and Torres Strait Islander patients, involving a trusted support person such as Aboriginal and Torres Strait Islander health workers, practitioners or nurses (252).

Health literacy, language, and cultural barriers in screening process

Many patients face significant barriers to engaging with health information, particularly those with low health literacy or from CALD backgrounds (271,272). Patients from CALD backgrounds may find screening processes intrusive, particularly when sensitive or culturally stigmatised topics are involved. Others may distrust the process due to past experiences of racism or systemic oppression (273). Cultural safety in clinical practice is key to overcoming these barriers and includes respectful communication, shared decision-making and involving family members in care when appropriate (274). Additionally, using trained interpreters and translated materials/tools/resources can also improve patient understanding and healthcare engagement. Soled et al. (2020) advocate for reconceptualising the use of interpreters as collaborative partners who can “provide valuable insights that extend beyond language interpretation at the bedside and who can function as both language and cultural interpreters and know these patient communities well” (272). In Australia, GPs can access the free Translating and Interpreting Service, though longer consultation times may be needed to use this service effectively, requiring additional funding support (275).

Health systems and information have become increasingly complex and around 60% of Australian adults are estimated to have low individual health literacy, limiting people’s ability to make informed decisions, adhere to treatment or access services effectively (276). While many screening tools, identified in this chapter, are translated into multiple languages, few are designed with health literacy in mind, often assuming a baseline level of medical knowledge and language proficiency that is not generalisable to all patients.

To address health literacy more systematically, the Australian Commission on Safety and Quality in Health Care recommends that practitioners ensure that all health information is in clear language, focused and usable during clinical interactions (276). The Canberra Health Literacy Hub further recommends that, instead of assessing each patient's health literacy, practitioners should assume that all patients may have difficulty understanding and focus on finding out what they already know, sharing clear information, supporting their understanding of their health and treatment options, and helping them navigate the health system (113).

References

1. Australian Chronic Disease Prevention Alliance. ACDPA submission - Development of the National Preventive Health Strategy [Internet]. 2020 [cited 2025 Feb 7].
2. Shaheen NA, Alaskar A, Almuflih A, Muhanna N, Barrak Alzomia S, Hussein MA. Screening Practices, Knowledge and Adherence Among Health Care Professionals at a Tertiary Care Hospital. Int J Gen Med. 2021 Oct;Volume 14:6975–89.
3. Aldrich R. Using socioeconomic evidence in clinical practice guidelines. BMJ. 2003 Nov 29;327(7426):1283–5. https://doi.org/10.1136/bmj.327.7426.1283
4. Australian Institute of Health and Welfare. The ongoing challenge of chronic conditions in Australia [Internet]. 2024 [cited 2025 Sept 4]. Available from: https://www.aihw.gov.au/reports/australias-health/chronic-conditions-challenge
5. RACGP. the Guidelines for preventive activities in general practice (Red Book) 10th Edition [Internet]. 2024 [cited 2025 Apr 29]. Available from: https://www.racgp.org.au/getattachment/52e81aef-5dec-4cf3-a903-fd202246c65f/Guidelines-for-preventive-activities-in-general-practice.aspx
6. RACGP. RACGP aged care clinical guide (Silver Book) [Internet]. 2025 [cited 2025 May 29]. Available from: https://www.racgp.org.au/silverbook
7. RACGP. Putting prevention into practice: guidelines for the implementation of prevention in the general practice setting. Third edition. East Melbourne, Victoria: RACGP; 2018.
8. Ridenour TA, Murray DW, Hinde J, Glasheen C, Wilkinson A, Rackers H, et al. Addressing Barriers to Primary Care Screening and Referral to Prevention for Youth Risky Health Behaviors: Evidence Regarding Potential Cost-Savings and Provider Concerns. Prev Sci. 2022 Feb;23(2):212–23.
9. Iyengar N, Mitchell E. The barriers and enablers of older person health assessments in Australian primary care: clinician and patient perspectives. BJGP Open. 2023 Dec;7(4):BJGPO.2023.0091.
10. Verbunt E, Boyd L, Creagh N, Milley K, Emery J, Nightingale C, et al. Health care system factors influencing primary healthcare workers' engagement in national cancer screening programs: a qualitative study. Aust N Z J Public Health. 2022 Dec;46(6):858–64.
11. Mulvaney-Day N, Marshall T, Downey Piscopo K, Korsen N, Lynch S, Karnell LH, et al. Screening for Behavioral Health Conditions in Primary Care Settings: A Systematic Review of the Literature. J Gen Intern Med. 2018 Mar;33(3):335–46.
12. Iragorri N, Spackman E. Assessing the value of screening tools: reviewing the challenges and opportunities of cost-effectiveness analysis. Public Health Rev. 2018 Dec;39(1):17.
13. Beard JR, Officer A, De Carvalho IA, Sadana R, Pot AM, Michel JP, et al. The World report on ageing and health: a policy framework for healthy ageing. The Lancet. 2016 May;387(10033):2145–54.
14. National Centre for Immunisation Research and Surveillance. Adult vaccination factsheet: vaccines for Australian adults [Internet]. 2017 [cited 2025 May 5]. Available from: https://www.ncirs.org.au/sites/default/files/2018-12/adult-vaccination-fact-sheet.pdf
15. Australian Institute Of Health And Welfare. The burden of vaccine preventable diseases in Australia. 2019 [cited 2025 May 5]; Available from: https://www.aihw.gov.au/reports/immunisation/the-burden-of-vaccine-preventable-diseases/summary
16. Immunisation Coalition. Older Adults: Immunisation remains an important part of ongoing healthcare for older Australians. [Internet]. 2024 [cited 2024 May 5].
17. Better Health Channel. Immunisations for older people [Internet]. 2023. Available from: https://www.betterhealth.vic.gov.au/health/healthyliving/immunisations-for-older-people

18. Services Australia. Australian Immunisation Register [Internet]. 2024. Available from: https://www.servicesaustralia.gov.au/australian-immunisation-register
19. Dolan C. Changes to Reporting Vaccination Encounters to AIR - March 2024 [Internet]. 2024 [cited 2025 May 21]. Available from: https://bestpracticesoftware.com/blog/changes-to-reporting-vaccination-encounters-to-air-march-2024/
20. O'Rilley M. Position Statement: Whole Of Life Immunisation Register [Internet]. Immunisation Coalition. 2014 [cited 2025 July 2]. Available from: https://www.immunisationcoalition.org.au/position-statement-whole-of-life-immunisation-register/
21. HALO principle | The Australian Immunisation Handbook [Internet]. 2019 [cited 2025 May 21]. Available from: https://immunisationhandbook.health.gov.au/technical-terms/halo-principle
22. Australian Government Department of Health and Aged Care. National Immunisation Program Schedule [Internet]. Australian Government Department of Health and Aged Care; 2025 [cited 2025 May 21]. Available from: https://www.health.gov.au/topics/immunisation/when-to-get-vaccinated/national-immunisation-program-schedule
23. Australian Government Department of Health and Aged Care. Catch-up vaccination | The Australian Immunisation Handbook [Internet]. 2025 [cited 2025 May 21]. Available from: https://immunisationhandbook.health.gov.au/contents/catch-up-vaccination
24. Si S, Moss J, Karnon J, Stocks N. Cost-effectiveness evaluation of the 45-49 year old health check versus usual care in Australian general practice: A modelling study. Postma M, editor. PLOS ONE. 2018 Nov 9;13(11):e0207110.
25. Department of Health and Aged Care. Note AN.0.37 | Medicare Benefits Schedule [Internet]. [cited 2025 July 2]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=note&qt=NoteID&q=AN.0.37
26. Department of Health, Disability and Ageing. Heart Health [Internet]. Australian Government Department of Health, Disability and Ageing; 2024 [cited 2025 July 2]. Available from: https://www.health.gov.au/news/heart-health
27. Department of Health and Aged Care. Note AN.0.42 | Medicare Benefits Schedule [Internet]. [cited 2025 July 2]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=note&qt=NoteID&q=AN.0.42
28. Department of Health and Aged Care. Note AN.0.40 | Medicare Benefits Schedule [Internet]. [cited 2025 July 2]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=note&qt=NoteID&q=AN.0.40
29. Ng R, Sutradhar R, Yao Z, Wodchis WP, Rosella LC. Smoking, drinking, diet and physical activity—modifiable lifestyle risk factors and their associations with age to first chronic disease. Int J Epidemiol. 2020 Feb 1;49(1):113–30.
30. Royal Australian College of General Practitioners. SNAP, smoking, nutrition, alcohol, physical activity (SNAP): a population health guide to behavioural risk factors in general practice. [Internet]. East Melbourne, Vic: RACGP; 2019 Sept [cited 2021 Sept 22].
31. Liss DT, Uchida T, Wilkes CL, Radakrishnan A, Linder JA. General Health Checks in Adult Primary Care: A Review. JAMA. 2021 June 8;325(22):2294.
32. Gordon S, Kidd M, Maeder A, Baker N, Marin T, Grimmer K. Health deficits in community dwelling adults aged 40 to 75 years. BMC Geriatr. 2019 Dec;19(1):148.
33. Ward KT, Reuben DB. Comprehensive geriatric assessment [Internet]. 2024 [cited 2025 May 21]. Available from: https://www.uptodate.com/contents/comprehensive-geriatric-assessment
34. Department of Health and Aged Care. Item 145 | Medicare Benefits Schedule [Internet]. [cited 2025 July 2]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=145&qt=item
35. Orcel V, Banh L, Bastuji-Garin S, Renard V, Boutin E, Gouja A, et al. Effectiveness of comprehensive geriatric assessment adapted to primary care when provided by a nurse or a general practitioner: the CEpiA cluster-randomised trial. BMC Med. 2024 Sept 27;22(1):414.
36. Garrard JW, Cox NJ, Dodds RM, Roberts HC, Sayer AA. Comprehensive geriatric assessment in primary care: a systematic review. Aging Clin Exp Res. 2020 Feb;32(2):197–205.
37. Nord M, Lyth J, Alwin J, Marcusson J. Costs and effects of comprehensive geriatric assessment in primary care for older adults with high risk for hospitalisation. BMC Geriatr. 2021 Dec;21(1):263.
38. Australian Government Department of Health and Aged Care. Item 705 | Medicare Benefits Schedule [Internet]. [cited 2025 May 21]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=705&qt=item

39. Monash Research and Education Network (MonREN). What is the effectiveness of the MBS Health Assessment for people aged 75 years and older? Evidence Brief 1 [Internet]. Monash University; 2023. Available from: https://www.monash.edu/
40. White J, Norton G, Pond D, Khaing K, Dolja-Gore X, Byles J, et al. General practitioner and practice nurses perspectives on implementation of the 75+ health assessment: Implications for dementia care and well-being. J Adv Nurs. 2025 Mar;81(3):1505–16.
41. Price K, Grimmer K, Foot J. Is the Australian 75+ Health Assessment person-centred? A qualitative descriptive study of older people's perceptions. Aust Health Rev. 2016 Nov 18;41(6):606–12.
42. Hazara R. Oral health in older adults. Br J Community Nurs. 2020 Aug 2;25(8):396–401.
43. Keuskamp D, Amarasena N, Balasubramanian M, Brennan DS. General health, wellbeing and oral health of patients older than 75 years attending health assessments. Aust J Prim Health. 2018;24(2):177.
44. Knapp J. Preventative health assessments at the 45–49-year health check [Internet]. 2023 [cited 2025 June 5].
45. Duddy C, Wong G, Gadsby EW, Krska J, Hibberd V. NHS Health Check programme: a protocol for a realist review. BMJ Open. 2021 Apr;11(4):e048937.
46. McCracken C, Raisi-Estabragh Z, Szabo L, Robson J, Raman B, Topiwala A, et al. NHS Health Check attendance is associated with reduced multiorgan disease risk: a matched cohort study in the UK Biobank. BMC Med. 2024 Jan 23;22(1):1.
47. Tanner L, Kenny R, Still M, Ling J, Pearson F, Thompson K, et al. NHS Health Check programme: a rapid review update. BMJ Open. 2022 Feb;12(2):e052832.
48. Dubey V, Glazier R. Preventive care checklist form. Evidence-based tool to improve preventive health care during complete health assessment of adults. Can Fam Physician Med Fam Can. 2006 Jan;52(1):48–55.
49. Ridley J, Ischayek A, Dubey V, Iglar K. Adult health checkup: Update on the Preventive Care Checklist Form©. Can Fam Physician Med Fam Can. 2016 Apr;62(4):307–13.
50. Khurana D, Leung G, Sasaninia B, Tran D, Khan M, Firek A. The Whole PERSON Health Score: A Patient-Focused Tool to Measure Nonmedical Determinants of Health. NEJM Catal [Internet]. 2022 July 20 [cited 2025 June 18];3(8). Available from: http://catalyst.nejm.org/doi/10.1056/CAT.22.0096
51. Harris PS, Payne L, Morrison L, Green SM, Ghio D, Hallett C, et al. Barriers and facilitators to screening and treating malnutrition in older adults living in the community: a mixed-methods synthesis. BMC Fam Pract. 2019 Dec;20(1):100.
52. Department of Health. Nutrition and hydration [Internet]. 2025 [cited 2025 June 5]. Available from: https://www.health.vic.gov.au/older-people-in-hospital/nutrition-and-swallowing-in-older-people/nutrition-and-hydration
53. Dietitians Australia. Diet and nutrition health advice Malnutrition [Internet]. 2023 [cited 2025 June 5]. Available from: https://dietitiansaustralia.org.au/health-advice/malnutrition
54. Brown F, Fry G, Cawood A, Stratton R. Economic Impact of Implementing Malnutrition Screening and Nutritional Management in Older Adults in General Practice. J Nutr Health Aging. 2020;24(3):305–11.
55. Brown F, Fry G, Cawood A, Stratton R. Economic Impact of Implementing Malnutrition Screening and Nutritional Management in Older Adults in General Practice. J Nutr Health Aging. 2020 Mar;24(3):305–11.
56. University of Southampton. MUST: A new tool for combating malnutrition in the UK and overseas [Internet]. 2014 [cited 2025 June 17]. Available from: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=44143
57. Gomes-Neto AW, Van Vliet IMY, Osté MCJ, De Jong MFC, Bakker SJL, Jager-Wittenaar H, et al. Malnutrition Universal Screening Tool and Patient-Generated Subjective Global Assessment Short Form and their predictive validity in hospitalized patients. Clin Nutr ESPEN. 2021 Oct;45:252–61.
58. The British Association for. The 'MUST' Toolkit [Internet]. BAPEN. 2023 [cited 2025 June 17]. Available from: https://www.bapen.org.uk/must-and-self-screening/must-toolkit/
59. Hormozi S, Alizadeh-Khoei M, Sharifi F, Chehrehgosha M, Esmaeili R, Rezaie-Abhari F, et al. Validity of Malnutrition Universal Screening Tool (MUST) in geriatric patients: Appropriate screening tool in hospital; MUST or Full-MNA. J Aging Res Lifestyle. 2019;1–6.
60. Oumer A, Abebe T, Hassan K, Hamza A. Validity and Predictive Performance of Mini Nutritional Assessment Tool for Institutionalized Elders in Ethiopia. Lee C, editor. BioMed Res Int. 2022 Jan;2022(1):6764657.
61. Nestle Nutrition Institute. Mini Nutritional Assessment MNA [Internet]. [cited 2025 June 5]. Available from: https://www.mna-elderly.com/sites/default/files/2021-10/MNA-english.pdf
62. Soysal P, Isik AT, Arik F, Kalan U, Eyvaz A, Veronese N. Validity of the Mini-Nutritional Assessment Scale for Evaluating Frailty Status in Older Adults. J Am Med Dir Assoc. 2019 Feb;20(2):183–7.

63. Nestle Nutrition Institute. A guide to completing the Mini Nutritional Assessment (MNA®) [Internet]. [cited 2025 June 5]. Available from: https://www.mna-elderly.com/sites/default/files/2021-10/mna-guide-english.pdf
64. Kather F, Hadzic M, Hehle T, Eichler S, Klein J, Völler H, et al. Test-retest reliability of the Mini Nutritional Assessment-Short Form (MNA-SF) in older patients undergoing cardiac rehabilitation. J Geriatr Cardiol JGC. 2020 Sept 28;17(9):574–9.
65. Tasmanian Government, Department of Health. Malnutrition screening [Internet]. 2025 [cited 2025 June 5]. Available from: https://www.health.tas.gov.au/healthy-ageing/malnutrition-screening
66. Ramar K, Malhotra RK, Carden KA, Martin JL, Abbasi -Feinberg Fariha, Aurora RN, et al. Sleep is essential to health: an American Academy of Sleep Medicine position statement. J Clin Sleep Med. 17(10):2115–9.
67. Ravyts SG, Dzierzewski JM. Sleep and Healthy Aging: A Systematic Review and Path Forward. Clin Gerontol. 2024;47(3):367–79.
68. National Heart, Lung and Blood Institute. Insomnia - Causes and Risk Factors | NHLBI, NIH [Internet]. 2022 [cited 2025 May 12]. Available from: https://www.nhlbi.nih.gov/health/insomnia/causes
69. US Preventive Services Taskforce. Obstructive Sleep Apnea in Adults: Screening [Internet]. 2022.
70. Hynes D, Mansfield D. Diagnosis and management of obstructive sleep apnoea in adults. Aust Prescr. 2024 Apr 23;47(2):52–6.
71. Scharf MT. Reliability and Efficacy of the Epworth Sleepiness Scale: Is There Still a Place for It? Nat Sci Sleep. 2022;14:2151–6.
72. Wong ML, Lau KNT, Espie CA, Luik AI, Kyle SD, Lau EYY. Psychometric properties of the Sleep Condition Indicator and Insomnia Severity Index in the evaluation of insomnia disorder. Sleep Med. 2017 May;33:76–81.
73. Luik AI, Machado PF, Siriwardena N, Espie CA. Screening for insomnia in primary care: using a two-item version of the Sleep Condition Indicator. Br J Gen Pract J R Coll Gen Pract. 2019 Feb;69(679):79–80.
74. Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep. 2011 May 1;34(5):601–8.
75. Shahid A, Wilkinson K, Marcu S, Shapiro CM. Insomnia Severity Index (ISI). In: Shahid A, Wilkinson K, Marcu S, Shapiro CM, editors. STOP, THAT and One Hundred Other Sleep Scales [Internet]. New York, NY: Springer New York; 2011 [cited 2025 July 3]. p. 191–3. Available from: https://link.springer.com/10.1007/978-1-4419-9893-4_43
76. Gagnon C, Belanger L, Ivers H, Morin CM. Validation of the Insomnia Severity Index in Primary Care. J Am Board Fam Med. 2013 Nov 1;26(6):701–10.
77. Thakral M, Von Korff M, McCurry SM, Morin CM, Vitiello MV. ISI-3: evaluation of a brief screening tool for insomnia. Sleep Med. 2021 June;82:104–9.
78. Chai-Coetzer CL, Antic NA, McEvoy RD. Identifying and managing sleep disorders in primary care. Lancet Respir Med. 2015 May 1;3(5):337–9.
79. Chen L, Pivetta B, Nagappa M, Saripella A, Islam S, Englesakis M, et al. Validation of the STOP-Bang questionnaire for screening of obstructive sleep apnea in the general population and commercial drivers: a systematic review and meta-analysis. Sleep Breath Schlaf Atm. 2021 Dec;25(4):1741–51.
80. Australian Sleep Association. OSA questionnaire - STOP-Bang [Internet]. 2025 [cited 2025 July 3]. Available from: https://www.sleepprimarycareresources.org.au/questionnaires/stop-bang
81. Nagappa M, Liao P, Wong J, Auckley D, Ramachandran SK, Memtsoudis S, et al. Validation of the STOP-Bang Questionnaire as a Screening Tool for Obstructive Sleep Apnea among Different Populations: A Systematic Review and Meta-Analysis. Arias-Carrion O, editor. PLOS ONE. 2015 Dec 14;10(12):e0143697.
82. Soni SJ. Improving the screening process for obstructive sleep apnea in the primary care setting. J Am Assoc Nurse Pract. 2023 Nov;35(11):731–9.
83. Australian Institute of Health and Welfare. Australia’s welfare 2015: Feature article - Mental health of older Australians [Internet]. 2015 [cited 2025 June 5]. Available from: https://www.aihw.gov.au/getmedia/0ec5c782-8ef0-4c4a-a7af-e25a3beb59d7/aw15-6-4-mental-health-of-older-australians.pdf.aspx
84. Reynolds CF, Jeste DV, Sachdev PS, Blazer DG. Mental health care for older adults: recent advances and new directions in clinical practice and research. World Psychiatry. 2022 Oct;21(3):336–63.
85. Carlucci L, Balestrieri M, Maso E, Marini A, Conte N, Balsamo M. Psychometric properties and diagnostic accuracy of the short form of the geriatric anxiety scale (GAS-10). BMC Geriatr. 2021 Dec;21(1):401.
86. Hills D RN, PhD; Hills, Sharon, RN; Robinson, Tracy, RN, PhD; Hungerford, Catherine, RN, PhD. Mental Health Nurses Supporting the Routine Assessment of Anxiety of Older People in Primary Care Settings: Insights from an Australian Study. Issues Ment Health Nurs. 2019;40(2):118–23.

87. Sapra A, Bhandari P, Sharma S, Chanpura T, Lopp L. Using Generalized Anxiety Disorder-2 (GAD-2) and GAD-7 in a Primary Care Setting. Cureus. 2020 May 21;12(5):e8224.
88. Australian Government Department of Health and Aged Care. National Framework for Alcohol, Tobacco and Other Drug Treatment 2019–29 [Internet]. Australian Government Department of Health and Aged Care; 2020 [cited 2025 May 21]. Available from: https://www.health.gov.au/resources/publications/national-framework-for-alcohol-tobacco-and-other-drug-treatment-2019-29?language=en
89. SA Health. ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) [Internet]. 2024.
90. Carlyle M, Walter ZC, Theroux B, Leung J, Hides L. Reliability of online self-report versions of the Australian Treatment Outcome Profile (ATOP) and Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) among people in residential treatment for substance use problems. Addict Behav. 2023 Sept;144:107756.
91. Gryczynski J, McNeely J, Wu LT, Subramaniam GA, Svikis DS, Cathers LA, et al. Validation of the TAPS-1: A Four-Item Screening Tool to Identify Unhealthy Substance Use in Primary Care. J Gen Intern Med. 2017 Sept;32(9):990–6.
92. Hartz SM. Capsule Commentary on Gryczynski et al., Validation of the TAPS-1: A Four-Item Screening Tool to Identify Unhealthy Substance Use in Primary Care. J Gen Intern Med. 2017 Sept;32(9):1026–1026.
93. Varghese D, Ishida C, Patel P, Haseer Koya H. Polypharmacy. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 May 6]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK532953/
94. Whitman AM, DeGregory KA, Morris AL, Ramsdale EE. A Comprehensive Look at Polypharmacy and Medication Screening Tools for the Older Cancer Patient. The Oncologist. 2016 June 1;21(6):723–30.
95. Halli-Tierney AD, Scarbrough C, Carroll D. Polypharmacy: Evaluating Risks and Deprescribing. Am Fam Physician. 2019 July 1;100(1):32–8.
96. Hung A, Kim YH, Pavon JM. Deprescribing in older adults with polypharmacy. BMJ. 2024 May 7;e074892.
97. Pattanaworasate W, Emmerton L, Pulver L, Winckel K. Comparison of prescribing criteria in hospitalised Australian elderly. Pharm Pract. 2010 Apr;8(2):132–8.
98. Page AT, Clifford RM, Potter K, Seubert L, McLachlan AJ, Hill X, et al. Exploring the enablers and barriers to implementing the Medication Appropriateness Tool for Comorbid Health conditions during Dementia (MATCH-D) criteria in Australia: a qualitative study. BMJ Open. 2017 Aug;7(8):e017906.
99. Perez FP, Perez CA, Chumbiauca MN. Insights into the Social Determinants of Health in Older Adults. J Biomed Sci Eng. 2022;15(11):261–8.
100. Andermann A. Screening for social determinants of health in clinical care: moving from the margins to the mainstream. Public Health Rev. 2018 Dec;39(1):19.
101. American Academy of Family Physicians. Three tools for screening for social determinants of health [Internet]. 2018 [cited 2025 June 12]. Available from: https://www.aafp.org/pubs/fpm/blogs/inpractice/entry/social_determinants.html
102. Liu X, Boak B, Eggleston M, Rodi A, Biscardi A, Elias T. Preparing to Address Social Determinants of Health (SDOH): Approaches to Clinic Transformation. J Public Health Manag Pract. 2024 July;30:S39–45.
103. Howell CR, Bradley H, Zhang L, Cleveland JD, Long D, Horton T, et al. Real-world integration of the protocol for responding to and assessing patients' assets, risks, and experiences tool to assess social determinants of health in the electronic medical record at an academic medical center. Digit Health. 2023 Jan;9:20552076231176652.
104. Lynch S, Street NW, Sharpe L, Kellish A. Social Determinants of Health Screening: Primary Care PRAPARE Tool Implementation. J Nurse Pract. 2024 Apr;20(4):104955.
105. Poirier BF, Ribeiro Santiago PH, Kapellas K, Jamieson L, Neadley KE, Boyd M. Development of Social Determinants of Health Screening Tool (SDoHST): qualitative validation with stakeholders and patients in South Australia. Curr Med Res Opin. 2023 Jan 2;39(1):131–40.
106. Australian Commission on Safety and Quality in Health Care. Health literacy: taking action to improve safety and quality [Internet]. 2014 [cited 2025 June 24]. Available from: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/health-literacy-taking-action-improve-safety-and-quality
107. Australian Commission on Safety and Quality in Health Care. National statement on health literacy [Internet]. 2014 [cited 2025 June 24]. Available from: https://www.safetyandquality.gov.au/standards/nsqhs-standards/partnering-consumers-standard/health-literacy

108. Sand-Jecklin K, Coyle S. Efficiently Assessing Patient Health Literacy: The BHLS Instrument. Clin Nurs Res. 2014 Dec 1;23(6):581–600.
109. Parker RM, Baker DW, Williams MV, Nurss JR. The test of functional health literacy in adults: A new instrument for measuring patients' literacy skills. J Gen Intern Med. 1995 Oct;10(10):537–41.
110. Tufts Medicine. Center for Health Literacy Research and Practice [Internet]. 2024 [cited 2025 June 24]. Available from: https://www.tuftsmedicine.org/research-clinical-trials/research-institutes-research-specialty/center-health-literacy-research-and-practice
111. Hawkins M, Gill SD, Batterham R, Elsworth GR, Osborne RH. The Health Literacy Questionnaire (HLQ) at the patient-clinician interface: a qualitative study of what patients and clinicians mean by their HLQ scores. BMC Health Serv Res. 2017 Dec;17(1):309.
112. Australian Bureau of Statistics. National Health Survey: Health Literacy [Internet]. 2019 [cited 2025 June 23]. Available from: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey-health-literacy/latest-release
113. Manser G. Assessing Health Literacy of Consumers [Internet]. \. 2025 [cited 2025 June 20]. Available from: https://cbrhl.org.au/health-services-providers/assessing-health-literacy/
114. Brach C. AHRQ Health Literacy Universal Precautions Toolkit, 3rd Edition [Internet]. AHRQ Publication No. 23-007; 2024 [cited 2025 June 30]. Available from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ahrq.gov/sites/default/files/wysiwyg/health-literacy/3rd-edition-toolkit/health-literacy-toolkit-third-edition.pdf
115. Agency for Healthcare Research and Quality. Guide to Implementing the Health Literacy Universal Precautions Toolkit [Internet]. [cited 2025 June 30]. Available from: https://www.ahrq.gov/health-literacy/improve/precautions/guide/index.html
116. Jaiswal A, Gupta S, Paramasivam A, Santhakumaran S, Holzhey P, Dupont P, et al. Continuum of Care for Older Adults With Concurrent Hearing and Vision Impairment: A Systematic Review. Albert SM, editor. Innov Aging. 2023 Feb 1;7(1):igac076.
117. Oosthuizen I, Frisby C, Chadha S, Manchaiah V, Swanepoel DW. Combined hearing and vision screening programs: A scoping review. Front Public Health. 2023 Mar 14;11:1119851.
118. Chadha S, Dillard LK, Mariotti SP, Keel S. Monitoring hearing and vision functions in older adults: rationale and process. Age Ageing. 2023 Oct 28;52(Suppl 4):iv158–61.
119. Roets-Merken LM, Zuidema SU, Vernooij-Dassen MJFJ, Kempen GIJM. Screening for hearing, visual and dual sensory impairment in older adults using behavioural cues: A validation study. Int J Nurs Stud. 2014 Nov;51(11):1434–40.
120. Lyng K, Svingen EM. Kartlegging av alvorlig, kombinert sansetap hos eldre [Internet]. Oslo Metropolitan University - OsloMet: NOVA; 2001 [cited 2025 June 12]. Available from: https://oda.oslomet.no/oda-xmlui/handle/20.500.12199/4825
121. Purnami N, Palandeng RW, Nugroho PS, Falerina R, Wiyadi HMS, Arifianto D, et al. Screening for hearing loss using the electronic whisper test: A prospective cross-sectional study. Int J Crit Illn Inj Sci. 2023 Oct;13(4):173–7.
122. Zakina I, Purnami N, Moon IS. Validity of the Electronic Whisper Sound Test as a Screening Method in School-aged Children. Biomol Health Sci J. 2023 July;6(2):123–7.
123. O'Neil S, McAndrew DJ. Australian Family Physician. 2016 [cited 2025 June 12]. The validity of visual acuity assessment using mobile technology devices in the primary care setting. Available from: https://www.racgp.org.au/afp/2016/april/the-validity-of-visual-acuity-assessment-using-mob
124. Suo L, Ke X, Zhang D, Qin X, Chen X, Hong Y, et al. Use of Mobile Apps for Visual Acuity Assessment: Systematic Review and Meta-analysis. JMIR MHealth UHealth. 2022 Feb 14;10(2):e26275.
125. Better Health Channel. Menopause [Internet]. Department of Health & Human Services; 2023 [cited 2025 June 10]. Available from: http://www.betterhealth.vic.gov.au/health/conditionsandtreatments/menopause
126. British Menopause Society. Vision for menopause care in the UK [Internet]. 2022. Available from: https://thebms.org.uk/wp-content/uploads/2024/07/BMS-Vision-JULY2024%E2%80%93B.pdf
127. Thuraisingham C, Nalliah S. Is menopause managed well enough in general practice? Malays Fam Physician Off J Acad Fam Physicians Malays. 2023;18:49–100.
128. Goldstein S. An efficient tool for the primary care management of menopause. Can Fam Physician Med Fam Can. 2017 Apr;63(4):295–8.
129. Reddish S. Menopausal transition: Assessment in general practice [Internet]. Australian Physician Volume; 2011. Available from: https://www.racgp.org.au/afp/2011/may/menopausal-transition

130. Burge K. NewsGP. 2025 [cited 2025 July 3]. newsGP - Detail of new women's health MBS items explained. Available from: https://www1.racgp.org.au/newsgp/professional/detail-of-new-women-s-health-mbs-items-explained
131. Menopause Management Tools. MQ6 Assessment Tool – MQ6 [Internet]. 2023 [cited 2025 June 11]. Available from: https://mq6.ca/mq6-assessment-tool/
132. Manoharan A, Harris MM, Chin BH, Ming KW, Asmuee Z, Salamon N, et al. Translation and validation of menopause quick 6 (MQ6) into the Malay language. BMC Prim Care. 2024 Mar 22;25(1):95.
133. Australian Menopause Centre. AMC Menopause Assessment [Internet]. 2023 [cited 2025 June 11]. Available from: https://www.menopausecentre.com.au/assessment/
134. Leslie SW, Sajjad H, Singh S. Nocturia. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 June 11]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK518987/
135. Barkin J. Nocturia: diagnosis and management for the primary care physicians. Can J Urol. 2016 Feb;23(Suppl 1):16–9.
136. Pedler K, Prince D, Rashid P. Australian Family Physician. 2012 [cited 2025 June 11]. Nocturia. Available from: https://www.racgp.org.au/afp/2012/june/nocturia-a-guide-to-assessment-and-management
137. Suman S, Robinson D, Bhal N, Fraser S, MacCormick A, Williams A, et al. Management of nocturia: overcoming the challenges of nocturnal polyuria. Br J Hosp Med. 2019 Sept 2;80(9):517–24.
138. Bower WF, Everaert K, Ong TJ, Ervin CF, Norgaard JP, Whishaw M. Questions to ask a patient with nocturia. Aust J Gen Pract. 2018 July 1;47(7):465–9.
139. Continence Health Australia. (formerly the Continence Foundation of Australia). 2021 [cited 2025 June 11]. Your Bladder Diary. Available from: https://www.continence.org.au/resource/your-bladder-diary
140. López-Fando L, Santiago M, Ruiz M, Casado Varela J, Celada Luis G, Bonillo MA, et al. Is the first day of the bladder diary enough for symptom assessment in women with lower urinary tract symptoms? Continence. 2022 June;2:100026.
141. Cameron AP, Wiseman JB, Smith AR, Merion RM, Gillespie BW, Bradley CS, et al. Are three-day voiding diaries feasible and reliable? Results from the Symptoms of Lower Urinary Tract Dysfunction Research Network (LURN) cohort. Neurourol Urodyn. 2019 Nov;38(8):2185–93.
142. Bright E, Cotterill N, Drake M, Abrams P. Developing and Validating the International Consultation on Incontinence Questionnaire Bladder Diary. Eur Urol. 2014 Aug;66(2):294–300.
143. Weiss JP, Everaert K. Management of Nocturia and Nocturnal Polyuria. Urology. 2019 Nov;133:24–33.
144. Bower WF, Rose GE, Ervin CF, Goldin J, Whishaw DM, Khan F. TANGO - a screening tool to identify comorbidities on the causal pathway of nocturia. BJU Int. 2017 June;119(6):933–41.
145. Rose GE, Bower WF, Ervin CF, Whishaw DM, Khan F. Reliability testing of the TANGO Short-Form nocturia screening tool. Aust N Z Cont J. 2017 Sept;23(3):68–74.
146. Zachariou A, Filiponi M, Kaltsas A, Dimitriadis F, Sapouna V, Giannakis I, et al. Translation and Validation of the TANGO Nocturia Screening Tool into Greek. J Multidiscip Healthc. 2021 July;Volume 14:1883–91.
147. Kaji H. Linkage between muscle and bone: common catabolic signals resulting in osteoporosis and sarcopenia. Curr Opin Clin Nutr Metab Care. 2013 May;16(3):272–7.
148. Cooper R, Ward KA, Sayer AA. A Life Course Approach to Musculoskeletal Ageing. In: Mishra G, Hardy R, Kuh D, editors. A Life Course Approach to Women's Health [Internet]. 2nd ed. Oxford University PressOxford; 2023 [cited 2025 June 30]. p. 115–34. Available from: https://academic.oup.com/book/46697/chapter/410194198
149. Das C, Das PP, Kambhampati SBS. Sarcopenia and Osteoporosis. Indian J Orthop. 2023 Dec;57(S1):33–41.
150. Joy EA, Briesacher M, Wiegand B. Musculoskeletal Failure. Am J Lifestyle Med. 2024 Nov;18(6):826–9.
151. Martin FC, Ranhoff AH. Frailty and Sarcopenia. In: Falaschi P, Marsh D, editors. Orthogeriatrics: The Management of Older Patients with Fragility Fractures [Internet]. 2nd ed. Cham (CH): Springer; 2021 [cited 2025 June 18]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK565582/
152. Milte R, Crotty M. Musculoskeletal health, frailty and functional decline. Best Pract Res Clin Rheumatol. 2014 June;28(3):395–410.
153. Shane Anderson A, Loeser RF. Why is osteoarthritis an age-related disease? Best Pract Res Clin Rheumatol. 2010 Feb;24(1):15–26.
154. Arthritis Foundation. Osteoarthritis: Symptoms, Diagnosis, and Treatment | Arthritis Foundation [Internet]. [cited 2025 June 30]. Available from: https://www.arthritis.org/diseases/osteoarthritis
155. Kuroda T, Shiraki M, Saito M, Urano T. Spinal osteoarthritis is a risk of vertebral fractures in postmenopausal women. Sci Rep. 2024 Feb 12;14(1):3528.

156. Huang G, Qian D, Liu Y, Qu G, Qian Y, Pei B. The association between frailty and osteoarthritis based on the NHANES and Mendelian randomization study. Arch Med Sci. 2023 Sept 1;19(5):1545–50.
157. Castell MV, van der Pas S, Otero A, Siviero P, Dennison E, Denkinger M, et al. Osteoarthritis and frailty in elderly individuals across six European countries: results from the European Project on OSteoArthritis (EPOSA). BMC Musculoskelet Disord. 2015 Nov 17;16:359.
158. Osteoarthritis Action Alliance. OA Signs and Symptoms [Internet]. [cited 2025 June 25]. Available from: https://oaaction.unc.edu/oa-module/oa-signs-and-symptoms/
159. RACGP. Osteoporosis management and fracture prevention in post-menopausal women and men > 50 years of age: Summary fo recommendations [Internet]. 2024. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/osteoporosis/summary-of-recommendations
160. Baleanu F, Iconaru L, Charles A, Kinnard V, Fils J, Moreau M, et al. Independent External Validation of FRAX and Garvan Fracture Risk Calculators: A Sub-Study of the FRISBEE Cohort. JBMR Plus. 2021 Sept;5(9):e10532.
161. RACGP. RACGP - Guideline for the management of knee and hip osteoarthritis [Internet]. 2018 [cited 2025 June 25]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/knee-and-hip-osteoarthritis
162. Arthritis Alliance of Canada, Centre for Effective Practice, The College of Family Physicians Canada. Osteoarthritis Tool [Internet]. 2017 [cited 2025 June 30]. Available from: http://arthritisalliance.ca/en/osteoarthritis-toolbox
163. Victorian Government, Department of HEALTH. Frailty [Internet]. 2024 [cited 2025 June 5]. Available from: https://www.health.vic.gov.au/older-people-in-hospital/frailty
164. Lim R, Kelly TL, Andrade AQ, Kalisch Ellett LM, Bilton R, Dorj G, et al. Frailty trajectory over one year among residential aged care (nursing home) residents. Front Med. 2022;9:1010444.
165. Ruiz JG, Dent E, Morley JE, Merchant RA, Beilby J, Beard J, et al. Screening for and Managing the Person with Frailty in Primary Care: ICFSR Consensus Guidelines. J Nutr Health Aging. 2020 Sept;24(9):920–7.
166. Apóstolo J, Cooke R, Bobrowicz-Campos E, Santana S, Marcucci M, Cano A, et al. Predicting risk and outcomes for frail older adults: an umbrella review of frailty screening tools. JBI Database Syst Rev Implement Rep. 2017 Apr;15(4):1154–208.
167. Ambagtsheer RC, Beilby J, Dabravolskaj J, Abbasi M, Archibald MM, Dent E. Application of an electronic Frailty Index in Australian primary care: data quality and feasibility assessment. Aging Clin Exp Res. 2019 May;31(5):653–60.
168. Lewis ETW Margaret; Lewis, Lou P; N√≠ Chr√≥in√≠n, Danielle; Dent, Elsa; Ticehurst, Maree; Peters, Ruth; Macniven, Rona; Cardona, Magnolia. The Feasibility of Deriving the Electronic Frailty Index from Australian General Practice Records. Clin Interv Aging. 2022;17(0):1589–98.
169. NHS England. Electronic Frailty Index [Internet]. [cited 2025 June 5]. Available from: https://www.england.nhs.uk/ourwork/clinical-policy/older-people/frailty/efi/#the-contract-requires-general-practice-to-use-an-appropriate-tool-for-example-the-electronic-frailty-index-efi-what-is-the-efi
170. Gleason LJ, Benton EA, Alvarez-Nebreda ML, Weaver MJ, Harris MB, Javedan H. FRAIL Questionnaire Screening Tool and Short-Term Outcomes in Geriatric Fracture Patients. J Am Med Dir Assoc. 2017 Dec;18(12):1082–6.
171. Vo NT, Tu YK, Lin KC, Chiu HY, Huang HC. Diagnostic Accuracy of the FRAIL Scale, Groningen Frailty Indicator, Tilburg Frailty Indicator, and PRISMA-7 for Frailty Screening Among Older Adults in Community Settings: A Systematic Review and Network Meta-Analysis. Heyn PC, editor. The Gerontologist. 2024 June 1;64(6):gnae008.
172. Ambagtsheer RC, Beilby J, Visvanathan R, Thompson MQ, Dent E. Prognostic accuracy of eight frailty instruments for all-cause mortality in Australian primary care. Arch Gerontol Geriatr. 2025 Jan;128:105625.
173. Lee L, Patel T, Costa A, Bryce E, Hillier LM, Slonim K, et al. Screening for frailty in primary care: Accuracy of gait speed and hand-grip strength. Can Fam Physician Med Fam Can. 2017 Jan;63(1):e51–7.
174. Koizia L, Khan S, Frame A, Mikhail GW, Sen S, Ruparelia N, et al. Use of the reported Edmonton frail scale in the assessment of patients for transcatheter aortic valve replacement: a possible selection tool in very high-risk patients? J Geriatr Cardiol JGC. 2018 June;15(6):463–6.
175. Australian Institute of Health and Welfare. Falls [Internet]. 2025. Available from: https://www.aihw.gov.au/reports/injury/falls

176. Phelan EA, Mahoney JE, Voit JC, Stevens JA. Assessment and Management of Fall Risk in Primary Care Settings. Med Clin North Am. 2015 Mar;99(2):281–93.
177. Meekes WM, Korevaar JC, Leemrijse CJ, Van De Goor IA. Practical and validated tool to assess falls risk in the primary care setting: a systematic review. BMJ Open. 2021 Sept;11(9):e045431.
178. Adam CE, Fitzpatrick AL, Leary CS, Hajat A, Ilango SD, Park C, et al. Change in gait speed and fall risk among community-dwelling older adults with and without mild cognitive impairment: a retrospective cohort analysis. BMC Geriatr. 2023 May 25;23(1):328.
179. Rodríguez-Molinero A, Gálvez-Barrón C, Narvaiza L, Miñarro A, Ruiz J, Valldosera E, et al. A two-question tool to assess the risk of repeated falls in the elderly. PloS One. 2017;12(5):e0176703.
180. Keramat SA, Lee V, Patel R, Hashmi R, Comans T. Cognitive impairment and health-related quality of life amongst older Australians: evidence from a longitudinal investigation. Qual Life Res. 2023 Oct;32(10):2911–24.
181. Chambers LW, Sivananthan S, Brayne C. Is Dementia Screening of Apparently Healthy Individuals Justified? Adv Prev Med. 2017;2017:9708413.
182. Espejo T, Wagner N, Riedel HB, Karakoumis J, Geigy N, Nickel CH, et al. Prognostic value of cognitive impairment, assessed by the Clock Drawing Test, in emergency department patients presenting with non-specific complaints. Eur J Intern Med. 2024 Aug;126:56–62.
183. Yokomizo JE, Simon SS, De Campos Bottino CM. Cognitive screening for dementia in primary care: a systematic review. Int Psychogeriatr. 2014 Nov;26(11):1783–804.
184. Brodaty H, Pond D, Kemp NM, Luscombe G, Harding L, Berman K, et al. The GPCOG: A New Screening Test for Dementia Designed for General Practice. J Am Geriatr Soc. 2002 Mar;50(3):530–4.
185. Limpawattana P, Manjavong M. The Mini-Cog, Clock Drawing Test, and Three-Item Recall Test: Rapid Cognitive Screening Tools with Comparable Performance in Detecting Mild NCD in Older Patients. Geriatr Basel Switz. 2021 Sept 16;6(3):91.
186. Abayomi SN, Sritharan P, Yan E, Saripella A, Alhamdah Y, Englesakis M, et al. The diagnostic accuracy of the Mini-Cog screening tool for the detection of cognitive impairment-A systematic review and meta-analysis. PloS One. 2024;19(3):e0298686.
187. Truong QC, Cervin M, Choo CC, Numbers K, Bentvelzen AC, Kochan NA, et al. Examining the validity of the MINI-MENTAL State Examination (MMSE) and its domains using network analysis. Psychogeriatrics. 2024 Mar;24(2):259–71.
188. Molloy W. Standardised Mini-Mental State Examination (SMMSE) Guidelines for administration and scoring instructions. 2024.
189. Australian Institute of Health and Welfare. Cancer data in Australia [Internet]. 2024 [cited 2025 June 5]. Available from: https://www.aihw.gov.au/reports/cancer/cancer-data-in-australia/contents/overview
190. Department of Health and Aged. About the National Lung Cancer Screening Program [Internet]. 2025. Available from: https://www.health.gov.au/our-work/nlcsp/about
191. Green T, Atkin K, Macleod U. Cancer detection in primary care: insights from general practitioners. Br J Cancer. 2015 Mar;112(S1):S41–9.
192. Department of Health and Aged. A single electronic record for each Australian taking part in the bowel, cervical and lung cancer screening programs [Internet]. 2025 [cited 2025 May 5]. Available from: https://www.ncsr.gov.au/
193. Gertig D, Lee J. Supporting health care providers in cancer screening: the role of the National Cancer Screening Register. Med J Aust. 2023 Aug 7;219(3):94–8.
194. Australian Government. National Cancer Screening Register: Quick Start Guide to the Alternative Access to Kits Mode, Bowel Screening [Internet]. 2025 [cited 2025 June 5]. Available from: https://www.ncsr.gov.au/content/dam/ncsr/quick-start-guides/Quick-Start-Guide-Alternative-Access-to-Kits-model.pdf
195. Cancer Council. Screening | Bowel Cancer | Early Detection Policy [Internet]. [cited 2025 June 17]. Available from: https://www.cancer.org.au/about-us/policy-and-advocacy/early-detection/bowel-cancer/screening
196. Chima S, Reece JC, Milley K, Milton S, McIntosh JG, Emery JD. Decision support tools to improve cancer diagnostic decision making in primary care: a systematic review. Br J Gen Pract. 2019 Dec;69(689):e809–18.
197. Walker JG, Macrae F, Winship I, Oberoi J, Saya S, Milton S, et al. The use of a risk assessment and decision support tool (CRISP) compared with usual care in general practice to increase risk-stratified colorectal cancer screening: study protocol for a randomised controlled trial. Trials. 2018 Dec;19(1):397.

198. Walker JG, Bickerstaffe A, Hewabandu N, Maddumarachchi S, Dowty JG, CRECRC, et al. The CRISP colorectal cancer risk prediction tool: an exploratory study using simulated consultations in Australian primary care. BMC Med Inform Decis Mak. 2017 Jan 19;17(1):13.
199. Phillips KA, Liao Y, Milne RL, MacInnis RJ, Collins IM, Buchsbaum R, et al. Accuracy of Risk Estimates from the iPrevent Breast Cancer Risk Assessment and Management Tool. JNCI Cancer Spectr. 2019 Dec 1;3(4):pkz066.
200. The Peter MacCallum Cancer Centre. iPrevent [Internet]. [cited 2025 June 5]. Available from: https://www.petermac.org/patients-and-carers/health-services-for-cancer-patients/cancer-prevention/iprevent
201. Melanoma Institute Australia. MIA Prediction Tool for Developing a First Primary Invasive Melanoma [Internet]. 2025. Available from: https://www.melanomarisk.org.au/FirstMelLand?AspxAutoDetectCookieSupport=1
202. Vuong K, Armstrong BK, Weiderpass E, Lund E, Adami HO, Veierod MB, et al. Development and External Validation of a Melanoma Risk Prediction Model Based on Self-assessed Risk Factors. JAMA Dermatol. 2016 Aug 1;152(8):889–96.
203. Heart Foundation. Key statistics: Cardiovascular disease [Internet]. 2025 [cited 2025 May 5]. Available from: https://www.heartfoundation.org.au/your-heart/evidence-and-statistics/key-stats-cardiovascular-disease
204. Australian Bureau of Statistics. Heart, stroke and vascular disease [Internet]. 2022 [cited 2025 May 5]. Available from: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/heart-stroke-and-vascular-disease/latest-release#cite-window1
205. National Institute on Aging. Heart Health and Aging [Internet]. 2024. Available from: https://www.nia.nih.gov/health/heart-health/heart-health-and-aging#:~:text=Changes%20in%20the%20heart%20and%20blood%20vessels%20that%20happen%20with,cognitive%20health%20in%20older%20adults.
206. Xue Y, Lewis M, Furler J, Waterreus A, Dettmann E, Palmer VJ. A scoping review of cardiovascular risk factor screening rates in general or family practice attendees living with severe mental ill-health. Schizophr Res. 2023 Nov;261:47–59.
207. Njie GJ, Proia KK, Thota AB, Finnie RKC, Hopkins DP, Banks SM, et al. Clinical Decision Support Systems and Prevention. Am J Prev Med. 2015 Nov;49(5):784–95.
208. Adil SO, Uddin F, Musa KI, Khan A, Shakeel A, Shafique K, et al. Risk Assessment for Cardiovascular Disease Using the Framingham Risk Score and Globorisk Score Among Newly Diagnosed Metabolic Syndrome Patients. Int J Gen Med. 2023 Sept;Volume 16:4295–305.
209. Nyirenda M. Assessment of cardiovascular disease risks using Framingham risk scores (FRS) in HIV-positive and HIV-negative older adults in South Africa. Prev Med Rep. 2021 June;22:101352.
210. Jennings G, Raffoul N, Nelson M. Assessing, communicating and managing cardiovascular disease risk: a practical summary of the 2023 guideline. Aust Prescr. 2024 Apr 23;47(2):57–63.
211. Department of Health and Aged. Australian Guideline for assessing and managing cardiovascular disease risk [Internet]. 2023 [cited 2025 May 5]. Available from: Australian Guideline for assessing and managing cardiovascular disease risk
212. Department of Health and Aged Care. Item 699 | Medicare Benefits Schedule [Internet]. [cited 2025 July 3]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=699&qt=item
213. News GP. GPs ‘blindsided’ by CVD risk calculator change [Internet]. 2024 [cited 2025 May 5]. Available from: https://www1.racgp.org.au/newsgp/clinical/gps-blindsided-by-cvd-risk-calculator-change
214. National Heart Foundation, ACDPA, Kidney Health Australia, Diabetes Australia, Stroke Foundation. CVD Risk Guidelines: Identify people for CVD risk assessment [Internet]. 2020 [cited 2025 June 5]. Available from: https://www.cvdcheck.org.au/identifying-people-for-assessment
215. Australian Institute of Health and Welfare. Australian Institute of Health and Welfare. 2024 [cited 2025 Mar 24]. Chronic respiratory conditions: Chronic obstructive pulmonary disease. Available from: https://www.aihw.gov.au/reports/chronic-respiratory-conditions/copd
216. Kukrety SP, Parekh JD, Bailey KL. Chronic obstructive pulmonary disease and the hallmarks of aging. Lung India Off Organ Indian Chest Soc. 2018;35(4):321–7.
217. Salinas GD, Williamson JC, Kalhan R, Thomashow B, Scheckermann JL, Walsh J, et al. Barriers to adherence to chronic obstructive pulmonary disease guidelines by primary care physicians. Int J Chron Obstruct Pulmon Dis. 2011;6:171–9.
218. NPS MedicineWise. NPS MedicineWise. 2020 [cited 2025 June 10]. The value of spirometry in clinical practice. Available from: https://www.nps.org.au/news/the-value-of-spirometry-in-clinical-practice

219. Gu Y, Zhang Y, Wen Q, Ouyang Y, Shen Y, Yu H, et al. Performance of COPD population screener questionnaire in COPD screening: a validation study and meta-analysis. Ann Med. 2021 Dec;53(1):1198–206.
220. Tsukuya G, Matsumoto K, Fukuyama S, Crawford B, Nakanishi Y, Ichinose M, et al. Validation of a COPD screening questionnaire and establishment of diagnostic cut-points in a Japanese general population: The Hisayama study. Allergol Int. 2015 Jan;64(1):49–53.
221. Perret JL, Zwar N, Walters EH, Patsamanis H, Abramson MJ, Dharmage SC, et al. A chronic obstructive pulmonary disease risk assessment tool in preventive lung healthcare: An unmet need? Aust J Gen Pract. 2023 Sept 1;52(9):595–8.
222. Hanibuchi M, Saijo A, Mitsuhashi A, Kajimoto T, Kitagawa T, Nishioka Y. The efficacy of mass screening for chronic obstructive pulmonary disease using screening questionnaires in a medical health check-up population. Respir Investig. 2022 Nov;60(6):815–21.
223. Tyagi J, Bhaumik S, Kakoti M, Moola S. Accuracy of screening tests for chronic obstructive pulmonary disease in primary health care: rapid evidence synthesis. [Internet]. George Institute for Global Health,; 2020. Available from: https://www.georgeinstitute.org/sites/default/files/documents/res-accuracy-of-screening-tests-for-copd_policy-brief.pdf
224. Pagano L, McKeough Z, Wootton S, Zwar N, Dennis S. Accuracy of the COPD diagnostic questionnaire as a screening tool in primary care. BMC Prim Care. 2022 Dec;23(1):78.
225. Price DB, Tinkelman DG, Halbert RJ, Nordyke RJ, Isonaka S, Nonikov D, et al. Symptom-Based Questionnaire for Identifying COPD in Smokers. Respiration. 2006;73(3):285–95.
226. Perret JL, Vicendese D, Simons K, Jarvis DL, Lowe AJ, Lodge CJ, et al. Ten-year prediction model for post-bronchodilator airflow obstruction and early detection of COPD: development and validation in two middle-aged population-based cohorts. BMJ Open Respir Res. 2021 Dec;8(1):e001138.
227. Lung Foundation Australia. COPD-X Plan Guidelines | COPD-X [Internet]. 2024 [cited 2025 June 2]. Available from: https://copdx.org.au/copd-x-plan/
228. ElMokhallalati Y, Bradley SH, Chapman E, Ziegler L, Murtagh FE, Johnson MJ, et al. Identification of patients with potential palliative care needs: A systematic review of screening tools in primary care. Palliat Med. 2020 Sept;34(8):989–1005.
229. Australian Government Department of Health, Disability and Ageing. What is palliative care? [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 July 8]. Available from: https://www.health.gov.au/topics/palliative-care/about-palliative-care/what-is-palliative-care
230. Nagarajan SV, Lewis V, Halcomb E, Rhee J, Morton RL, Mitchell GK, et al. Barriers and facilitators to nurse-led advance care planning and palliative care practice change in primary healthcare: a qualitative study. Aust J Prim Health. 2022 Feb 8;28(2):151–7.
231. SPICT. Using SPICT [Internet]. 2025 [cited 2025 June 5]. Available from: https://www.spict.org.uk/usingspict/
232. Hiratsuka Y, Inoue A. Perspectives on screening tools to identify palliative care needs in patients with advanced cancer. Ann Palliat Med. 2023 Jan;12(1):13–5.
233. Riffin C, Wolff JL, Estill M, Prabhu S, Pillemer KA. Caregiver Needs Assessment in Primary Care: Views of Clinicians, Staff, Patients, and Caregivers. J Am Geriatr Soc. 2020 June;68(6):1262–70.
234. Australian Bureau of Statistics. Disability, Ageing and Carers, Australia: Summary of Findings, 2022 [Internet]. 2022 [cited 2025 June 12]. Available from: https://www.abs.gov.au/statistics/health/disability/disability-ageing-and-carers-australia-summary-findings/latest-release
235. Australian Institute of Healh and Welfare. Informal carers [Internet]. 2023 [cited 2025 June 12]. Available from: https://www.aihw.gov.au/reports/australias-welfare/informal-carers
236. Peters M, Rand S, Fitzpatrick R. Enhancing primary care support for informal carers: A scoping study with professional stakeholders. Health Soc Care Community. 2020 Mar;28(2):642–50.
237. Yomim L. Zarit Burden Interview Assessing Caregiver Burden [Internet]. 2011. Available from: https://wai.wisc.edu/wp-content/uploads/sites/1129/2021/11/Zarit-Caregiver-Burden-Assessment-Instruments.pdf
238. Kühnel MB, Ramsenthaler C, Bausewein C, Fegg M, Hodiamont F. Validation of two short versions of the Zarit Burden Interview in the palliative care setting: a questionnaire to assess the burden of informal caregivers. Support Care Cancer. 2020 Nov;28(11):5185–93.
239. Higginson IJ, Gao W, Jackson D, Murray J, Harding R. Short-form Zarit Caregiver Burden Interviews were valid in advanced conditions. J Clin Epidemiol. 2010 May;63(5):535–42.

240. American Psychological Association. https://www.apa.org. 2020 [cited 2025 June 13]. Zarit Burden Interview. Available from: https://www.apa.org/pi/about/publications/caregivers/practice-settings/assessment/tools/zarit
241. Ewing G, Grande G, on behalf of the National Association for Hospice at Home. Development of a Carer Support Needs Assessment Tool (CSNAT) for end-of-life care practice at home: A qualitative study. Palliat Med. 2013 Mar;27(3):244–56.
242. CSNAT-i. Translations [Internet]. 2022 [cited 2025 June 13]. Available from: https://csnat.org/translations/
243. CSNAT-i. Carer Support Needs Assessment Tool Intervention [Internet]. 2022 [cited 2025 June 12]. Available from: https://csnat.org/
244. Puri I, Hollingshead CM, Tadi P. Quality Improvement. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 June 13]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK556097/
245. North Western Melbourne Primary Health Network. Quality improvement (QI) [Internet]. 2025 [cited 2025 June 13]. Available from: https://nwmphn.org.au/for-primary-care/quality-improvement/
246. Morley CP, Schad LA, Tumiel-Berhalter LM, Brady LA, Bentham A, Vitale K, et al. Improving Cancer Screening Rates in Primary Care via Practice Facilitation and Academic Detailing: A Multi-PBRN Quality Improvement Project. J Patient-Centered Res Rev. 2021;8(4):315–22.
247. Australian Government, Department of Health, Diability and Ageing. Practice Incentives Program Quality Improvement Incentive [Internet]. 2025 [cited 2025 June 13]. Available from: https://www.health.gov.au/our-work/practice-incentives-program-quality-improvement-incentive
248. Agency for Clinical Innovation. Agency for Clinical Innovation. Agency for Clinical Innovation (ACI); 2025 [cited 2025 June 16]. About patient-reported measures. Available from: https://aci.health.nsw.gov.au/statewide-programs/prms/about
249. Kearns R, Harris-Roxas B, McDonald J, Song HJ, Dennis S, Harris M. Implementing the Patient Activation Measure (PAM) in clinical settings for patients with chronic conditions: a scoping review. Integr Healthc J. 2020;2(1):e000032.
250. Australian Commission on Safety and Quality in Health Care. Patient-Reported Measures [Internet]. 2023 [cited 2025 June 16]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/person-centred-care/person-centred-care-network/patient-reported-measures
251. Casaca P, Schäfer W, Nunes AB, Sousa P. Using patient-reported outcome measures and patient-reported experience measures to elevate the quality of healthcare. Int J Qual Health Care. 2023 Dec 26;35(4):mzad098.
252. RACGP. Standards for general practices (5th edition): A benchmark for quality care and risk management in Australian general practices. [Internet]. 2017 [cited 2025 June 16]. Available from: https://www.racgp.org.au/running-a-practice/practice-standards/standards-5th-edition/standards-for-general-practices-5th-ed/table-of-contents
253. RACGP. RACGP - Patient feedback requirements [Internet]. 2024 [cited 2025 June 16]. Available from: https://www.racgp.org.au/running-a-practice/practice-standards/standards-5th-edition/patient-feedback-requirements
254. University Centre for Rural Health. Validating Outcomes by Including Consumer Experience (Voice) [Internet]. 2025 [cited 2025 June 16]. Available from: https://ucrh.edu.au/project/validating-outcomes-by-including-consumer-experience-voice/
255. International Consortium for Health Outcomes Measurement. Sets of Patient-Centered Outcomes Measures [Internet]. [cited 2025 June 16]. Available from: https://www.ichom.org/patient-centered-outcome-measures/
256. Janamian T, Greco M, Cosgriff D, Baker L, Dawda P. Activating people to partner in health and self-care: use of the Patient Activation Measure. Med J Aust [Internet]. 2022 June 6 [cited 2025 June 24];216(S10). Available from: https://onlinelibrary.wiley.com/doi/10.5694/mja2.51535
257. Hibbard J. Patient Activation and Health Literacy: What's the Difference? How Do Each Contribute to Health Outcomes. Stud Health Technol Inform. 2017;240:251–62.
258. Greene J, Hibbard JH. Why does patient activation matter? An examination of the relationships between patient activation and health-related outcomes. J Gen Intern Med. 2012 May;27(5):520–6.
259. CFEP Surveys. https://cfepsurveys.com.au/. 2022 [cited 2025 June 24]. What is Patient Activation? Available from: https://cfepsurveys.com.au/articles/what-is-patient-activation/
260. Nichols T, Calder R, Morgan M, Lawn S, Beauchamp A, et al. Self-care for health: a national policy blueprint. Policy paper [Internet]. 2020. Available from: www.mitchellinstitute.org.au

261. Battista M. Continuity of Care: How to Retain Patients and Reduce Redundancy [Internet]. 2024 [cited 2025 June 13]. Available from: https://creyos.com/blog/continuity-of-care
262. Raman R. NewsGP. 2025 [cited 2025 June 13]. Fragmented care – why bother? Available from: https://www1.racgp.org.au/newsgp/gp-opinion/fragmented-care-why-bother
263. Joo JY. Fragmented care and chronic illness patient outcomes: A systematic review. Nurs Open. 2023 June;10(6):3460–73.
264. Harding S, Brijnath B, Schattner P. Australian Family Physician. The Royal Australian College of general Practitioners; 2015 [cited 2025 June 13]. How general practitioners manage mental illness in culturally and linguistically diverse patients: an exploratory study. Available from: https://www.racgp.org.au/afp/2015/march/how-general-practitioners-manage-mental-illnes-2
265. Lau RS, Boesen ME, Richer L, Hill MD. Siloed mentality, health system suboptimization and the healthcare symphony: a Canadian perspective. Health Res Policy Syst. 2024 July 17;22(1):87.
266. Pescheny JV, Pappas Y, Randhawa G. Facilitators and barriers of implementing and delivering social prescribing services: a systematic review. BMC Health Serv Res. 2018 Feb 7;18(1):86.
267. Seyed-Nezhad M, Ahmadi B, Akbari-Sari A. Factors affecting the successful implementation of the referral system: A scoping review. J Fam Med Prim Care. 2021 Dec;10(12):4364–75.
268. RACGP. Integrated Care Physicians supporting better patient outcomes: Discussion paper [Internet]. 2018. Available from: https://www.racp.edu.au/docs/default-source/advocacy-library/integrated-care-physicians-supporting-better-patient-outcomes-discussion-paper.pdf
269. Pace CA, Gergen-Barnett K, Veidis A, D'Afflitti J, Worcester J, Fernandez P, et al. Warm Handoffs and Attendance at Initial Integrated Behavioral Health Appointments. Ann Fam Med. 2018 July;16(4):346–8.
270. Sanderson D, Braganza S, Philips K, Chodon T, Whiskey R, Bernard P, et al. "Increasing Warm Handoffs: Optimizing Community Based Referrals in Primary Care Using QI Methodology." J Prim Care Community Health. 2021 Jan;12:21501327211023883.
271. Lazaro G. When Positive is Negative: Health Literacy Barriers to Patient Access to Clinical Laboratory Test Results. J Appl Lab Med. 2023 Nov 2;8(6):1133–47.
272. Soled D. Language and Cultural Discordance: Barriers to Improved Patient Care and Understanding. J Patient Exp. 2020 Dec;7(6):830–2.
273. Center for Substance Abuse Treatment (US. Culturally Responsive Evaluation and Treatment Planning. In: Improving Cultural Competence [Internet]. US: Substance Abuse and Mental Health Services Administration (US); 2014 [cited 2025 June 13]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK248423/
274. Australian Institute of Health and Welfare. Cultural safety in health care for Indigenous Australians: monitoring framework, Summary [Internet]. 2023 [cited 2025 June 13].
275. Chandrakumar A, Hoon E, Benson J, Stocks N. Barriers and facilitators to cervical cancer screening for women from culturally and linguistically diverse backgrounds; a qualitative study of GPs. BMJ Open. 2022 Nov 14;12(11):e062823.
276. Australian Commission on Safety and Quality in Health Care. Health Literacy - Taking action to improve safety and quality [Internet]. 2014 [cited 2025 June 13]. Available from: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/health-literacy-taking-action-improve-safety-and-quality

Chapter 4: Interventions for healthy ageing through the adult life-course

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Background

Promotion of healthy ageing is reliant on development of preventive and person-centered health care, particularly in primary and community health care (1). General practitioners (GPs) are typically the first point of contact in the primary care setting although, in some communities and particularly in rural and remote regions, nurses, including nurse practitioners, may be the principal primary care provider (2). Regardless of provider type, supporting older people to maintain optimal health relies on primary health care prevention, early identification, timely intervention and functional support (3,4). As outlined in Chapter 1, general practice is well positioned to support healthy ageing by providing proactive, lifelong care that prevents or delays the onset of chronic conditions, promotes and supports positive behavioural change and coordinates services across care settings. Through multidisciplinary team-based models, general practice can deliver comprehensive care across the ageing lifecourse, addressing not only clinical health needs but also the social and personal factors that influence wellbeing, from preventive care through to end-of-life support (4).

Partnering with consumers, whether through co-design, shared decision-making or systematic feedback collection, enhances the relevance, acceptability and sustainability of primary care strategies for healthy ageing. Embedding the perspectives of older people and their carers in health care ensures interventions address what matters most to those they aim to serve (5,6).

Findings from the 2024 Commonwealth Fund International Health Policy Survey of Older Adults across 10 countries highlight the role of continuity of care in improving preventive health outcomes. The survey reported that older adults with a regular and identifiable source of care were more likely to receive recommended immunisations, including those for influenza, pneumonia and respiratory syncytial virus. Regular engagement with a primary care provider was also associated with the uptake of health-promoting behaviours such as healthy eating and physical activity (7).

This chapter presents evidence-based, person-centred interventions in primary and community health care that promote healthy ageing throughout adulthood. The approach aligns with both the UN Decade of Healthy Ageing: Plan of Action (2021-2030) and Australia's National Preventive Health Strategy, each of which emphasise the importance of maintenance of functional ability, strengthening of preventive action and support for ageing in place (3,8).

A significant policy and practice development relevant to the role of primary care in healthy ageing is the growing emphasis on interventions supporting reablement and restorative care. These time-limited, function-focused interventions aim to restore or maintain independence following illness, injury or hospitalisation. Typically, less intensive than clinical rehabilitation, these programs are delivered in community settings and led by allied health professionals, nurses and care workers (2).

This also reflects a broader shift toward comprehensive, multi-dimensional healthy ageing interventions (MHAIs). A review by Seah et al. (9) found that effective multi-dimensional healthy ageing interventions address physical, mental and social health by acknowledging the interaction between physiological changes, personal beliefs, social participation and environmental supports. Health education programs for older adults were associated with improvements in quality of life and life satisfaction, while combined assessment and education programs facilitated positive health behaviours. Group-based education programs in particular, offer older adults opportunities to benefit from peer support and adopt health-promoting behaviours. The review also highlighted the importance of social and environmental contexts, including resilience, autonomy and connectedness, as critical to intervention success (10).

The Royal Australian College of General Practice (RACGP) Green Book (*Putting prevention into practice: Guidelines for the implementation of prevention in the general practice setting, 3rd edition*) is a resource for general practitioners and general practices supporting integration of preventive health into usual health care. The Green Book complements the RACGP Red Book (*Guidelines for preventive activities in general practice, 10th edition*) by focusing on how to implement evidence-based preventive strategies (11,12). The Green Book draws on implementation science and practical experience and emphasises team-based care, data-driven quality improvement and partnerships with community and allied health providers to strengthen prevention across the practice population. It acknowledges that while clinical knowledge is essential, successful preventive care depends on practice culture, leadership and the ability to adapt strategies to context-specific needs, capacity and resources (11,12).

The RACGP *Handbook of Non-Drug Interventions* (HANDI) complements these resources by providing evidence-based guidance on non-pharmacological treatments for common health conditions, supporting clinicians to offer effective, low-risk alternatives or adjuncts to medication where appropriate (13).

This chapter presents a curated selection of interventions that:

- are person-centred and culturally responsive;
- are prevention-focused, evidence-informed and adaptable to local contexts;
- are scalable and feasible within primary care settings;
- are integrated with community-based and multidisciplinary systems of care.

This chapter is structured in two parts. The first section focuses on behavioural and social domains that are often referred to as the pillars of healthy ageing, including physical activity, nutrition, sleep, cognitive health, social connection and alcohol and other drug use. Each domain is examined in terms of relevant interventions, implications for primary care and opportunities for early prevention and management. All content presented is based on published evidence and does not constitute clinical guidance or the views of the authors or affiliated organisations.

The second section discusses interventions relevant to common age-related conditions and physiological transitions such as osteoarthritis, menopause and nocturia, hearing and vision loss, cardiovascular disease, frailty, dementia and COPD, which affect function and quality of life across mid to later life. This includes consideration of complex, multifactorial states often described as geriatric syndromes. This aligns with the life stages of ageing in adulthood and with WHO recommendations to act early, preserve intrinsic capacity and maintain independence through later life.

Immunisation for healthy ageing – a preventive health priority

Vaccination remains one of the most effective and cost-efficient public health strategies, preventing an estimated 2.5 million deaths globally yearly. Australia's comprehensive National Immunisation Program (NIP) has led to the near elimination or significant reduction of vaccine-preventable diseases such as tetanus, diphtheria, Haemophilus Influenzae Type B and Poliomyelitis. By promoting herd immunity, vaccines not only protect individuals but also reduce community transmission, which is particularly critical for vulnerable populations such as older adults (14,15). Immunisation contributes to healthy ageing by preserving functional independence, reducing preventable hospitalisations and mitigating complications from infectious diseases.

The Australian Immunisation Handbook (2024) provides national clinical guidance for vaccine administration, supported by tools such as the Handbook app and the Australian Immunisation Register (AIR). These digital resources help primary care providers manage vaccination records, plan catch-up schedule, and ensure continuity of care (14).

In July 2025, the Department of Health, Disability and Ageing released the *Infectious Respiratory Disease: Vaccination Eligibility and Access for Older People* toolkit to support communication with older adults, particularly those in aged care (16).

Priority vaccines for middle and older adulthood

As adults reach middle and older age, immunisation assumes increased relevance in protecting against morbidity and supporting health system sustainability.

Vaccines that contribute to healthy ageing include:

- Influenza: Annual influenza vaccination reduces the risk of severe illness and complications in older adults. The 2025 ATAGI guidance recommends age-appropriate quadrivalent or high-dose/adjuvanted formulations for those aged 65 years and over (17).
- Pertussis (Whooping Cough): Booster doses are recommended at ages 50 and 65, particularly for adults who are in close contact with infants, work in healthcare, or provide caregiving. Pertussis outbreaks continue to occur cyclically in Australia and can result in significant morbidity in both older adults and infants (14).
- Pneumococcal Disease: Vaccines such as Prevenar 13 and Pneumovax 23 provide protection against pneumonia, meningitis, and bacteremia. Under the NIP, vaccination is funded for adults aged 70 and over and for Aboriginal and Torres Strait Islander people aged 50 and over (14).
- Shingles (Herpes Zoster): Shingles can cause debilitating post-herpetic neuralgia, particularly in older adults. From November 2023, the recombinant zoster vaccine Shingrix replaced Zostavax on the NIP for eligible high-risk populations (14).
- COVID-19: Ongoing COVID-19 vaccination remains critical for older adults, given increased risks of severe disease and hospitalisation. The 2025 ATAGI statement recommends a single annual booster dose for adults aged 65 years and over, and for younger adults at higher risk due to medical conditions or immunocompromise. mRNA vaccines, including updated formulations, are preferred for booster doses (18).

Adults with chronic conditions, immunosuppression or occupational exposure may require additional vaccines such as tetanus, hepatitis A and B, measles–mumps–rubella (MMR) or varicella. Where immunity status is uncertain, laboratory testing can guide targeted catch-up immunisation (14).

Socio-economic value of adult immunisation

Adult immunisation programs are not only clinically effective but also deliver substantial socio-economic returns. El Banhawi et al. (19) call for a shift in policy focus from reactive treatment to proactive prevention, with vaccination as a cornerstone. Immunisation supports population health while reducing health system burden, preserving workforce productivity and promoting health equity (19).

Programs targeting influenza, pneumococcal disease, respiratory syncytial virus (RSV) and shingles generate significant healthcare savings by reducing hospital admissions and emergency care use. These programs can yield a return on investment of up to 19 times their cost, with an estimated societal value of US$4,637 generated per vaccinated adult. This return is comparable to that achieved by childhood immunization programs (19).

Adult immunisation can reduce health disparities by delivering proportionally greater health and economic benefits to socioeconomically disadvantaged and underserved groups. Increasing vaccine coverage in adulthood supports equitable access to preventive care and reduces disparities in disease burden (19).

In addition to direct benefits, El Banhawi et al. (19) highlight the broader impacts of immunisation, such as reduced antimicrobial resistance, lower caregiver burden and sustained community workforce capacity. These non-clinical benefits are often underrepresented in economic evaluations but should be included in policy assessments to fully reflect the value of adult vaccination (19).

Primary care serves as the frontline of adult immunisation and plays a pivotal role in its successful implementation.

General practitioners and practice nurses are ideally placed to (15):

- assess immunisation status opportunistically during consultations;
- use the AIR to verify vaccine history and initiate catch-up plans;
- provide patient-centred education to address vaccine hesitancy;
- embed vaccination into chronic disease management and healthy ageing plans;
- use GP clinical decision support software to support proactive vaccination by prompting care gaps, generating reminders and improving recall rates (20).

The literature highlights the need for primary care providers to stay informed about changes to immunisation schedules, eligibility updates and the introduction of new vaccines. Emerging evidence also suggests broader preventive effects of some vaccinations, such as a potential association between zoster vaccination and reduced dementia risk. Integrating immunisation into healthy ageing strategies has been identified as a key approach to reducing preventable illness, supporting independence and enhancing quality of life, particularly among underserved populations (15,21).

Evidence-based immunisation Interventions

The 4 Pillars™ Practice Transformation Program

The 4 Pillars™ Practice Transformation Program is a well-established, evidence-based intervention designed to increase adult immunisation rates in primary care. Developed in the United States for family medicine settings through over two decades of implementation research, the program addresses both structural and behavioural barriers to vaccination. Two large randomised cluster trials have validated its effectiveness in increasing uptake of influenza and pneumococcal vaccines in adult populations (22,23).

The 4 Pillars program consists of four interdependent pillars:

- Convenient vaccination services: Practices improve accessibility by offering services such as standing orders, walk-in vaccination clinics, flexible appointment times and extended hours.

- Patient communication: Staff deliver tailored education and reminders through various channels, including print, electronic, and interpersonal communication, to enhance awareness and motivation.
- Enhanced office systems**:** Practices use tools such as electronic health record prompts, performance dashboards, and regularly updated guidelines to support workflow integration.
- Motivation through an immunisation champion: A designated staff member leads the program, coordinates team activities, and ensures accountability for outcomes.

The program is designed to be locally adapted. Each participating practice receives structured support, including provider education, practice facilitation and access to a web-based dashboard for tracking performance.

The 4 Pillars™ Program provides a practical, scalable framework for improving adult immunisation rates in general practice. Its relevance to the Australian context includes:

- reducing missed opportunities for adult vaccination during routine care;
- supporting team-based care through clear roles and shared accountability;
- aligning with digital health infrastructure such as the Australian Immunisation Register;
- contributing to national quality improvement initiatives and benchmarks.

By integrating vaccination into existing workflows and using adaptive implementation strategies, the 4 Pillars™ Program enables sustained improvements in vaccine uptake. Its strong evidence base and flexible delivery model make it a viable candidate for broader implementation in Australian primary care (23).

Multi-faceted practice level approaches promoting vaccination uptake

Other systematic reviews of immunisation strategies for older adults, including provider reminders, standing orders and patient outreach, offer broader generalisability (24,25). Findings from a Cochrane systematic review by Thomas & Lorenzetti, reinforce the importance of multi-faceted, system-level approaches in improving influenza vaccination rates among people aged 60 years and older in the community (25). Effective strategies included client reminders—particularly personalised letters or postcards, education delivered by healthcare providers and interventions that enhanced access such as home visits and offering vaccines free of charge.

Patient reminder and recall systems

Patient reminder and recall systems are effective interventions to increase immunisation rates in primary care. A Cochrane systematic review by Jacobson Vann et al. (2018) found that all types of patient reminders—such as telephone calls, letters, texts and postcards, were associated with improved vaccine uptake, with increases ranging from 5 to 20 percentage points compared to no intervention. Telephone reminders were the most effective individual strategy, followed by letters. Combined approaches, particularly those integrating patient and provider reminders, showed the strongest effects, although fewer studies examined this model. The review highlighted the importance of tailoring reminders to local systems and infrastructure, including leveraging billing systems and immunisation registries. These findings support the use of structured reminder and recall systems as a key quality improvement strategy in general practice (26).

Provider recommendations and education

Recommendation from a healthcare provider is one of the most influential factors in older adults' vaccination decisions. Australian research has demonstrated that general practitioners and practice nurses are central to vaccine decision-making among older people (27). The perceived authority and trust in these professionals underscore their role in both advising and educating patients. A recent Cochrane Review of communication strategies for older adult vaccination found that providers must balance public health goals with respect for individual autonomy (28). Communication should support informed decision-making, not solely persuasion and must account for varying levels of patient engagement and decisional capacity. The provider's role in vaccine communication must be clearly defined, supported by training in shared decision-making and embedded into routine clinical practice. The review also identified key barriers, including limited time, misinformation and inconsistent access to patient immunisation history. Addressing these challenges requires investment in provider education, communication resources, and structural supports that enable consistent, evidence-based vaccine conversations in primary care settings (28).

Opportunistic and onsite vaccination

Integrating opportunistic vaccination into routine primary care visits is a practical and effective strategy for increasing vaccine uptake among older adults. Vaccination offered at the point of care, during health assessments, chronic disease management appointments or other general consultations, has been shown to address both access and equity barriers. Opportunistic delivery aligns well with time-limited clinical environments, where patients may be unlikely to return for scheduled vaccination-only visits (29). A recent scoping review of pneumococcal vaccination interventions found that opportunistic approaches in primary care, particularly when linked to routine clinical interactions, supported higher vaccination rates in older adults (30).

The RACGP further notes that embedding vaccination into standard care pathways supports timely, person-centred delivery while enabling general practice teams to address information gaps and hesitancy in real time. Clear communication, proactive offer of vaccines and access to accurate patient records are essential components of successful opportunistic vaccination models (31).

Addressing financial and structural barriers to adult vaccination

Reducing financial and structural barriers is essential to achieving equitable vaccine uptake among older adults. The Australian National Immunisation Program (NIP) provides free influenza, pneumococcal and zoster vaccines to individuals aged 65 years and older, which directly removes cost as a barrier and has been associated with higher vaccination coverage (32). Complementary initiatives, such as free community-based vaccination days coordinated by the Immunisation Coalition during Immunisation Action Week, increase accessibility by offering convenient, no-cost options in local settings (33). These efforts align with global strategies to promote vaccine equity, which emphasise removing barriers related to cost, access and awareness to ensure that all individuals regardless of age, location or socioeconomic status, can benefit from vaccination (34).

Shingles vaccination: a preventive health and cognitive protection strategy

Shingles (herpes zoster) is a reactivation of the varicella-zoster virus, primarily affecting individuals over 50 years of age. It presents as a painful blistering rash, often accompanied by debilitating nerve pain known as post-herpetic neuralgia. Approximately one in three people will develop shingles in their lifetime, with the risk and severity of the condition increasing with age. Complications can include ophthalmic involvement, neurological disorders and chronic pain. In 2016 alone, shingles caused 2,677 hospital admissions and 27 deaths in Australia, with the highest rates among those aged 80 and older (35).

Prevention through vaccination is a public health priority. Since 1 November 2023, the non-live recombinant zoster vaccine (Shingrix) has been available under the National Immunisation Program (NIP) for eligible high-risk populations, replacing the previously used live vaccine (Zostavax). Shingrix is now provided free of charge to people aged 65 and over, First Nations people aged 50 and over and immunocompromised adults aged 18 and older (30).

Zoster vaccination significantly reduces the risk of developing shingles and its complications. Beyond these benefits, emerging evidence suggests that shingles vaccination may have off-target protective effects against dementia. A large natural experiment conducted in Wales used a regression discontinuity design to evaluate the impact of herpes zoster vaccination on dementia diagnoses. The study found a 20% relative reduction in new dementia diagnoses over a seven-year follow-up among those vaccinated (36). The effect was more pronounced in women. Complementary mortality data from England and Wales estimate that approximately one in twenty dementia-related deaths may have been prevented through vaccination, with no corresponding increase in deaths from other causes (37). While population-based studies suggest a potential protective association between shingles vaccination and reduced dementia risk, these findings remain observational and causality has not been established (38). Proposed mechanisms include reduced neuroinflammation triggered by varicella-zoster virus reactivation and broader immune-modulating effects that may support cognitive health.

Shingles vaccination represents a valuable dual-purpose strategy for healthy ageing, preventing herpes zoster and its complications while potentially reducing the risk of dementia. With robust evidence supporting its effectiveness in lowering the incidence of shingles and post-herpetic neuralgia and emerging findings indicating cognitive protection, the vaccine offers substantial individual and population health benefits. The implementation of Shingrix through the National Immunisation Program strengthens this opportunity, particularly for older adults and high-risk groups. Primary care providers play a pivotal role in maximising uptake by integrating shingles vaccination into routine preventive care, reinforcing its relevance not only for infectious disease control but also for long-term cognitive health (35,39).

Promoting overall health and wellbeing in ageing – interventions for modifiable risk factors

Maintaining overall health and well-being throughout adulthood is pivotal to healthy ageing. The World Health Organization (WHO) defines healthy ageing as not merely the absence of disease or infirmity, but as the process of developing and maintaining functional ability that enables wellbeing in older age (40). This includes the capacity to meet basic needs, learn and grow, make decisions, build and maintain relationships and contribute to society (7). Promoting health and wellbeing in older age therefore involves addressing the broader range of factors that shape health outcomes, including behavioural, psychosocial and environmental determinants.

The Ottawa Charter for Health Promotion emphasised the importance of enabling people to increase control over and improve their health through supportive environments, health literacy and community action (41). These principles provide a foundation for a life course approach to healthy ageing. Interventions to maintain and improve health and wellbeing for healthy ageing should begin in mid-life to reinforce protective behaviours and address emerging risk factors for poor health and wellbeing in later life. This should be sustained through older adulthood to maintain autonomy, purpose and social connection (41).

Psychological wellbeing, social participation and emotional support are equally important to functional health, particularly in mitigating the impacts of isolation, loss and age-related decline. Evidence from integrated reviews highlights that health interventions are more effective when they also support self-efficacy, cultural identity and meaningful roles in family or community life (3,10).

Social determinants, such as income, education, housing and access to health services, profoundly influence older adults' capacity to maintain wellbeing. These factors intersect with biological ageing processes and contribute to inequities in healthy ageing outcomes (42). A particular focus on the social determinants of health – those social and economic factors that can adversely affect the health of individuals is increasingly being considered as an important adjunct to primary health care. Known as social prescribing, this additional component of primary health care refers to the practice of connecting individuals to a range of non-clinical supports, including community-based programs and services, to address factors that are considered to be affecting a person's health and wellbeing (43,44).

Evidence from recent reviews highlights the value of moving beyond disease-focused approaches toward integrated, preventive and person-centred models of care that support health and wellbeing across the life course (9,10). Models that consider the whole person and account for cumulative life course exposures have been associated with improved functional ability, greater independence and enhanced quality of life in older adults (45).

As previously stated this chapter presents a curated selection of interventions that contribute to wellbeing across physical, cognitive, emotional and social domains, including physical activity, nutrition, sleep, cognitive health and social connection, as well as targeted approaches for common age-related conditions.

Physical activity

Physical activity is a cornerstone of healthy ageing, contributing not only to disease prevention but also to the promotion of well-being, social connection and functional independence in later life. Regular movement supports physical and cognitive health, improves mood and energy levels and enhances sleep quality. It is strongly associated with reduced risks of cardiovascular disease, type 2 diabetes, some cancers, osteoporosis, depression and cognitive decline. For adults aged 65 years and over, engaging in at least 30 minutes of moderate-intensity physical activity on most days can substantially improve quality of life and enable continued independence (46).

Beyond chronic disease prevention, physical activity supports functional capacity. Evidence shows that structured programs that include resistance and balance training are effective in maintaining strength and mobility in older age and in reducing frailty and sarcopenia and preventing falls (47,48).

Falls remain a major contributor to injury, hospitalisation and disability in older Australians, with one in three adults over 65 experiencing a fall each year (49). Maintaining functional reserves through regular physical activity reduces this risk. Strengthening physical resilience also supports older adults in recovering from illness or injury, maintaining social engagement and remaining active in their communities.

Primary care practitioners are well-placed to promote physical activity among older adults, through identifying and addressing barriers, offering brief interventions, referring to allied health or community-based programs. Linking individuals to culturally appropriate and locally accessible services can support behaviour change. Such approaches reinforce autonomy and vitality across the later life course (50,51).

Evidence-based physical activity interventions

Evidence-informed interventions have demonstrated efficacy in promoting physical activity among older adults. This section summarises established interventions relevant for implementation through a primary care lens.

Resistance and multicomponent physical activity training programs are effective in addressing sarcopenia and frailty. Interventions targeting progressive overload, balance and gait retraining show significant benefits in preserving muscle mass, reducing frailty markers and enhancing activities of daily living (52,53). These programs can be adapted for home or community settings and delivered by trained health or fitness professionals. However, supporting adherence and resourcing ongoing supervision can be challenging (53).

Physical activity interventions aimed at falls prevention typically include balance training, lower limb strengthening and task-specific functional exercises. Group-based models offer added social benefits, while home-based models enhance accessibility. The ProAct65+ trial offers high-quality evidence on comparative effectiveness, outlined below.

ProAct 65+ trial

Falls are a significant risk to the health and independence of older adults, with primary care settings playing a central role in prevention strategies. Structured strength and balance programs have been developed to address this risk, including the Falls Management Exercise (FaME) program and the Otago Exercise Programme (OEP) (54–56).

The ProAct65+ trial was a large, pragmatic cluster randomised controlled trial conducted across UK general practices. The trial aimed to evaluate whether the two evidence-based exercise interventions. FaME and OEP, could increase physical activity levels and reduce falls in community-dwelling older adults compared to usual care (54).

Participants were randomised at the general practice level into one of three arms:

- **Falls Management Exercise (FaME) Program**: A supervised, group-based exercise program delivered in community settings. FaME targets multiple components, including strength, balance, flexibility, endurance, and functional mobility.
- **Otago Exercise Programme (OEP):** A home-based, individually tailored program, supported by health professionals. OEP consists of strength and balance exercises and a structured walking plan.
- **Usual care**: Participants received standard health and falls prevention advice without additional exercise intervention.

The primary outcome was the proportion of participants achieving at least 150 minutes of moderate-to-vigorous physical activity per week at 12 months post-intervention (68). Results of the intervention were:

- **Physical activity:** At 12 months, nearly half (49%) of participants in the FaME program met the recommended physical activity levels, compared to 43% in the OEP group and 38% in usual care. Participants in the FaME group were more likely to reach the activity target than those receiving usual care, and this difference was statistically significant.
- **Falls prevention:** Both exercise programs lowered falls over 12 months compared to usual care. FaME reduced falls by 27%, a statistically significant effect, while OEP showed a smaller reduction that was not significant.
- **Balance confidence and attitudes**: Both FaME and OEP improved participants' balance confidence and exercise expectations at 12 months
- **Bone health sub-study:** A nested bone health study found no significant change in bone mineral density or bone strength parameters at 24 weeks in either intervention group, suggesting the exercise intensity and duration were insufficient to affect skeletal outcomes (69).

A subsequent implementation study (56) assessed the effectiveness of FaME when delivered at scale across 10 local authorities in England:

- significant improvements were observed at program completion in functional measures (timed-up-and-go, functional reach), balance confidence, and concern about falling.
- minutes of strength and balance activity increased by 55% and remained elevated at the six-month follow-up.
- falls incidence decreased but was not statistically significant.
- most functional gains were not sustained at six months post-program and only 41% of participants completed ≥75% of classes.

The ProAct65+ trial demonstrated that FaME and OEP are feasible to implement in general practice settings, with FaME showing significant improvements in physical activity levels and fall reduction at 12 months and OEP showing a smaller but positive effect on falls reduction (54).

PACE walking intervention

The PACE (Pedometer and Consultation Evaluation) study (57) was a randomised controlled trial involving 988 participants aged 60–75 who attended three general practices in the UK between 2011 and 2012. The aim was to determine whether a primary care, nurse-led walking intervention could sustainably increase physical activity levels. Participants were randomly assigned to an intervention group and a usual care control group (57). The PACE intervention was delivered by practice nurses during extended consultations.

The intervention group participants were provided with:

- pedometer: to track daily steps with a simple pedometer, encouraging self-monitoring;
- accelerometer: to measure the intensity and duration of physical activity, with data reviewed during consultations;
- nurse consultations: four individualised consultations with practice nurses trained in behavioural change techniques to support goal setting, action planning, and overcoming barriers;
- patient handbook: a structured 12-week walking guide, reinforcing the importance of regular moderate-intensity physical activity;

- personalised walking/physical activity plan: to develop a tailored walking plan to increase activity levels gradually;
- physical activity diary: to record daily steps, goals, and reflections, promoting accountability and self-motivation.

Results of the intervention were:

- Intervention participants increased their average daily steps by 1,037 steps at 3 months and 658 steps at 12 months compared to controls. This equates to approximately 40 additional minutes of walking per week at 12 months. Moreover, participants in the intervention group spent significantly more time in moderate-to-vigorous physical activity in ≥10-minute bouts at both 3 and 12 months.
- No statistically significant changes were observed in BMI, blood pressure, or other clinical endpoints. However, modelling based on established risk estimates suggested that the observed increase in walking could lead to a 5.5% reduction in coronary heart disease risk and a 9.1% reduction in type 2 diabetes risk, if sustained.
- No adverse events were reported. The intervention was well accepted, with 87% of participants attending all four nurse consultations and high compliance with accelerometer wear.

Nutrition

Nutrition is a critical determinant of health, functional capability and quality of life in older adults. Adequate nutrition supports resilience against illness, preserves muscle mass and physical function, enhances cognitive health and underpins independence in daily life. However, malnutrition, dehydration and obesity are significant and growing challenges among ageing populations (58).

Malnutrition remains common yet under-recognised, leading to increased risk of frailty, sarcopenia, infection, hospitalisation and early mortality (59). Sarcopenia, the loss of muscle mass and strength, contributes directly to physical impairment, frailty and greater dependency, and impairs the body's ability to respond to stress and disease (58).

At the same time, obesity is an escalating concern among older Australians. Overweight and obesity are increasingly affecting older Australians with serious implications for health, independence and quality of life.

In 2022, the proportion of adult men and women who lived with overweight or obesity generally increased with age (60) :

- the proportion of men increased steadily from 42% of those aged 18–24 to a peak of 81% in those aged 65–74;
- the proportion of women increased from 41% of those aged 18–24 to a peak of over 70% in those aged 55–64 and 65–74;
- obesity is also more common in older age groups with 41% of men and 37% of women aged 65–74 living with obesity compared to 15% of men and 16% of women aged 18–24 years.

In older age groups, this pattern contributes to elevated risk for chronic diseases such as type 2 diabetes, cardiovascular conditions, osteoarthritis and dementia, as well as a number of types of cancer. Excess body weight also heightens the likelihood of functional decline, falls and reduced mobility, factors that compromise autonomy and increase reliance on health and aged care services.

The burden of diseases attributable to being overweight and obesity is particularly high among socioeconomically disadvantaged older adults, who face a 2.2 times greater disease burden compared to those in the highest socioeconomic areas. Addressing overweight and obesity in later life is critical to preventing avoidable hospitalisations, supporting healthy ageing and reducing system-level costs (71).

Nutritional interventions for older adults should consider the dual challenges of malnutrition and obesity, ensuring that both undernutrition and excessive weight gain are proactively addressed. This requires emphasis on balanced, personalised dietary support, aiming to meet energy, protein, fluid and micronutrient needs without promoting excess caloric intake. Oral nutrition interventions such as dietary counselling, food fortification and, where appropriate, oral nutritional supplements should be tailored to individual circumstances, taking into account functional status, co-morbidities and personal preferences (58).

In primary care, dietary management is important in tertiary prevention for older adults with established chronic conditions such as type 2 diabetes. The *RACGP–Diabetes Australia Handbook on Management of Type 2 Diabetes* recommends an individualised approach that incorporates culturally appropriate nutrition advice, supports gradual and sustainable dietary changes and integrates medical nutrition therapy with overall care planning. For older adults, this includes strategies to optimise glycaemic control while maintaining adequate nutritional intake to prevent sarcopenia and unintentional weight loss. Collaborative care involving GPs, practice nurses, and accredited practicing dietitians is essential to monitor progress, adjust meal plans to functional abilities and comorbidities and address barriers such as food insecurity or limited cooking capacity. Such integrated, patient-centred nutritional care can improve metabolic outcomes, enhance quality of life, and reduce the risk of diabetes-related complications in later life (62).

Beyond physiological outcomes, oral nutrition plays an important psychological and social role. Eating enables sensory enjoyment, social connection and emotional wellbeing, all of which contribute to better health outcomes and improved quality of life (58). Nutritional support should be embedded within a multimodal and multidisciplinary approach, linked to broader goals of maintaining independence, supporting rehabilitation, enhancing social participation and reducing morbidity and mortality across the ageing population (58).

Evidence-based nutrition and malnutrition interventions

Individualised nutritional support in older adults

The EFFORT (Effect of early nutritional support on Frailty, Functional Outcomes and Recovery) trial provides compelling evidence for the benefits of individualised nutrition care in hospitalised older adults. Conducted across eight Swiss hospitals, this multicentre randomised controlled trial included 2028 medical inpatients at nutritional risk (63). Participants were assigned to either standard hospital food or a protocol-guided, individualised nutrition intervention delivered by trained dietitians.

The intervention group received tailored nutritional plans targeting specific protein and energy goals, adjusted for comorbidities, functional status and patient preferences. Results demonstrated a 35% reduction in severe adverse clinical outcomes, including mortality, ICU admission and major complications within 30 days compared to the control group (63). Additionally, participants showed improved functional status and higher daily caloric and protein intake, with no significant increase in adverse events.

Multidisciplinary and multimodal interventions

Evidence shows that comprehensive, multifaceted approaches such as community-based programs and multidisciplinary discharge planning teams improve nutritional status and functional outcomes for older adults (64). Transitional care interventions can prevent the 'nutritional gap' that often arises post-hospital discharge. However, implementation in primary care is frequently hindered by inadequate training, misconceptions about malnutrition and low awareness among both clinicians and the public. Systematic screening using validated tools, combined with professional education, would support early identification and effective intervention. A coordinated primary care approach, underpinned by multidisciplinary collaboration, is central to improving health outcomes for older adults at risk of or experiencing malnutrition (64).

The European Society for Clinical Nutrition and Metabolism (ESPEN) highlights the need to strengthen clinical nutrition in primary care through structured, system-level actions. These include embedding routine malnutrition screening using validated tools such as the Malnutrition Universal Screening Tool (MUST), applying the Global Leadership Initiative on Malnutrition (GLIM) criteria for diagnosis and ensuring access to ongoing assessment and treatment. Despite its potential, nutritional care remains inconsistently implemented due to barriers such as inadequate education, limited dietetic support and a lack of referral pathways. ESPEN advocates for a strategic roadmap that integrates nutrition education into medical training, equips primary care teams with appropriate tools and formalises multidisciplinary collaboration. These initiatives aim to reduce hospitalisations, improve recovery following discharge and enhance quality of life for high-risk groups, including older adults and those with chronic or post-acute conditions (65).

Nutrition education for professionals and caregivers

Improving nutrition knowledge among healthcare professionals, informal caregivers and older adults themselves is essential to promoting healthy ageing and preventing malnutrition. Research highlights persistent knowledge gaps in geriatric nutrition, with no significant differences observed between healthcare and non-healthcare professionals (66). One study found that healthcare professionals have lower awareness of the role of nutrition in disease prevention and management compared to laypeople, indicating the need for formal, targeted education that covers age-related metabolic changes and the dietary needs of older adults (66).

The Aged Care Quality and Safety Commission (2021) emphasises that all workers supporting older people, regardless of clinical training, require access to evidence-based nutrition resources and support to identify and respond to malnutrition risks (67) . Dietitians Australia (2024) outlines the specialised role of Accredited Practising Dietitians in aged care and advocates for multidisciplinary collaboration, nutrition screening and capacity-building of generalist staff to strengthen nutritional health care (68).

Ongoing professional development, the integration of dietitians into aged care teams, and the use of digital tools such as mobile applications and online training modules are critical enablers of better nutrition care. Educational strategies should address common misconceptions and build understanding of the social and medical determinants that shape dietary health in later life (64,65).

Oral nutritional supplements and food fortification

When dietary counselling and other interventions fail to achieve nutritional requirements, the use of oral nutritional supplements and fortified foods becomes an important alternative, particularly for malnourished or at-risk older adults. The Australian Prescriber emphasises that oral nutritional supplements can effectively increase protein and energy intake and support weight gain when used alongside dietary modifications (69). WHO guidelines similarly recommend oral nutritional supplements combined with dietary advice to improve nutritional status in undernourished older individuals (70). A pilot study of a “med-pass” protocol in residential aged care administering small, energy-dense supplements alongside medication rounds showed high compliance and improvements in weight, BMI, fat and muscle mass and reduced malnutrition risk scores (71).

Home-delivered meals

Home-delivered meal programs play an important role in supporting the nutritional status of older adults living in the community. Evidence shows that such services can lead to modest but clinically relevant improvements in dietary intake, nutritional status and quality of life. However, the long-term impact on functional outcomes and health service use remains under-researched. While home-delivered meals may not fully address underlying malnutrition, they represent an important component of a broader, coordinated nutrition strategy tailored to older individuals at nutritional risk (72).

Individual dietary counselling

In a three year (2004-2007) study in Finland of the inclusion of dietary counselling as part of a comprehensive geriatric assessment (CGA) of people aged 75 and older, dietary counselling was found to be associated with improved nutritional status. The intervention provided tailored nutritional advice based on each participant’s baseline assessment, aiming to improve energy intake, protein consumption and overall dietary quality without relying on supplements (73). The intervention comprised:

- two face-to-face counselling sessions with a nutritionist to develop, review and adjust dietary plans;
- personalised meal plans to increase meal frequency, energy, and protein intake using regular foods;
- telephone follow-up every two months to monitor progress, reinforce goals and provide additional support;
- family and caregiver involvement during counselling sessions, particularly for patients with cognitive impairment, to ensure adherence and understanding;
- dietary adjustments made during the second session based on patient feedback and evolving nutritional needs (73).

Results of the intervention included:

- significant improvement in nutritional status: MNA (Mini Nutritional Assessment) scores increased by 1.8 points in the intervention group compared to controls. Whereas, serum albumin levels rose by 0.8 g/L, indicating improved protein status;
- behavioural improvements: Increase in the number of meals consumed per day, higher intake of protein-rich foods, and enhanced self-perception of their nutritional status.

Primary care role in nutrition for healthy ageing

Primary care is the most accessible level of health care for provision of support of nutritional health among older adults and to reduce risks for malnutrition, frailty and obesity. GPs, practice nurses, and allied health professionals are ideally placed to identify nutrition-related risks, initiate timely interventions and support long-term wellbeing through collaboration with community-based services (58,73,74).

Primary care is positioned to refer or connect older adults to community nutrition services including home-delivered meal programs (such as Meals on Wheels), culturally tailored food support, local cooking groups and structured shared meal programs. These services not only enhance nutritional intake but also address food insecurity and social isolation, two key factors contributing to malnutrition and functional decline in older adults (75). Shared meal programs have shown promise in improving the health and wellbeing of community-dwelling older adults. These programs provide not only nutritious meals but also the opportunity for commensal eating, shared meal occasions that promote social interaction and emotional connection. Participation in shared meals has been associated with improved dietary intake, expanded social networks and enhanced perceived wellbeing, even when direct physical health improvements are less evident (76). As loneliness and social isolation are known risk factors for poor health outcomes, shared meal programs offer dual benefits: nutritional support and social connection.

In Australia, the development of home and community care services has a long history with major policy milestones such as the Delivered Meals Subsidy Act (1970), the Home and Community Care Program (1980-2010s) and the more recent Commonwealth Home Support Program. These initiatives have progressively expanded access to nutrition support, personal care and home services to enable older adults to maintain independence and age in place (77).

Meals on Wheels is a national network of community-based organisations delivering an estimated 10 million home-delivered and centre-based meals annually to over 50,000 clients across Australia (58). Meals on Wheels services are often tailored to meet the cultural, dietary and functional needs of local populations, providing an essential link between clinical care and the broader social determinants of health.

Primary care providers can:

- actively refer patients at risk of malnutrition or social isolation to appropriate meal services and community nutrition programs;
- incorporate participation in shared meal programs or meal delivery services into care planning.;
- educate carers and families, particularly for older adults with cognitive or functional impairments. Providing advice on preparing high-protein meals, recognising early signs of malnutrition and supporting adequate hydration are essential components of preventive care (58).

The RACGP recommends that adults be supported to adopt dietary patterns aligned with the Australian Dietary Guidelines. This includes consuming five or more servings of vegetables and two servings of fruit daily, alongside a varied intake of foods from the five core food groups: vegetables and legumes; fruits; wholegrain cereals; lean meats and alternatives; and mostly reduced-fat dairy or alternatives. Patients should also be encouraged to limit foods high in saturated fat, added salt and added sugars, as well as discretionary foods such as processed snacks, confectionery and sugar-sweetened beverages. Nutrition advice should be delivered opportunistically in primary care, with an emphasis on practical, culturally responsive and age-appropriate guidance to support chronic disease prevention and healthy ageing (78).

Emerging or innovative approaches

Photo-based communication intervention

A photo-based communication intervention (61) was developed to promote diet-related discussions among older adults living with multiple chronic conditions. Participants received training to use smartphones to capture photographs of factors influencing their dietary habits, including meals, shopping habits, kitchen environments and social eating situations. These photos, combined with personal narratives, were shared with primary care clinicians during consultations. The impact of the intervention was evaluated through post-visit interviews with both patients and clinicians, using thematic analysis to assess changes in communication and care planning (79).

Key outcomes included:

- High engagement: 93% of older adults and 86% of clinicians expressed willingness to use photo-sharing in future clinical visits.
- Enhanced communication: Photographs facilitated deeper understanding of patients' dietary habits, cultural food practices and environmental influences on nutrition.
- New insights uncovered: Patients shared information not previously disclosed during standard consultations, enriching clinical understanding.
- Influence on care planning: Clinicians reported modifying care recommendations based on the new insights gained from the photos and discussions.

Home-based eHealth intervention

The Home-Based eHealth Intervention was designed to improve dietary intake and physical activity among older adults attending 17 primary health care centres in Portugal who were experiencing food insecurity. The project comprised a 12 week intervention with 31 participants. Delivered via an interactive television application, the program provided weekly thematic content focused on nutrition education, affordable meal preparation and home-based exercise promotion (61). The content included:

- nutrition and diet tips;
- low-cost healthy recipes;
- physical activity program with structured guidance encouraging home-based exercise for 30 minutes, three times a week.

Key outcomes included:

- 40% reduction in food insecurity among participants;
- significant decrease in fatigue levels;
- improved physical function as measured by the Health Assessment Questionnaire;
- increased exercise regularity, with participants achieving a rise from 32% baseline to 58% adherence at three months.

Sleep

Sleep undergoes marked changes with ageing, reflecting both biological shifts and broader lifestyle transitions. While healthy older adults may report fewer sleep complaints, objective measures show that sleep becomes increasingly fragmented with reduced slow-wave and REM sleep, increased sleep latency and greater nocturnal awakenings. Sleep efficiency declines gradually with age and older adults tend to experience circadian phase advancement, leading to earlier sleep and wake times. Hormonal shifts including reduced melatonin and growth hormone secretion and altered cortisol and thyroid rhythms, further disrupt sleep quality in later life (80).

Daytime napping becomes more frequent with age, often driven by excessive daytime sleepiness, which may be linked to underlying comorbidities, medications or poor nocturnal sleep. Despite these age-related changes, sleep patterns typically stabilise after the age of 60 among healthy older adults. However, for many, sleep disturbances persist, especially when compounded by chronic conditions, psychiatric illness, environmental disruptions or social isolation. These factors are not intrinsic to ageing but are common contributors to disrupted sleep among older populations (80).

Poor sleep quality has significant implications for healthy ageing. A systematic review by Casagrande et al. (2022) demonstrated that compromised sleep is prevalent in older adults and is significant among those with mild cognitive impairment and Alzheimer’s disease. Individuals with mild cognitive impairment and Alzheimer’s disease exhibited lower sleep efficiency, increased sleep latency, reduced REM and slow-wave sleep, and greater sleep fragmentation than healthy peers. Importantly, longitudinal data suggest that deteriorating sleep quality may precede and predict cognitive decline. Sleep disturbances have been associated with impaired memory consolidation and reduced clearance of neurotoxic metabolites, including beta-amyloid, contributing to the neurodegenerative processes characteristic of Alzheimer’s disease (81).

Sleep should be recognised as a core pillar of healthy ageing. Interventions that support circadian regulation, improve sleep hygiene and address comorbid conditions can support cognitive function and overall wellbeing in later life (80,81).

Obstructive Sleep Apnoea (OSA) is characterised by repetitive episodes of upper airway obstruction during sleep, leading to intermittent hypoxia and sleep fragmentation. Risk factors such as increased age, obesity, craniofacial changes and comorbidities including hypertension and type 2 diabetes increase its prevalence in older populations (82). Untreated OSA is associated with significant health consequences including cognitive impairment, cardiovascular disease, and increased risk of falls (83).

Management of OSA in older adults involves tailored interventions aimed at reducing airway obstruction and improving sleep quality. Continuous positive airway pressure (CPAP) remains the gold standard treatment, effectively reducing apnoeic episodes, improving oxygenation and enhancing daytime alertness and cognitive outcomes. For patients unable to tolerate continuous positive airway pressure, alternative therapies such as mandibular advancement devices, positional therapy and weight management strategies may be appropriate. Multidisciplinary approaches involving sleep specialists, primary care providers and allied health professionals optimise treatment adherence and address comorbidities common in older populations, such as cardiovascular disease and frailty. Early initiation and ongoing support for OSA treatment are crucial to mitigate adverse health outcomes and improve quality of life in older adults (83–85).

Evidence-based sleep interventions

Continuous Positive Airway Pressure (CPAP) therapy in older adults

Continuous Positive Airway Pressure (CPAP) therapy delivers pressurised air via a mask to maintain airway patency during sleep, effectively reducing apnoeic events, improving oxygenation and enhancing sleep quality. Evidence indicates that sustained continuous positive airway pressure use in older populations can improve daytime functioning, reduce cardiovascular risks and enhance overall quality of life (84–87).

Sleep Association Australia provides an RACGP-endorsed clinical resource for primary care management of obstructive sleep apnoea and insomnia. The resource includes recommendations on diagnosis, treatment options such as continuous positive airway pressure (CPAP), and patient education resources (88).

Cognitive Behavioral Therapy for Insomnia (CBT-I) and Tai Chi Chih (TCC)

Cognitive Behavioral Therapy for Insomnia (CBT-I) is a structured, non-pharmacological intervention that targets the behavioural and cognitive mechanisms contributing to chronic insomnia. In a randomized controlled comparative efficacy trial, Irwin et al. (2014) evaluated CBT-I against Tai Chi Chih, a gentle meditative movement intervention and a sleep education seminar in a sample of 123 community-dwelling older adults with primary insomnia. Participants attended weekly two-hour group sessions over four months, with follow-up assessments conducted at 7 and 16 months (89).

CBT-I includes the following components:

- sleep education and psychoeducation on sleep–wake physiology;
- stimulus control to strengthen the association between bed and sleep ;
- cognitive restructuring to challenge maladaptive beliefs about sleep;
- sleep hygiene strategies;
- a behavioural activation and mood-enhancement module to address comorbid depressive symptoms and support daytime functioning (89).

This multicomponent approach yielded the highest rates of insomnia remission, with CBT-I participants nearly twice as likely to achieve diagnostic remission compared to those in the Tai Chi Chih and sleep education groups. Improvements in sleep latency, efficiency, and wakefulness after sleep onset were sustained over time, alongside moderate to large improvements in fatigue and depressive symptoms.

A clinically significant and novel finding was the reduction in systemic Inflammation, measured via high-sensitivity C-reactive protein (CRP). At the 16-month follow-up, the CBT-I group exhibited a 50% reduction in the proportion of participants with elevated CRP. Remission of insomnia was directly associated with lower C-reactive protein levels, suggesting that effective sleep interventions may yield broader physiological benefits, including reduced cardiovascular and metabolic risk.

While not effective in achieving remission of clinical insomnia, Tai Chi Chih produced short-term improvements in sleep quality, depressive symptoms and fatigue when compared to the control group. These gains were not maintained at the 16-month follow-up and Tai Chi Chih did not impact inflammatory biomarkers.

This trial highlights the sustained efficacy and systemic health impact of CBT-I for treating insomnia in older adults. Beyond resolving sleep complaints, CBT-I appears to modulate inflammatory pathways relevant to chronic disease and ageing, making it a powerful, multidimensional strategy for promoting healthy ageing in clinical practice (89).

Given the prevalence of sleep disturbances in older adults and their association with fatigue, cognitive decline and mood symptoms, timely and proactive identification in primary care of sleep health risks in individuals and their management is important (80,89).

Cognitive Behavioral Therapy for Insomnia (CBT-I) is a recommended first-line, non-pharmacological intervention. Primary care teams can refer patients to trained CBT-I practitioners or incorporate brief behavioural strategies within routine care. Group-based programs and digital CBT-I platforms may expand access, especially in settings with limited psychological services (89).

A growing body of evidence supports the integration of Tai Chi into primary care and community-based strategies for promoting health among older adults. A scoping review of 27 meta-analyses identified moderate to high-quality evidence that Tai Chi can lead to significant improvements in balance, mobility, cardiorespiratory fitness, strength, cognition, proprioception and sleep, and can reduce the incidence of falls and nonfatal stroke (90). These findings indicate the potential utility of Tai Chi as a low-cost, accessible intervention for older adults across diverse health profiles. In primary care settings, providers have incorporated movement-based therapies such as Tai Chi into multidisciplinary and preventive care approaches, particularly in programs targeting chronic disease management, fall prevention and cognitive health (90).

Brief Behavioural Therapy for Insomnia in general practice

Brief Behavioural Therapy for Insomnia is a structured, evidence-based intervention developed to address the limitations of traditional Cognitive Behavioural Therapy for Insomnia (CBTi) within Australian general practice. While CBTi is the first-line treatment for chronic insomnia recommended by the RACGP, the resource-intensive nature of traditional CBTi makes it less feasible in general practice. Brief Behavioural Therapy for Insomnia offers a practical alternative, distilling the most effective behavioural components of CBTi into a brief, four-session model that can be delivered by general practitioners or practice nurses with minimal training (91).

Brief Behavioural Therapy for Insomnia targets chronic insomnia, defined as difficulties initiating or maintaining sleep or early morning awakenings with associated daytime impairment that persist for at least three months. The core therapeutic components include stimulus control therapy and bedtime restriction therapy which leverage the homeostatic sleep drive and circadian processes. These are delivered alongside psychoeducation about sleep regulation and the four key behavioural rules for improving sleep: getting out of bed at the same time each morning, delaying bedtime until sleepy, avoiding non-sleep activities in bed and getting out of bed during extended wakefulness at night (91). The Brief Behavioural Therapy for Insomnia model has demonstrated effectiveness across various patient populations including older adults, individuals with comorbid depression or hypnotic-resistant insomnia and those withdrawing from sedative–hypnotic medications. Notably, Brief Behavioural Therapy for Insomnia is associated with sustained improvements in insomnia severity, reduced reliance on medication and enhanced self-management of future insomnia episodes. Importantly, it does not require access to overnight sleep studies and is well-suited to both in-person and telehealth delivery, either individually or in group settings (91).

Australian studies have highlighted the feasibility of delivering Brief Behavioural Therapy for Insomnia in primary care, including by practice nurses, which supports wider implementation aligned with

RACGP clinical guidance. Given its brevity, scalability, and cost-effectiveness, Brief Behavioural Therapy for Insomnia represents a valuable intervention model for addressing the high burden of insomnia in ageing populations (91).

Studies report that Brief Behavioural Therapy for Insomnia facilitates the adoption of behavioural strategies to address chronic insomnia and supports reductions in sedative–hypnotic use (91). The approach aligns with RACGP guidance recommending non-pharmacological interventions as first-line treatment for insomnia and is supported by practical tools such as the HANDI platform, the SA Health Insomnia Management Kit, and standardised sleep diaries.

Literature also supports the integration of Brief Behavioural Therapy for Insomnia into routine care as a cost-effective and scalable model, particularly suitable for ageing populations with high rates of sleep disturbance. Screening for insomnia and comorbid mood symptoms using validated tools can assist with identifying appropriate candidates for Brief Behavioural Therapy for Insomnia. Where complexity or treatment resistance is identified, referral to psychologists with sleep expertise for full CBTi remains an evidence-based option (91).

Box 4.1. Sleep management resources for primary care

Resources for primary care providers

- RACGP HANDI: Brief behavioural therapy for insomnia in adults (92).
- SA Health – Insomnia management kit (93)
- Sleep diary template (94)

Cognitive health

Cognitive health, the ability to think clearly, learn and remember, is essential for older adults to maintain autonomy, perform daily activities and experience a good quality of life. It is one pillar of broader brain health and is vital to the capacity for independent living, decision-making, medication adherence, financial management and social participation (95).

While some degree of cognitive change is a regular part of ageing, age-related cognitive decline is heterogeneous with wide onset, rate and severity variability. This decline disproportionately affects processing speed, executive function and episodic memory (95,96). More severe impairment can progress to dementia which poses profound personal, social and economic challenges. Experts expect the global burden of dementia to increase substantially over the next 25 years, making the promotion of cognitive health in older age a global public health priority (97,98).

Although genetics and age influence some aspects of cognitive decline, modifiable lifestyle and environmental factors are significant in their influence on cognitive health. These factors include physical activity, nutrition, social engagement, educational attainment and mental stimulation (99). The concept of cognitive reserve, the brain’s resilience to neuropathological damage, is strongly shaped by these intra-individual variables which can buffer against the clinical expression of decline (96).

Recent research has highlighted that the efficacy of cognitive interventions is shaped by individual characteristics such as age, sex, baseline cognitive status and even neuroimaging markers of brain network connectivity (95). Women may benefit more from exercise interventions, while those with mild impairment may show better outcomes from cognitive training and neuromodulation than those with advanced cognitive decline. Importantly, some interventions that are not directly cognitive in focus such as mindfulness practices, therapeutic music and social meal programs, may still yield indirect benefits by improving mood, social connection and executive functioning, particularly in individuals with early-stage or more advanced cognitive impairment (95,100).

Safeguarding cognitive health requires a lifespan approach that integrates risk reduction, early support and person-specific interventions grounded in both clinical and social determinants of health (101).

Evidence-based cognition interventions

Home-based cognitive behavioural program to address fall concerns

In a randomized controlled trial undertaken in the Netherlands, a home based cognitive behavioural program was assessed for its capacity to reduce the fear of falling and promote safe activity engagement among frail, community-dwelling older adults. Community nurses trained in behaviour change techniques delivered the program over seven structured sessions. The program included three home visits (60–75 minutes each) and four telephone calls (35 minutes each). Sessions focused on building confidence, managing fear of falling and encouraging safe behaviours. Participants set individual goals, completed reflective homework and practiced previously avoided activities like stair walking or leaving the house (102). Trial outcomes showed that participants in the intervention group had:reduced concerns about falling, sustained for up to 12 months;

- decreased activity avoidance due to fear of falling;
- lower disability levels;
- fewer reported indoor falls.

Emerging or Innovative Approaches

Maintain Your Brain (MYB) Online lifestyle intervention

Maintain Your Brain is a large-scale, online, multidomain lifestyle intervention designed to reduce dementia risk by targeting multiple modifiable factors: physical inactivity, poor diet, cognitive inactivity and anxiety and depression (95).

The intervention was delivered entirely online through a custom-built web application. Participants engaged in personalised modules addressing exercise, nutrition, cognitive training and mental health, depending on individual risk profiles. MYB aimed to offer an accessible, scalable solution by enabling users to complete the intervention at home without direct supervision, supporting behaviour change through educational content, goal-setting and interactive tasks (95). The intervention group showed greater global cognitive function improvements than the control group. The following cognitive domain improvements were observed:

- complex attention;
- executive function;
- learning and memory.

The intervention demonstrated the effectiveness of a personalised, multidomain approach for dementia risk reduction in a younger, community-recruited population.

Findings from the Maintain Your Brain intervention suggest that scalable, online programs may complement existing preventive strategies in primary care, particularly in settings with limited access to specialist or in-person services. Literature also points to the importance of primary care in facilitating early identification of cognitive and mood-related changes and enabling timely access to preventive resources (103,104).

Primary care relevant strategies described in the literature include:

- Integrating brief, validated screening tools such as the General Practitioner Assessment of Cognition (GPCOG) and the Patient Health Questionnaire (PHQ-9) to detect early cognitive or psychological symptoms (105).
- Using culturally competent approaches to initiate conversations about memory concerns and mental wellbeing which may help reduce stigma and promote early intervention (106).
- Providing information or referring individuals to evidence-based digital interventions like MYB, community-based programs, or multidisciplinary care pathways, where appropriate (103,107).

Social isolation and loneliness in ageing

Social isolation and loneliness are major public health challenges that affect older adults across diverse settings. Social isolation refers to the objective absence of social contact, while loneliness reflects the subjective experience of feeling disconnected or lacking companionship. Both are linked to a range of negative outcomes, including increased risks of depression, anxiety, cognitive decline, functional deterioration and premature mortality (104).

The experience of social isolation becomes more common in older age due to life transitions such as retirement, bereavement, declining mobility, chronic illness and reduced access to transport. The prevalence is even higher among older people in lower-income households. A recent European survey showed that older adults living in poorer households reported loneliness at rates 10 percent higher than their wealthier peers (105).

Despite the well-documented impacts, interventions often fail to systematically identify or target older adults who are lonely or socially isolated. Many programs use broad risk criteria such as age or living alone, without formally assessing social isolation. This can lead to a mismatch between individuals and interventions. Older adults may withdraw from programs that do not meet their needs or respect their desire for privacy and autonomy (105).

Research highlights the need for interventions that are sustained, accessible and tailored to older people’s physical, emotional and social capabilities. Effective strategies include fostering community connections, providing shared-interest group activities, offering transportation support and involving professionals with strong relational skills. Programs built on participatory design approaches tend to achieve greater relevance and acceptability (105).

A wide range of interventions have been developed to address loneliness and social isolation, operating at individual, community and system levels.

Reviews such as Poscia et al., 2017 and Thompson et al., 2023, (106,107) highlight that the most effective interventions are:

- multi-component: targeting more than one factor (e.g., social, cognitive, behavioural);
- community-based: embedded within existing services and designed in collaboration with older people and community organisations;
- productive: involving active participation rather than passive attendance.

Examples of promising approaches include:

- intergenerational reminiscence therapy, which fosters connection through shared memory and storytelling (108).
- participatory arts programs, particularly for those with sensory impairments, which promote creativity, confidence, and community ties (109).
- technology-based supports, such as computer training, video interaction and digital communication platforms, which can reduce isolation when adequately tailored and supported (110).
- volunteering and peer support models, where older adults contribute or mentor others, fostering purpose and reciprocal engagement (111).

Thompson et al. (2023) identify four key functions for primary care professionals in identifying and responding to social isolation among older people:

- identifier/referrer: detecting signs of isolation and making appropriate community referrals
- assessor: conducting structured assessments of social support needs
- responder: contributing to patient engagement in interventions
- supporter: assisting in the design and delivery of community-led initiatives (107).

Social prescribing has developed in recent decades as a component of primary health care enabling primary care providers to connect patients with non-clinical health-related needs to be connected with community-based supports tailored to their interests, needs and capabilities. Pilot programs in Australia have shown that social prescribing can improve uptake of community-based activities and help address the broader social determinants of health (112,113).

Recent policy discussions in Australia, including a national roundtable convened by the Australian Social Prescribing Institute of Research and Education (ASPIRE), have reinforced that primary care is the logical starting point for system-wide adoption. The roundtable identified the need for national coordination, modest but sustained funding and improved partnerships at local and regional levels. The inclusion of dedicated link workers, based in local communities or general practices was recognised as critical to effective implementation. These workers assess patients' social needs, connect them to suitable community activities and provide follow-up support, enhancing the continuity and personalisation of care (112,114).

The literature also identifies implementation enablers. These include training for primary care practitioners, clear referral pathways and co-designed interventions that are culturally relevant and contextually appropriate (106–108). A broader shift toward prevention rather than episodic treatment is also necessary to embed social wellbeing into routine care and ensure that interventions are equitable and sustainable.

As part of a comprehensive healthy ageing approach, social prescribing can help restore connection, foster community engagement and reduce the burden of isolation in later life. Integrating these models more systematically within primary care practice represents a scalable, community-centred response to one of the most pressing issues facing older Australians (114).

Evidence-based interventions for social isolation and loneliness

Social isolation and loneliness are well-established determinants of poor health outcomes in later life, associated with depression, cardiovascular disease, cognitive decline and increased mortality (115). In response, a growing evidence base supports a diverse range of interventions to reduce isolation and enhance social connection among older adults. These include one-to-one supports, group-based activities, therapeutic modalities and system-wide initiatives such as social prescribing (116).

Gardiner et al. (2018) identified 38 studies in their integrative review, concluding that while many interventions reported some success, there was no 'one-size-fits-all' model. The most promising interventions shared three common features:

- adaptability to individual needs, allowing flexibility across settings and stages of ageing;
- productive engagement, involving meaningful, interactive activity rather than passive participation;
- community development orientation, which builds on local assets and fosters neighbourhood connections.

Contrary to earlier assumptions, Gardiner et al. found no consistent evidence that group-based interventions are superior to one-to-one or solitary activities. This highlights the importance of offering a spectrum of options tailored to personal preferences, cultural contexts and health status (116).

One-to-one interventions offer personalised support for older adults experiencing social isolation or loneliness, particularly those with limited mobility or who prefer individual engagement. These approaches include volunteer visitor schemes, befriending services and tailored therapeutic support. Primary care providers can play a key role in identifying suitable individuals and connecting them with appropriate services as part of a broader, person-centred care approach.

Regular companionship has been shown to improve quality of life, reduce symptoms of depression and promote social participation. The Australian Government Aged Care Volunteer Visitors Scheme provides structured one-on-one support to older people at risk of social disconnection (117).Previously known as the Community Visitors Scheme, Aged Care Volunteer Visitors Scheme offers free, volunteer-based visiting services to individuals receiving government-funded aged care services. This includes people living in residential aged care, those receiving a Home Care Package and individuals on the National Priority List awaiting placement. The program aims to enhance social connectedness, reduce loneliness and recognise the contributions of older Australians to the community (117). Although formal evaluation data is pending, anecdotal evidence and long-standing engagement suggest that the program is widely valued by both recipients and volunteers (118).

Group-based community interventions reduce social isolation and loneliness by fostering peer connection, shared purpose and routine social engagement. These programs typically involve structured activities such as physical exercise, creative arts or education, delivered in accessible community settings. Evidence suggests they are particularly effective when they build trust over time, target specific groups and promote active participation (116,119). Participatory approaches, where older adults co-facilitate sessions or help shape group content, enhance engagement and ensure relevance. Program evaluations should embed consumer-reported outcome and experience measures to assess acceptability, perceived benefit, and areas for improvement (120).

Emerging or innovative approaches

School of Health for Older People

The School of Health for Older People is a structured, group-based community intervention developed under Barcelona's Health in the Neighbourhoods strategy. It aims to reduce social isolation and loneliness among older adults (65+) in disadvantaged urban areas. Based on an asset-based community development approach, the program promotes health education, peer interaction and social engagement through 22 weekly 90-minute group sessions, covering physical, mental and social health (105–107). Sessions are held in accessible community venues and led by local professionals, including nurses, social workers and police officers. Topics range from healthy habits and personal safety to navigating health and community supports.

An evaluation in 2022 (107) found that:

- attendance rates were over 76% in both sites, and 98.6% of participants would recommend the program;
- psychological distress significantly decreased in the intervention group compared to the control group;
- health related quality of life was maintained in the intervention group and declined in the control group;.
- participants in the intervention group reported increased access to companionship and peer support (e.g. “someone to relax with” rose from 34.8% to 59.4%);
- greater neighbourhood engagement: Participants felt more recognised, greeted others more often in the neighbourhood and reported a stronger sense of belonging.

Evidence from this program highlights the value of structured, nurse-led, community-based interventions in reducing loneliness and supporting mental wellbeing in older adults. For primary care, the evaluation underscores opportunities to strengthen referral pathways, particularly through nurses; to use risk indicators such as bereavement, social isolation, or low mobility to inform participation; and to align these programs with social prescribing frameworks that integrate non-clinical supports into holistic, person-centred care (121,122).

Life Story Club

The Life Story Club is a New York-based nonprofit that organises small social clubs for adults aged 60 and older to share personal stories (123). The initiative fosters a sense of belonging, supports social engagement and enhances purpose and identity through structured, narrative-based interaction. It operates both online and by phone, offering inclusive options for individuals with varying levels of technological comfort.

The Life Story Club aligns with emerging models of social prescribing in which healthcare professionals refer patients to non-clinical community resources to address psychosocial determinants of health. Through its “Story Rx” program, the Life Story Club partners with healthcare providers to connect socially isolated patients with its storytelling groups. Once referred, participants receive a welcome call, are matched to an appropriate group and attend regular weekly sessions. Monthly reports on engagement and attendance are provided back to referring partners.

Life Story Club also collaborates with libraries, senior centers, naturally occurring retirement communities and other community-based organisations to deliver these clubs locally (123–125).

Program outcomes have included positive psychosocial outcomes among participants:

- 95% of participants report feeling supported by the group;
- 70% show reduced loneliness, as measured by the UCLA Loneliness Scale;
- 92% feel a sense of community;
- 93% experience mood improvement after sessions.

The program’s structured format with its emphasis on peer connection and integration with healthcare provider networks suggest its potential utility within multidisciplinary primary care models (124,125).

Social Prescribing

Social prescribing as previously mentioned, refers to the practice of connecting individuals to a range of non-clinical supports, including community-based programs and services to improve health and wellbeing (44,126). This model has been integrated into primary healthcare in the UK and is increasingly being considered internationally as a complement to clinical care. Most social prescribing programs enable healthcare providers, including GPs, primary care nurses, allied health professionals and pharmacists, to refer individuals to a 'link worker' or community connector who works with referred individuals to co-produces a tailored non-medical intervention to address the individual's health-related social needs (45).

Social prescribing interventions typically address factors such as social isolation, loneliness, housing and food insecurity and other social determinants that influence chronic disease risk and wellbeing (127). Four core categories of social prescription interventions are commonly identified:

- physical activity;
- arts and cultural participation;
- engagement with the natural environment;
- advice and information provision (45).

Evidence from systematic reviews and evaluations indicates that social prescribing can yield improvements across a range of health and wellbeing outcomes, including:

- self-reported health status and quality of life;
- mental health indicators such as reduced anxiety and improved mood;
- physical health;
- social connection and reduction in loneliness;
- enhanced self-care and health literacy (128).

Reported health system benefits include reductions in unnecessary GP appointments, emergency department presentations, hospital admissions and associated healthcare costs (45).

Evidence-based social prescribing interventions

LiveUp

LiveUp is a digital health promotion platform designed to support older Australians in maintaining their independence and improving their wellbeing through accessible, evidence-based information and tools. Designed in collaboration with healthy ageing experts and funded by the Australian Government, LiveUp provides tailored resources and practical guidance to promote functional capacity and optimise ageing trajectories across the later stages of life (129).

The platform responds to evidence indicating that a significant proportion of the ageing experience, up to 75 percent, is shaped by modifiable lifestyle factors such as physical activity, nutrition and social engagement. Furthermore, the loss of independence remains one of the most significant concerns among older adults. LiveUp functions as a digital intervention that aligns with a social prescribing model by connecting individuals to community-based activities, assistive technologies and healthy ageing strategies.

LiveUp offers a suite of interactive tools, including a brief quiz and the LifeCurve assessment, which helps users understand their current functional ability and identify appropriate next steps for improvement (130). Users can access curated physical activity resources, social activities and self-care strategies aligned with their ageing goals. Importantly, the platform features a free, confidential LiveUp Navigator service enabling older people to receive personalised support, explore community programs and co-produce a healthy ageing plan based on their needs and preferences.

For primary care providers, LiveUp presents a scalable and accessible tool that complements clinical care by guiding patients toward preventive and health-enabling behaviours. It supports patient empowerment and health literacy while offering a structured pathway for referring individuals to non-clinical supports. This aligns with the broader objectives of social prescribing to promote wellbeing and reduce avoidable health service use, particularly in older populations.

Men’s Sheds

The Men’s Shed network is a nationally recognised model that provides community-based, peer-led spaces where older men can connect, contribute and maintain a sense of purpose. Supported by the Australian Men’s Shed Association which oversees more than 1,300 Men’s Sheds across the country, the initiative promotes men’s health and wellbeing through practical activity, social connection and mutual support (131). Originally developed as a response to growing concerns about social isolation and disengagement among older men, particularly after retirement, Men’s Sheds offers a culturally familiar environment that fosters identity, belonging and community contribution. The majority of Shed participants are older males navigating one or more life transitions, such as retirement, bereavement or the onset of chronic health issues, often accompanied by reduced social interaction and a diminished sense of self-worth (132).

Evidence indicates that Men’s Sheds play a significant role in addressing the social determinants of health. Research highlights that participation enhances self-esteem, strengthens social networks and promotes engagement in purposeful activity (132–134). These protective factors can contribute to improved mental health, reduced loneliness and increased health literacy. The Australian Men’s Shed Association has embedded health promotion into its programming through initiatives such as Spanner in the Works? (135), which improves access to male-targeted health information; Living Well (136), which supports wellbeing practices based on positive psychology; and Shed Mates (137), which equips peer networks to foster mental health support within the Shed community.

Men’s Sheds have been identified in the literature as a potential non-clinical pathway to support older men who may be socially isolated, disengaged from formal health services or experiencing psychosocial challenges. Participation in Men’s Sheds has been associated with strengthened social networks, regular structured activities and increased exposure to informal health information (131,133,134) suggesting that such engagement may be linked to broader benefits for mental wellbeing and community connectedness which could have implications for health service utilisation and preventive care strategies in older male populations.

Parkrun

Parkrun is a free, weekly, community event that enables individuals to walk, jog, run or volunteer in a supportive and inclusive environment. Established over two decades ago, Parkrun has grown into a global movement with widespread uptake across 20 countries (138). The appeal of Parkrun lies in its accessibility, non-competitive format and emphasis on community engagement. Unlike structured exercise programs, Parkrun fosters participation across diverse populations, including those traditionally underrepresented in physical activity, such as women, older adults and individuals with lower baseline activity levels (139).

Evidence indicates that participation in Parkrun is associated with improvements in physical fitness, mood and overall physical activity levels and in both physical and mental health outcomes (140). The most significant health benefits are reported among those who were least active at registration with a dose–response relationship observed between frequency of participation and positive outcomes (139). Qualitative data further suggest that participants experience psychological benefits, social connection and a strengthened sense of identity and belonging within the "Parkrun movement" (139). These findings are consistent with broader literature identifying social support, routine and accessible locations as critical facilitators of physical activity among older adults (141,142).. The characteristics of Parkrun, including its accessibility, routine scheduling and social engagement, align with factors associated with sustained physical activity in older populations (141,142)..

Alcohol and other drugs

Alcohol and other drug use among older Australians is an under-recognised contributor to health burden and health service use. In 2021, Australians aged 50 years and over accounted for more than one-third (35%) of the population, reflecting an ageing demographic with complex and evolving health profiles. Ageing is associated with physiological changes including altered metabolism, increased central nervous system sensitivity and polypharmacy, that heighten susceptibility to alcohol and other drug related harms, even at low levels of use. These harms include increased risk of falls, fractures, cognitive impairment, sleep disturbances and adverse drug interactions (143).

The 2022–2023 *National Drug Strategy Household Survey* (NDSHS) further illustrates the scale of alcohol and other drug use in older populations. Daily drinking remains most common among Australians aged 70 and over (11.7%), followed by those in their 60s (8.5%) and 50s (6.5%) (144). Risky drinking persists across older age groups: in 2022–2023, 33% of those aged 60–69 drank at levels associated with long-term harm. Although there has been a slight decline in risky drinking among people in their 50s since 2010 (from 36% to 32%), levels in older cohorts have remained relatively stable(144). Male older adults continue to drink at riskier levels than females; 44% of men aged 60–69 reported risky drinking compared with 23% of women of the same age (143).

Older Australians are also increasingly represented in illicit drug use trends. Among people in their 50s, recent use of any illicit drug nearly doubled between 2001 and 2022–2023 (from 6.7% to 13.6%) (144). The increase was evident in both males (from 8.1% to 16.1%) and females (from 5.2% to 11%). In those aged 60 and above, use increased from 3.9% to 7.8% over the same period. Cannabis remains the most commonly used illicit substance in these age groups (143,144).

In parallel, the non-medical use of pharmaceuticals such as opioids, benzodiazepines and sleeping pills is a growing concern. In 2021–2022, people aged 80 and above had the highest prescription dispensing rates for these drugs, followed by those aged 70–79 and 60–69 (143). Females over 80 had the highest dispensing rates overall. In 2022–2023, 4% of people in their 50s and 3.7% of those aged 60 and over reported non-medical use of pharmaceuticals, comparable to the general population prevalence of 5.3% (143).

These patterns of use do not occur in isolation. Life events such as bereavement, retirement, chronic pain or social isolation may lead to late-onset alcohol and other drug use, while long-term users may face new or compounding health risks as they age. In older adults, particularly women, substance misuse often reflects a complex interplay of biopsychosocial factors, including prior trauma, mental illness and caregiving burdens. These complexities can obscure substance misuse within the broader context of ageing and multimorbidity, reinforcing the need for age-sensitive clinical approaches (145).

The use of multiple substances, including alcohol, prescription medications and illicit drugs, is increasingly recognised as a key risk factor in later life (145). Symptoms of alcohol and other drug-related harm may mimic, mask or be mistaken for common geriatric conditions such as cognitive impairment, depression, frailty or recurrent falls, making detection in clinical settings particularly challenging. Identification is further complicated by barriers on both sides of the clinical encounter: clinicians may lack the time, training or familiarity with a patient's psychosocial history, while older adults may underreport use due to denial, discomfort or generational attitudes toward substance use (143,145).

Despite these risks, screening and intervention remain limited in primary care. Older adults are less likely to be screened for alcohol and other drug use and stigma continues to inhibit open disclosure. Sub-populations, including those from culturally and linguistically diverse backgrounds, rural and low socioeconomic communities and older women, face disproportionate access barriers and often require tailored, culturally appropriate responses (143).

The *National Alcohol Strategy 2019–2028* outlines a national framework for reducing alcohol-related harm and aims to achieve a 10% reduction in harmful alcohol consumption by 2025. It identifies four priority areas: developing healthier communities, supporting individuals to seek help, improving safety and improving treatment access. The Strategy identifies primary care as important to early intervention, treatment and referral. The Strategy highlights the need to strengthen workforce capacity in primary care, including improved training, tools and referral systems for general practitioners and pharmacists to identify and manage alcohol-related risk. It advocates integrated care approaches and promotes consistent screening and brief intervention as part of routine clinical practice to ensure timely and equitable access to treatment and support (146).

Evidence-Based Interventions

Brief interventions

Brief interventions are structured, time-limited conversations designed to reduce harmful or hazardous use of alcohol and other drugs. In primary care, brief interventions are typically delivered following opportunistic or routine screening and include motivational interviewing and the FRAMES framework (Feedback, Responsibility, Advice, Menu of options, Empathy, Self-efficacy) (147). They aim to enhance awareness of substance-related harm, motivate behavioural change and support patients in reducing consumption or associated risks.

Substantial international evidence supports the effectiveness of brief interventions in reducing risky alcohol use, particularly among non-dependent individuals (148,149). Interventions can be delivered in person or electronically and typically last between 3 to 15 minutes. Components may include personalised feedback, discussion of risks, elicitation of motivation to change and negotiation of a reduction strategy. The U.S. Preventive Services Task Force and the Community Preventive Services Task Force both recommend the delivery of brief interventions in primary care settings for adults engaging in excessive alcohol use (150,151).

In the Australian context, brief alcohol and substance use interventions are supported by clinical guidelines; however, uptake remains limited. General practitioners often view universal alcohol and substance use interventions implementation as impractical and favour targeted or context-specific approaches, such as during chronic disease management, preventive health assessments or mental health consultations (152). Patients also report higher levels of comfort with alcohol-related discussions in these settings, particularly when the clinician uses a collaborative and respectful tone, links the discussion to the presenting condition and avoids moral framing (152).

Evidence suggests that the therapeutic value of brief interventions may stem as much from the quality of the clinician–patient interaction as from the formal components of the intervention (152,153). In particular, repeated brief interventions delivered within an ongoing clinical relationship may be more impactful than one-off sessions (147,153). Brief conversations that raise awareness of alcohol-related risks and initiate behaviour change can be seen as part of a longitudinal care strategy.

e-SBI (electronic screening and brief intervention) presents an emerging opportunity to overcome time and workflow constraints. These interventions, delivered via digital devices offer tailored feedback and motivational content. Studies indicate that e-SBI is effective in reducing self-reported alcohol consumption and alcohol-related harms and can be integrated into general practice workflows without increasing clinician burden (151).

Local implementation studies highlight the value of practice-wide quality improvement approaches to support Screening and Brief Intervention delivery. For example, measuring and improving the completeness of alcohol use documentation in electronic health records has been used as a catalyst for change (153,154). In the CDC-supported Office Champions Project, Screening and Brief Intervention implementation in family practices led to increased patient engagement and improved care quality, particularly when supported by team-based approaches and staff training (149).

Medication review and deprescribing

Deprescribing is a structured, patient-centred intervention that supports healthy ageing by reducing the burden and risks associated with polypharmacy in older adults. In primary care, deprescribing involves the active withdrawal or dose reduction of medications that no longer provide benefit, pose potential harm or do not align with the patient’s current goals of care. This process is particularly relevant for older adults with comorbidities, functional vulnerability, and hazardous alcohol or substance use, where medication interactions may exacerbate risk (155,156). Shared decision-making is central to deprescribing, requiring clinicians to partner with patients and carers to align medication management with individual goals, preferences, and quality of life priorities. Involving consumers in the design and evaluation of deprescribing initiatives can help identify barriers, facilitators and improve communication strategies (157,158).

In primary care, the RACGP Aged Care Clinical Guide (Silver Book) provides a practical five-step framework to guide deprescribing. This includes medication reconciliation, risk–benefit assessment, shared decision-making, prioritisation of medicines for cessation and structured monitoring of withdrawal effects (159). Integration with multidisciplinary teams such as through Home Medicines Reviews and Residential Medication Management Reviews further strengthens the safety and quality of this process (50,160).

Evidence suggests deprescribing can improve cognitive function, reduce falls, decrease medication burden and support treatment adherence (161). Tools such as the PRISCUS 2.0 list, FORTA classification and POSAMINO criteria help identify potentially inappropriate medications and drug–alcohol interactions that may compromise treatment efficacy or safety in older patients (155,161). For individuals consuming alcohol at hazardous levels, targeted medication reviews can identify interactions that reduce therapeutic effect or increase adverse outcomes, prompting safer alternatives and supporting harm reduction (156). Tools like the Drug Burden Index (DBI) support clinicians in quantifying the cumulative impact of sedative and anticholinergic medications on older adults, helping to identify patients at higher risk of adverse outcomes and prioritise deprescribing efforts accordingly (162).

Behavioural and psychological therapies

Psychosocial interventions are frequently employed in the treatment of alcohol and other drug use. These include motivational interviewing, cognitive behavioural therapy and counselling modalities adapted for age-specific needs. In primary care, these therapies are often integrated into brief interventions or structured referrals (163,164).

In Australia, counselling remains the most frequent primary treatment type across all age groups. In 2022–23, 34% of all alcohol and other drug treatment episodes identified counselling as the main intervention, with alcohol the most commonly cited principal drug of concern (41%) (164).

Motivational interviewing, frequently used in primary care and specialist settings, aims to enhance an individual's intrinsic motivation to change behaviour. However, a recent Cochrane review of 93 studies found that while motivational interviewing may reduce substance use in the short term compared to no treatment, its effectiveness compared to standard or active treatments remains uncertain. The evidence for motivational interviewing benefit in reducing substance use in older adults specifically is limited and overall certainty was rated as moderate to very low, indicating a need for further targeted research (165).

Cognitive behavioural therapy is another widely used intervention, particularly in the treatment of co-occurring mental health conditions such as depression and anxiety, which are common in older adults with substance use disorders. Cognitive behavioural therapy focuses on modifying unhelpful thought patterns and behaviours and can be adapted to the needs of older people. The NSW Health Psychosocial Interventions Practice Guide supports Cognitive behavioural therapy as an evidence-informed therapy for alcohol and other drug treatment and recommends its delivery through structured approaches tailored to the cognitive, emotional and functional profile of older individuals (163).

In primary care, brief lifestyle and psychosocial interventions, including motivational interviewing and cognitive behavioural therapy, have been incorporated into stepped care models. A recent review identified these approaches as accessible, low-intensity options suitable for general practice. However, evidence on their effectiveness in older adults is mixed, with variability in outcomes and limited age-specific trials (166).

Community-based support and harm reduction

Community-based models of alcohol and other drug support and harm reduction are increasingly critical as the ageing population grows and alcohol and other drug-related harm among older adults becomes more visible. Older adults are a diverse cohort, with different life experiences, health conditions and sociocultural contexts, meaning that harm reduction strategies must be responsive to heterogeneity in age groups, cultural backgrounds and life stage-specific risks (167).

Peer-led and outreach-based models show promise in reducing harms associated with alcohol and other drug use among older people, though the evidence base remains emergent. In Victoria, lived-experience-informed consultations conducted by Self Help Addiction Resource Centre (SHARC) and Victorian Alcohol and Drug Association Inc. (VAADA) with older service users have informed the development of peer-support and age-relevant recovery tools. These interventions emphasise the importance of social connection, shared experience and informal therapeutic environments, particularly for older adults who may face stigma or isolation (168).

Community health services and Aboriginal Community-Controlled Health Organisations (ACCHOs) play a pivotal role in delivering culturally safe, holistic harm reduction support. In particular, the Victorian Government has supported ACCHOs to develop alcohol and other drug prevention and harm reduction pathways that reflect the needs of older Aboriginal Victorians (169). These approaches integrate cultural wellbeing, community engagement and flexible service models that reach older clients in accessible ways.

Counselling and psycho-social support remain the most common treatment types across all age groups, including older adults. In 2022–23, counselling comprised 34% of all main alcohol and other drug treatment episodes nationally. Among those aged 40 and over receiving counselling related to another person's substance use, treatment episodes were more likely to extend beyond one month, suggesting the importance of sustained engagement and flexibility in delivery (164). However, many psychosocial interventions remain generalist in design and are not tailored specifically for older people.

Harm reduction services such as Needle and Syringe Programs, assertive outreach and safer use education are often geared toward younger populations, despite evidence of growing risk among older adults. Data from the Alcohol and Drug Foundation (2024) show a marked increase in alcohol and other drug related hospitalisations and medication-related harms among those aged 50 and over. Outreach-based harm reduction services can help address barriers faced by older adults, including mobility issues, digital exclusion and low treatment literacy (164,170).

The National Centre for Education and Training on Addiction emphasises that the needs of older people who use alcohol or drugs remain under-recognised and under-researched (171). Older adults aged 55–65, 65–80, and 80+ may have vastly different expectations, social roles and vulnerabilities. The National Centre for Education and Training on Addiction review notes that cultural background and lived experience, including those of Aboriginal and Torres Strait Islander peoples, further influence patterns of alcohol and other drug use and service needs. These findings indicate the relevance of age-differentiated and culturally sensitive approaches in service design and delivery (171).

Digital health tools and telehealth

Older adults face unique challenges accessing alcohol and other drug services, including limited mobility, transportation barriers and regional workforce shortages. Telehealth and digital therapeutic tools can mitigate these obstacles, offering accessible, private and adaptable care models. With increasing digital literacy among older Australians and expanded telehealth funding since COVID19, these modalities are playing a growing role in substance use care (172,173).

Engaging older adults in the co-design of digital health interventions has been identified as a key strategy to improve usability, accessibility and cultural relevance. Involving consumers throughout the design and testing process can help ensure that technologies accommodate varying levels of digital literacy, health literacy and functional ability. As demonstrated in the study by Backåberg et al., participatory approaches that involve older adults can contribute to more inclusive and effective digital solutions, reducing the risk of marginalisation and promoting sustained engagement (174).

Digital Cognitive Behavioural Therapy has demonstrated sustained clinical effectiveness. Kiluk et al. conducted an 8-month RCT comparing digital Cognitive Behavioural Therapy plus weekly remote monitoring, clinician delivered Cognitive Behavioural Therapy, and standard outpatient care for alcohol use disorder. Participants in the digital Cognitive Behavioural Therapy group increased days abstinent from 47.6% at baseline to 75.1% at treatment end and 82.6% at 6-month follow-up, a significant improvement and greater increase across the full study period compared to clinician delivered Cognitive Behavioural Therapy and standard care (173). Moreover, Gushken et al. evaluated self-guided internet based Cognitive Behavioural Therapy added to treatment-as-usual in primary care internationally. They found that internet based Cognitive Behavioural Therapy + treatment-as-usual produced greater reductions in alcohol consumption than treatment-as-usual alone (175).

Older adults with alcohol dependence may prefer treatment through primary care due to accessibility, lower stigma and continuity of care (176). However, GPs often face constraints in time and specialist training when supporting alcohol use disorders. Internet-based cognitive behavioural therapy has emerged as a potential adjunct or alternative, offering structured, evidence-informed modules with minimal clinician time.

Hyland et al. (2025) conducted a pragmatic randomised controlled trial in 14 Swedish primary care centres, enrolling 264 adult patients diagnosed with alcohol dependence. Participants were randomly assigned to receive internet-based cognitive behavioural therapy plus treatment as usual, or treatment as usual alone. The internet-based cognitive behavioural therapy program lasted 12 weeks and included motivational interviewing, relapse prevention and behavioural self-control components (176).

Outcomes of the trial included:

- both moderate and severely alcohol-dependent participants reduced alcohol consumption across the study period;
- participants with moderate dependence who received Internet-based cognitive behavioural therapy + treatment as usual showed a sustained reduction in alcohol use over 12 months;
- those with severe dependence demonstrated substantial short-term reductions regardless of group allocation but tended to relapse after three months unless further support was provided;
- Sociodemographic characteristics and co-occurring conditions (e.g., depression or anxiety) did not significantly predict outcomes.

Interventions for common age-related changes and diseases

As people age, they experience physiological changes that increase the likelihood of chronic, progressive and multifactorial conditions. These conditions, while common, are not inevitable consequences of ageing (177). Left unaddressed, they can impair physical function, psychological wellbeing and social participation. The rising prevalence of these conditions across Australia's ageing population creates a compelling case for targeted, evidence-based interventions that support healthy longevity, autonomy and quality of life (9,177,178).

Osteoarthritis is the leading cause of pain and disability in older adults, often affecting the hips, knees and hands. It reduces mobility, limits daily activities and contributes to physical deconditioning and isolation. Management should begin early to maintain joint function and prevent unnecessary dependence (3,8,179).

For women, perimenopause represents a key life stage involving hormonal shifts that can affect mood, sleep, cognition and cardiovascular risk. Interventions, including lifestyle changes and hormone therapy where appropriate, can support symptom management and optimise long-term health outcomes (180).

Hearing and vision loss are among the most prevalent sensory impairments in later life. Both are associated with poorer communication, reduced social engagement and increased risk of depression, falls and cognitive decline (181). Timely intervention can improve function and slow downstream complications.

Nocturia is a common but under-addressed condition in older adults. It affects sleep quality, increases the risk of falls and often indicates broader physiological issues such as cardiovascular or endocrine disease. Its impact on wellbeing is significant, and it warrants early clinical attention and multidisciplinary management (182).

Cognitive disorders, including dementia, are a growing concern as the population ages. Dementia affects memory, executive function and behaviour, with substantial impacts on carers and health services. Early intervention enables access to supports, slows progression and allows planning aligned with the person’s preferences (182). Depression in older adults is under-recognised and often coexists with physical illness. It contributes to reduced motivation, impaired self-care and higher morbidity. Timely psychological and social interventions are effective and can reverse or alleviate symptoms (183).

Chronic obstructive pulmonary disease imposes a significant burden due to dyspnoea, fatigue and frequent exacerbations. It limits physical activity, contributes to frailty and is often diagnosed late. Intervening early in its course helps preserve lung function and improve quality of life (184).

Cardiovascular disease accounted for nearly one in four deaths nationally in 2022. The prevalence of CVD increases markedly with age, with approximately 28% of Australians aged 75 years and older affected (185).

These common conditions do not exist in isolation. They often interact and compound each other, contributing to frailty and reduced resilience. Early identification and intervention can mitigate functional decline, reduce hospitalisations and support older people to live independently. (50).

Menopause

The menopause transition, which includes the late reproductive stage, marks a significant physiological and psychosocial phase in a woman’s life. This can include numerous symptoms that may substantially affect quality of life, productivity and health outcomes (186).

Globally, the number of postmenopausal women continues to rise, with estimates suggesting that 1.02 billion were postmenopausal in 2021, increasing to a projected 1.65 billion by 2050 (187). Menopause typically occurs around the age of 51. However, approximately 7% of women experience it earlier, between ages 40 and 45, and 1.9% experience premature menopause before age 40 (187). Women frequently begin experiencing symptoms before any changes in menstruation. The Women Living Better online survey in 2020 found that women in the late reproductive stage reported symptoms such as disrupted sleep, mood changes, anxiety, forgetfulness, fatigue and genitourinary issues, which were comparable in burden to those experienced during the menopausal transition (188,189). Despite this, most women do not anticipate symptoms before age 50, leading to delayed care-seeking. Without anticipatory guidance, many women report feeling confused or dismissed when they present with early symptoms (188).

An estimated 60% to 86% of women experience bothersome symptoms during the menopause transition, including hot flushes, night sweats, vaginal dryness, sleep disruption, reduced libido, joint pain and cognitive concerns (187,190). Clinician knowledge gaps contribute to inconsistent care. Few medical trainees report feeling adequately trained to manage menopausal symptoms and many do not receive formal education on the topic. These care gaps contribute to undertreatment, which may lead to increased healthcare utilisation, mental health issues, reduced workplace productivity and inappropriate reliance on unregulated over-the-counter supplements (187).

Social and cultural factors influence how women experience and report menopausal symptoms. For example, data from the American Study of Women's Health Across the Nation, indicate that Black women often experience more severe and prolonged symptoms shaped by biological and socio-structural factors such as systemic racism (187). Cultural norms and beliefs about menopause also influence how women perceive symptoms and whether they seek help.

Women with early or premature menopause require particular attention in primary care. Without adequate hormonal support, they face elevated risks of cardiovascular disease, osteoporosis, mood disorders, dementia and sexual dysfunction (191,192). The Royal Australian College of Obstetricians and Gynaecologists (RANZCOG) advises that clinicians should feel confident discussing menopause, offering evidence-based information and tailoring treatment based on symptom burden. From the age of 45, women should receive anticipatory education, support for symptom management and advice on preventive health, including cardiovascular and bone health (190,192). Primary care provides a central access point to improve outcomes for women through timely education, early validation of symptoms and personalised management across the stages of reproductive ageing (193).

Evidence based interventions for menopause in the older women

Menopausal Hormone Therapy (MHT)

The 2016 International Menopause Society recommendations emphasised the importance of individualised, evidence-based care for women in midlife and beyond with a focus on improving quality of life and long-term health outcomes. The recommendations addressed the variability of menopausal hormone therapy (MHT) risks and benefits arising from individual factors, particularly age and time since menopause (194).

MHT is generally safe for healthy women under 60 years of age or within 10 years of menopause onset. When initiated during this "window of opportunity," MHT can offer significant benefits with minimal risk. Evidence indicates that most of the breast cancer risk associated with MHT arises from the progestogen component rather than estrogen alone. The use of modern progestogens, natural progesterone, or selective estrogen receptor modulators may optimise metabolic outcomes and reduce breast tissue effects (192,195).

Randomised trials such as the Danish Osteoporosis Prevention Study, the Kronos Early Estrogen Prevention Study, and the Early versus Late Intervention Trial with Estradiol, support early initiation of MHT to avoid cardiovascular harm and achieve health benefits. These include primary prevention of osteoporotic fractures and coronary artery disease, as well as reduced all-cause mortality (194).

The 2023 Practitioner's Toolkit for Managing Menopause provides an accessible desk-top resource for health care professionals caring for women in mid-life. Developed by a collaborative network of Australian and other researchers, the toolkit provides algorithms to guide clinical assessment and care including understanding why women present, issues that may influence shared decision-making and options for treatment including menopausal hormone therapy and non-hormonal options. The toolkit is endorsed by the International Menopause Society, the Australasian and British Menopause Societies and other organisations (196).

Non-Hormonal pharmacological therapies

Non-hormonal therapies with demonstrated efficacy for vasomotor symptoms include isoflavones and red clover extract. Black cohosh may offer benefit but carries a risk of hepatotoxicity. St John's wort, particularly when combined with black cohosh or passionflower, may improve hot flushes and mood, though it can interact with medications. Other natural remedies, including hops, chamomile and Korean ginseng, remain widely used but lack strong evidence (197).

Psychological and behavioural interventions

Psychological and behavioural therapies are a key component of holistic menopause care. Cognitive behavioural therapy (CBT) has been shown in randomised controlled trials to reduce vasomotor symptom distress, improve mood and sleep quality, and enhance coping strategies, making it a suitable non-pharmacological first-line option, particularly for women with contraindications to MHT(197,198).

Mindfulness-based interventions (MBIs) have also demonstrated effectiveness in improving a range of menopause-related outcomes, including anxiety, depressive symptoms, stress, sleep quality and overall quality of life. A 2024 systematic review of 19 randomised controlled trials found that MBIs significantly improved these outcomes, particularly when interventions lasted more than eight weeks and sessions exceeded 60 minutes (199). Programs such as Mindfulness-Based Stress Reduction and Acceptance and Commitment Therapy, especially those incorporating homework assignments, were associated with greater reductions in depressive symptoms. MBIs can also be delivered effectively by trained non-professionals, supporting their scalability in diverse care settings.

In contrast, structured physical activity and yoga have not demonstrated consistent benefits for vasomotor symptoms. A Cochrane review of five trials (n = 762) found no significant effect of exercise or yoga on hot flushes or night sweats (200). Similarly, earlier and subsequent reviews have reported only small or inconsistent benefits on somatic and psychological symptoms, often limited by methodological weaknesses and variability across studies (197).

Nocturia

Nocturia, defined as the need to wake from sleep to void, affects over half of adults aged over 60, and as many as 80% of those aged 80 years and older (59,201). While often dismissed as a benign part of ageing, emerging evidence indicates that nocturia is associated with serious health consequences. These include impaired sleep quality, increased risk of falls, frailty, depression and reduced health-related quality of life (59,202).

Age-related physiological changes contribute significantly to the development of nocturia. These include a decline in the kidneys' ability to concentrate urine, reduced bladder capacity, altered detrusor muscle activity and circadian rhythm disruption leading to nocturnal polyuria. In women, additional factors such as hormonal changes following menopause, parity and prior hysterectomy contribute to nocturia risk.

Nocturia also acts as a marker of multimorbidity and systemic vulnerability in older adults. Dutoglu et al. (2019) demonstrated that ≥2 nightly episodes of nocturia are associated with insomnia, recurrent falls, polypharmacy, urinary incontinence, reduced functional mobility and frailty (201). Furthermore, Tikkinen et al. (2010) showed that even two episodes of nocturia per night significantly reduce health-related quality of life (59). These findings align with Komleva et al. (202) who in their recent scoping review, highlighted a growing recognition that nocturia may not only reflect frailty but also contribute causally to its development by disrupting sleep, impairing cognition and reducing physical resilience.

Sleep disruption, a central mechanism linking nocturia and frailty, compounds risks through fatigue, cognitive decline and impaired balance (202). The Komleva review emphasised that circadian rhythm disruption may underpin both nocturia and frailty, reinforcing the need to view nocturia not simply as a urinary complaint but as a geriatric syndrome requiring holistic management (202).

Given its high prevalence, complex aetiology and association with multiple adverse outcomes, nocturia has been identified in literature as a modifiable factor relevant to healthy ageing. Studies suggest that recognising and addressing nocturia in primary care and geriatric settings may contribute to reducing functional decline and associated risks (203).

Evidence-based interventions for nocturia in the older person

Targeted assessment and management approach for nocturia in primary care

Bower et al. (2018) recommend an assessment and management pathway using the TANGO tool (Targeting the individual's Aetiology of Nocturia to Guide Outcomes) to identify underlying causes and personalise treatment in primary care. Clinicians begin by collecting a detailed history via a nocturia screening instrument and eight targeted questions addressing frequency, bother, medication use, bladder storage capacity, sleep disorders, diuretic timing, and hormonal factors. A 48–72 hour bladder diary (frequency volume chart) supplies objective data to distinguish nocturnal polyuria, overactive bladder and reduced bladder capacity (204).

Following diagnosis, treatment aligns with the identified aetiology. For nocturnal polyuria, evening loop diuretics (e.g., furosemide) or low-dose desmopressin may be prescribed, with close monitoring for hyponatraemia. Addressing comorbid sleep disorders such as obstructive sleep apnoea or insomnia, can also reduce nocturia episodes. Adjusting antihypertensive timing or prescribing topical oestrogen for postmenopausal women may benefit selected patients (203,204).

Primary care can integrate nocturia assessment into routine health care. Using the TANGO framework facilitates identification of multifactorial contributors, nocturnal polyuria, bladder dysfunction, sleep disorders, and medication effects, without immediate specialist referral (204). Simple tools, such as bladder diaries and targeted sleep apnoea screening, inform potential interventions. Regular medication reviews should identify and modify agents that exacerbate nocturia. Behavioural advice on fluid timing, bladder training, and sleep hygiene complements pharmacotherapy (203).

When nocturnal polyuria is confirmed, desmopressin or timed diuretics can be effective but require electrolyte monitoring in older patients (204). Clinicians should regard two or more nightly voids as clinically significant and address nocturia proactively to improve sleep quality, reduce injury risk, and help maintain functional independence (59,201).

Osteoporosis

Osteoporosis is a chronic condition characterised by reduced bone strength and microarchitectural deterioration, leading to an increased risk of fragility fractures. It predominantly affects older adults, especially postmenopausal women. In 2022, an estimated 924,000 Australians were living with osteoporosis (205). The condition contributes substantially to morbidity, mortality and healthcare costs, with hip, vertebral and wrist fractures being the most common and clinically significant consequences (205,206).

The updated 2024 Australian guideline developed by the RACGP and Healthy Bones Australia includes new recommendations related to pharmacological therapies, particularly osteoanabolic treatments and emphasises the need for early identification of individuals at very high risk of fracture (207). Although widespread population-based screening is not recommended, the guideline supports risk stratification using tools such as FRAX to guide treatment decisions.

Evidence-based interventions for osteoporosis

Pharmacological Interventions

Osteoporosis interventions focus on preventing fractures and slowing disease progression through pharmacological treatment, physical activity, nutrition, falls prevention and patient education. Pharmacological therapies are stratified by fracture risk, with bisphosphonates, denosumab and osteoanabolic agents such as romosozumab recommended accordingly (207). The RACGP guideline states that calcium and vitamin D supplementation should be reserved for those with documented deficiency, as benefits in the general community-dwelling population are limited.

Exercise-based interventions

Exercise is a key non-pharmacological intervention. Meta-analyses and randomised controlled trials demonstrate that weight-bearing and resistance-based exercise improve bone mineral density (BMD) in the lumbar spine and femoral neck among postmenopausal women (208). A network meta-analysis by Hejazi et al. (2022) found that combined aerobic and resistance training produced the greatest improvements, while whole-body vibration training showed additional benefits for femoral neck BMD and lower limb strength. These improvements are attributed to enhanced osteogenic response to mechanical loading and modulation of bone turnover markers (226).

Falls prevention strategies

Falls prevention forms a central component of osteoporosis management. Interventions include home hazard assessments, strength and balance training, medication reviews and visual assessments. These strategies aim to reduce the risk of fractures, particularly in older adults with previous fragility fractures or established osteoporosis. Educational interventions targeting adherence to treatment and self-management have also been found to improve clinical outcomes (209).

Multicomponent/combined therapies

Improving adherence to osteoporosis treatment remains a persistent challenge with educational interventions alone showing inconsistent results. A systematic review by Cornelissen et al. (2020) examined 15 studies, including 12 randomised controlled trials and found mixed outcomes across various intervention types (210). While some educational programs showed promise, particularly when combined with counselling or support strategies, the overall evidence for education alone was limited. Multicomponent interventions that actively engaged patients through a combination of education, counselling, monitoring or interdisciplinary collaboration were more likely to improve adherence and persistence with osteoporosis medications. In contrast, interventions focused solely on clinician behaviour, such as a brief educational program for primary care providers, did not significantly improve patient adherence (210–212).

Pharmacist-led models

A systematic review by Laird et al. (2022) indicated that pharmacist interventions, including medication reviews, fracture risk assessments and collaborative care with physicians may help improve treatment uptake, patient knowledge and adherence (213).

Clinical guidelines and primary care tools:

The 2024 RACGP Healthy Bones Australia guideline highlights the importance of continuity of care and annual review of pharmacological therapy. It also addresses risks associated with therapy cessation, such as rebound vertebral fractures following discontinuation of denosumab (206,207). The *Osteoporosis risk assessment, diagnosis and management* flow chart is also available through the RACGP and provides a practical guide for clinical decision-making in primary care (214).

Emerging or innovative approaches for managing osteoporosis in older adults

Healthy Bones Australia fracture prevention model

Healthy Bones Australia, established in 2001, aims to address the increasing prevalence of poor bone health among Australians and the limited health system focus on osteoporosis prevention. The organisation works to raise awareness among both the public and healthcare professionals, and to advocate for national strategies to reduce the burden of osteoporosis (215).

Healthy Bones Australia has implemented a national model that promotes post-fracture care through primary care engagement. This model aligns with the Fracture Liaison Service principles, which aim to systematically identify, assess and manage individuals with minimal trauma fractures to prevent further injury.

Within this model, general practitioners are supported to implement evidence-based interventions including initiation of osteoporosis treatment, patient education, falls risk assessment and referral to physiotherapy or allied health services. Educational resources, clinical tools and communication templates are provided to streamline care pathways and improve coordination between acute and community-based services (206). This model has indicated improved osteoporosis treatment initiation rates and reduced rates of subsequent fractures among patients enrolled in post-fracture programs. The model supports implementation of the updated national guideline and highlights the capacity of primary care to deliver multifaceted interventions tailored to the needs of older adults with poor bone health (206).

The role of primary care in managing osteoporosis incldes identifying at-risk patients, assessing fracture risk using tools such as FRAX and initiating evidence-based treatment, including osteoanabolic therapies where appropriate (207). Multicomponent interventions combining medication, exercise and calcium/vitamin D supplementation are most effective (208). Post-fracture care models involving general practitioners, such as those supported by Healthy Bones Australia, improve treatment uptake and reduce future fracture risk (206). Collaboration with pharmacists and allied health can further support adherence and long-term management (213).

Osteoarthritis

Osteoarthritis is a highly prevalent musculoskeletal condition and a leading cause of chronic pain, disability and reduced mobility among Australians aged over 45 years. It is characterised by degeneration of joint cartilage and underlying bone, most commonly affecting the knees, hips and hands. According to the Australian Institute of Health and Welfare (2020), over 2.2 million Australians live with osteoarthritis, with increasing incidence linked to ageing populations and rising rates of overweight and obesity (205).

The disease contributes to significant healthcare burden, including increased hospitalisation rates, premature joint replacement and loss of independence. The 2018 National Osteoarthritis Strategy was developed by the Australasian College of Sport and Exercise Physicians to provide a coordinated national approach to osteoarthritis prevention, early intervention and chronic disease management (216). Programs such as the NSW Osteoarthritis Chronic Care Program reflect efforts to embed evidence-based conservative care in clinical and community settings (217).

Evidence-based interventions for osteoarthritis

Current national and international guidelines recommend non-surgical, non-pharmacological interventions as first-line care for osteoarthritis (218,219).

These include:

- structured exercise interventions, such as resistance and aerobic training, which reduce pain and improve joint function and mobility.
- weight management, particularly for individuals with overweight or obesity, to reduce joint loading and inflammation.
- patient education and self-management support, which empower individuals to understand their condition and adopt health-promoting behaviours.
- pharmacological support, using analgesics or anti-inflammatory medications as adjuncts where appropriate, with avoidance of long-term opioid use.
- multidisciplinary team care, incorporating physiotherapists, dietitians, exercise physiologists and where necessary, referral to rheumatology or sport and exercise medicine specialists.

The National Osteoarthritis Strategy highlights the general practitioner's role in early identification, behavioural counselling and referral to allied health services, as well as broader health promotion to increase physical activity and improve diet (216).

Programs such as Healthy Weight for Life and the Osteoarthritis Hip and Knee Service assist general practitioners by providing structured education and coordinated care for at-risk individuals. Care options include referral pathways to accredited exercise physiologists, physiotherapists, and dietitians (216,220).

NSW Osteoarthritis Chronic Care Program

The NSW Osteoarthritis Chronic Care Program is a state-wide initiative designed for people with moderate to severe hip or knee osteoarthritis who are at risk of surgery. The program provides conservative care through a multidisciplinary model, aiming to reduce surgical demand and improve function and quality of life (217).

Patients are referred to the program by general practitioners or specialists and receive coordinated support through care planning, physiotherapy, dietetic services, pain education and falls prevention. Implementation across multiple Local Health Districts has demonstrated improvements in pain, physical function and self-efficacy, alongside reduced demand for orthopaedic services (217). General practitioners remain central to the patient journey, referring individuals into the program, monitoring progress and supporting long-term behaviour change through shared decision-making and continuity of care (217).

The Arthritis Movement, formerly known as Arthritis Australia, is a national organisation committed to advancing the lives of people affected by arthritis. Through a focus on innovative care, evidence-informed support and advocacy, the organisation provides education, resources and services that empower individuals to manage their condition and improve quality of life (221).

Frailty, sarcopenia and falls

Frailty is a multidimensional clinical syndrome that results from cumulative declines in physiological systems, leading to increased vulnerability to adverse outcomes such as falls, hospitalisation and loss of independence (222). It is not defined by chronological age but by biological ageing across physical, cognitive, psychological and social domains (223,224). Sarcopenia, the progressive loss of skeletal muscle mass and strength, is a key biological contributor to frailty. It has been associated with impaired balance, decreased mobility and greater risk of disability and falls in older adults (164).

Falls remain a major consequence of frailty and sarcopenia. In 2022–23 in Australia, there were 238,055 hospitalisations due to falls, representing 43.4% of all injury admissions. Among those aged 65 years and over, fall-related hospitalisation rates were 12 times higher than in adults aged 25 to 44 (225). The same year, there were 6,378 deaths due to falls, with the majority occurring in older adults. Age-standardised hospitalisation and mortality rates for fall-related injuries have increased over the past decade, with older women more frequently hospitalised than older men (225). These data highlight the need for effective, evidence-based strategies to identify and manage frailty and its associated risks in primary care.

The FITTEST Study, led by the Australian Frailty Network, is a trial to evaluate two approaches to delivering a frailty prevention program for people aged 65 years and over with mild frailty. The trial aims to recruit people over 65 years of age (55 years for those who identify as Aboriginal and/or Torres Strait Islander) and will compare a health professional-supported intervention with a self-management model, both incorporating evidence-based recommendations across physical activity, nutrition, medicine optimisation and social connection (226).

Meta-analyses have shown that regular, targeted exercise can reduce the risk of falls in older adults by up to 50% (227). Programs delivered by trained allied health professionals have demonstrated high acceptability and effectiveness when integrated into local community settings.

Evidence-based and emerging Interventions

The Frailty Early Intervention Program in primary care

Australian grey literature illustrates the practical application of multi-dimensional frailty management within primary care. The Frailty Early Intervention Program, developed by the Hunter New England and Central Coast Primary Health Network (228), supports general practices to implement structured frailty screening and coordinated intervention. The program engaged 19 general practices across regional New South Wales, providing training, validated tools such as the FRAIL Scale and resources including the Frailty Fundamentals guide (228). Practices embedded routine screening into annual health assessments and chronic disease reviews, with subsequent care pathways involving health coaching, goal-setting, physical activity promotion and medication review. This model aligns with the broader Healthicare approach, which prioritises early risk identification, team-based care and patient empowerment through context-sensitive and person-centred intervention (229).

Still Standing Program – Western Sydney

The Still Standing program is a structured falls prevention and light exercise program for community-dwelling older adults. Delivered by accredited exercise physiologists at New Edge Performance, the program has been funded since 2017 by the Western Sydney Primary Health Network (WentWest). It is specifically designed to reduce falls risk in older people and promote independence through regular, supervised exercise. The program focuses on balance, strength, mobility and functional fitness, which are all key components in preventing falls and maintaining quality of life (230). Participants attend group-based sessions that are tailored to their capabilities and delivered in a supportive local setting. By offering a no-cost option through PHN funding, the program has addressed affordability barriers and reached a broad population of older adults in Western Sydney. In recent years, demand has outpaced funding availability, demonstrating high community interest and engagement.

Cardiovascular disease (CVD)

Cardiovascular disease (CVD) encompasses a range of disorders affecting the heart and blood vessels, including coronary heart disease, stroke and heart failure. It remains a significant public health challenge in Australia, contributing substantially to morbidity and mortality (Australian Institute of Health and Welfare (185).

According to the 2022 National Health Survey conducted by the Australian Bureau of Statistics, an estimated 1.3 million adults aged 18 and over (representing 6.7% of the adult population) reported having one or more heart, stroke or vascular conditions (231). The prevalence of CVD increases markedly with age, with approximately 28% of Australians aged 75 years and older affected (185). In 2022, the prevalence of CVD among adults aged 75 and over was 28% and among adults aged 85 and over, it was 52% (185).

CVD remains a major public health concern and was the underlying cause of approximately 45,000 deaths, accounting for nearly one in four deaths nationally in 2022 (185).

Evidence-based Interventions

Interventions to prevent and manage cardiovascular disease focus on controlling modifiable risk factors, particularly hypertension which remains a leading contributor to morbidity and mortality globally and in Australia (232). Elevated blood pressure is strongly and independently associated with cardiovascular outcomes, including coronary artery disease, stroke, chronic kidney disease and all-cause mortality (232).

Lifestyle modification has a significant role in the prevention and management of CVD. Ghodeshwar et al. (2023) highlight that the adoption of multiple healthy behaviours, such as regular physical activity, dietary improvements, smoking cessation, stress management and adequate sleep, has a synergistic effect on cardiovascular health. These interventions collectively reduce blood pressure, improve lipid profiles, support glycaemic control and lower the risk of adverse cardiac events. Importantly, the authors emphasise the necessity of long-term adherence, as sustained behavioural change is required to realise and maintain cardiovascular benefits (233). Personalised intervention strategies are required to take account of individual variability, including genetic predispositions and comorbid conditions to enhance intervention effectiveness (233).

Emerging or Innovative Approaches

Heart Foundation’s Walking Wins program

The Walking Wins campaign, launched by the Heart Foundation in 2024, is a national campaign to engage Australians, particularly those at risk of or living with CVD, in regular walking through free, accessible programs. These include joining local walking groups, leading groups or following a personalised six-week walking plan tailored to individual capabilities and preferences (234).

Walking Wins offers an evidence-informed, scalable intervention that primary care clinicians can recommend as part of preventive and chronic disease management. General practitioners, nurses and allied health professionals can refer patients directly to the program, integrating lifestyle advice into routine care and encouraging adherence through structured goal setting and community support. The program also addresses psychosocial determinants of health, such as social isolation, by facilitating group participation and fostering peer connection, factors known to influence both cardiovascular and mental health outcomes. Moreover, the campaign’s national visibility and alignment with physical activity guidelines make it a valuable adjunct to clinical care and health promotion activities (235).

The DASH Diet

The Dietary Approaches to Stop Hypertension (DASH) diet is a well-established, evidence-based nutritional strategy for reducing cardiovascular risk, particularly hypertension. Originally developed through research supported by the U.S. National Heart, Lung and Blood Institute, the DASH diet emphasises consumption of fruits, vegetables, whole grains, low-fat dairy products, lean proteins and limited sodium, saturated fats, and added sugars (236).

Clinical trials provide strong evidence for the cardiovascular benefits of the DASH (Dietary Approaches to Stop Hypertension) dietary pattern, particularly in managing elevated blood pressure and systemic inflammation. The landmark DASH-Sodium trial demonstrated that the combination of the DASH diet with reduced sodium intake significantly lowered systolic blood pressure, with reductions of up to 11.5 mmHg among participants with hypertension and 7.1 mmHg among those without hypertension (236). These effects were observed consistently across subgroups, including men and women, and individuals from diverse racial backgrounds. In addition to its antihypertensive effects, the DASH diet has also been shown to reduce systemic inflammation. A systematic review and meta-analysis of randomised controlled trials found that adherence to the DASH diet significantly decreased serum levels of high-sensitivity C-reactive protein (hs-CRP), a biomarker of inflammation, by an average of 1.01 mg/L when compared to usual diets (237). These findings suggest that the DASH diet offers dual benefits in lowering blood pressure and modulating inflammatory processes, both of which are significant in the prevention and management of cardiovascular disease among older adults.

Australian primary care settings are increasingly incorporating the DASH approach into patient counselling and care planning for individuals with elevated cardiovascular risk. Educational materials provided by HeartSmart Australia outline practical strategies for implementing the DASH diet in everyday eating, tailored to the Australian context. These include incorporating high-fibre cereals, fresh produce, and lean proteins, while reducing processed and high-sodium foods (238). This aligns with the National Heart Foundation of Australia’s dietary recommendations and supports broader goals of lifestyle modification within chronic disease management.

The DASH diet is particularly relevant to older adults given its role in reducing hypertension, a condition that affects approximately two-thirds of Australians aged over 65 (185).

Hearing and vision loss

Sensory impairments such as hearing and vision loss are common in older adults and have a substantial impact on quality of life, social participation, mental health and functional independence. According to the Australian Institute of Health and Welfare (239), over one-third of Australians aged 65 years and over experience hearing difficulties, while more than 90% use some form of vision correction (239). Age-related hearing loss is a progressive condition often underdiagnosed and undertreated and is associated with increased risks of depression, social isolation and cognitive decline (240). Similarly, untreated vision impairment is associated with a higher risk of falls, fractures and institutionalisation (178).

Despite the significant burden of sensory loss in later life, hearing and vision health remain under prioritised in preventive care. The RACGP recommends regular assessment of vision and hearing function in older adults, particularly those aged 65 years and over or presenting with symptoms or functional changes or risk factors such as diabetes and hypertension(178,241). Early identification and appropriate intervention are necessary to minimise avoidable deterioration and maintain independence.

Evidence-based interventions for hearing and vision

Interventions for hearing and vision loss are most effective when embedded in routine preventive care and tailored to individual needs. For vision, regular eye examinations, timely prescription of corrective lenses, cataract surgery and environmental modifications have been shown to reduce functional decline and fall risk (178).

For hearing loss, interventions include audiological assessment, hearing aids, assistive listening devices, auditory rehabilitation and environmental adaptations such as communication strategies and noise reduction. A systematic review of public health approaches to age-related hearing loss in Australia highlighted the effectiveness of integrating hearing assessment and referral pathways within primary care, supported by public education and stigma reduction initiatives (240). Evidence suggests that early fitting of hearing aids and rehabilitation programs can delay cognitive decline and improve quality of life outcomes (239).

Barriers to optimal management of hearing loss include low uptake of hearing aids due to factors such as cost, stigma and limited perceived benefit. Stigma associated with hearing aid use remains a significant deterrent with many individuals perceiving hearing aids as stigmatising symbols of ageing or disability. Additionally, under-referral for low-vision services contributes to suboptimal management of vision impairment. Addressing these gaps requires multidisciplinary collaboration, patient education and accessible referral pathways to ensure timely and effective interventions(242–244).

National services for sensory health

Through Hearing Australia's *GP support pathway*, clinicians can access decision support tools, printable referral forms and resources for conducting hearing checks in line with RACGP recommendations. Patients referred to Hearing Australia by their GP can receive a comprehensive hearing assessment, device fitting where appropriate and ongoing rehabilitation support, with feedback provided to the referring practice to support continuity of care (245).

Similarly, Vision Australia provides services tailored to people with low vision or blindness, including low vision assessments, assistive technology training and occupational therapy. Primary care teams can refer patients directly and receive updates through shared care models (246).

These services offer scalable, evidence-informed approaches to enhance early intervention and reduce the long-term impacts of untreated sensory decline. Coordination of care between the GP and the services can improve access, streamline referral processes and support older adults to maintain function and independence (245–248).

Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) is a progressive, preventable and treatable lung disease characterised by persistent airflow limitation and chronic respiratory symptoms resulting from airway and/or alveolar abnormalities. It is commonly associated with long-term exposure to irritants such as tobacco smoke, air pollution and occupational dust (Australian Institute of Health and Welfare (249). Management of COPD involves both primary and acute care systems. Relevant vaccinations contribute to preventing exacerbations and reducing hospital admissions among COPD patients.

In 2022, an estimated 638,000 Australians (2.5% of the population) were living with COPD. Prevalence increases with age, with higher rates reported among adults aged 65 years and over. COPD contributed 3.6% of the total disease burden in 2023 and accounted for 50% of the total burden of respiratory diseases. The economic impact is substantial: in 2020–21, the Australian health system spent an estimated $831.6 million on treatment and management of COPD. In 2022, COPD was the underlying cause of 7,691 deaths, corresponding to 29.6 per 100,000 population (249).

Hospitalisation rates remain high. In 2021–22, there were 53,000 hospitalisations for COPD among people aged 45 years and over, equating to 500 hospitalisations per 100,000 population. The condition is frequently comorbid with other chronic diseases. In 2022, 87% of people living with COPD also had at least one additional chronic condition. The most prevalent comorbidities included mental and behavioural conditions (49%), arthritis (45%), asthma (42%) and back problems (42%)(249). Patterns of hospitalisation, multimorbidity and disease burden suggest a high level of clinical complexity among older adults with COPD.

Evidence-based Interventions for COPD

Management of COPD in older adults requires a comprehensive, multidisciplinary approach aligned with evidence-based guidelines. The COPD-X Plan, developed by Lung Foundation Australia and the Thoracic Society of Australia and New Zealand, presents practical, evidence-based practice information across five areas of clinical practice: case finding and confirming diagnosis; optimizing function; preventing deterioration; developing a plan of care and managing exacerbations(184,250). Published and updated quarterly, the guidelines are accompanied by the COPD-X Handbook, an accredited RACGP resource.

Pulmonary rehabilitation for COPD includes supervised exercise training, education and psychosocial support and has been shown to improve quality of life, reduce symptoms and decrease hospital admissions. Evidence supports its inclusion for all patients with moderate to severe disease (184).

Smoking cessation is the single most effective intervention to slow disease progression. Intensive behavioural support combined with pharmacotherapy, including nicotine replacement therapy, varenicline or bupropion, is recommended as first-line management (184).

Pharmacological management of COPD should align with disease severity and the individual's symptom profile. Long-acting bronchodilators, including long-acting muscarinic antagonists and long-acting beta-agonists are recommended to reduce symptoms and exacerbation risk. Inhaled corticosteroids may be considered for patients with frequent exacerbations or elevated eosinophil levels; however, their use requires careful consideration due to an increased risk of pneumonia (184,250). The 2024 COPD Clinical Care Standard reinforces key elements of best practice, including timely diagnosis with spirometry, development of a personalised action plan, referral to pulmonary rehabilitation and regular review of medicines, inhaler technique and vaccination status (250).

Comprehensive care also includes support for self-management, facilitated by structured education and written COPD action plans. Action plans have demonstrated a reduction in hospital presentations and support timely identification and response to exacerbations (184,250).

COPD Foundation's smoking cessation program

The U.S. COPD Foundation delivers a structured smoking cessation support program as part of its comprehensive approach to managing COPD. Smoking remains the primary modifiable risk factor for both the development and progression of COPD and cessation is a core element of disease management (251). The Foundation's program offers education, tools and patient-centred support tailored for individuals with COPD. This includes access to trained coaches, educational materials on nicotine dependence, personalised cessation planning and resources for managing withdrawal symptoms. The program also incorporates motivational interviewing techniques and repeated engagement, recognising that sustained behavioural change requires ongoing support (251).

Digital tools form a key component of the intervention, including an online portal with educational content and a helpline staffed by respiratory health professionals. The Foundation also provides resources for clinicians to use in primary care, supporting consistent messaging and shared decision-making with patients. Key elements include reinforcing the benefits of quitting such as improved lung function, reduced symptom burden and lower risk of hospitalisation and addressing barriers to cessation through tailored strategies.

COPD management through vaccination in NSW primary care

Chronic Obstructive Pulmonary Disease (COPD) affects approximately 2.2% of the adult population in NSW. In 2022, data from the NSW Health Lumos data program, which links general practice data with data from other NSW health services, analysed healthcare utilisation among COPD patients in the calendar year 2019. Findings indicated that regular general practitioner visits were associated with reduced hospital admissions. However, vaccination rates among COPD patients remained suboptimal with barriers including lack of recommendation, knowledge gaps, misunderstandings and cost concerns (252). To address these issues, NSW Health collaborated with primary care providers to:

- reduce clinical variation in COPD management;
- increase education, resources and support for COPD patients to self-manage their disease;
- develop optimal care strategies post-discharge and at the end of life (250,252).

These initiatives aimed to improve vaccination uptake by integrating vaccination status checks into routine care and enhancing patient education(250,252). Integration of vaccination strategies into primary care practices is expected to lead to (252):

- reduced COPD exacerbations;
- lower hospital admission rates;
- improved patient quality of life.

Dementia

Dementia is a significant and growing public health issue in Australia with widespread impacts on individuals, families and the broader health and aged care systems. In 2023, the Australian Institute of Health and Welfare estimated that approximately 411,100 Australians were living with dementia, including nearly 257,500 women and 153,700 men. This equates to 15 people with dementia per 1,000 Australians with prevalence rising sharply with age reaching 429 per 1,000 among those aged 90 and over(253).

Two-thirds (67%) of people with dementia reside in the community rather than in residential care. This proportion is highest among those with younger-onset dementia and decreases with increasing age (253). Many people with dementia continue to live independently, particularly in the earlier stages of the condition, supported by tailored interventions, family caregivers and community-based services. However, as dementia progresses the demand for formal care increases, especially among older women who experience higher prevalence rates than men in advanced age groups (254).

Projections suggest the number of people with dementia in Australia will more than double by 2058, reaching an estimated 849,300, driven by continued population ageing (253). These demographic shifts underscore the need for proactive and scalable interventions across the care continuum, with a particular focus on primary care as a critical setting for early identification, ongoing management and care coordination.

Although dementia is typically diagnosed in older age, increasing evidence shows that underlying neuropathological changes begin up to two decades earlier. The 2020 *Lancet Commission on dementia prevention, intervention and care* emphasises that dementia is often the end-stage of processes that begin in midlife or earlier, making prevention a public health priority. Epidemiological research indicates that up to 40% of dementia cases worldwide could be prevented or delayed through action on modifiable risk factors across the life course (255).

These modifiable risk factors include low educational attainment, hearing loss, hypertension, obesity, diabetes, smoking, depression, physical inactivity, social isolation, traumatic brain injury, alcohol misuse and exposure to air pollution. Many of these risks cluster in midlife (ages 45–65), a period identified as critical for prevention, although risk accumulation may begin earlier and persist into later life. Preventive approaches targeting cardiovascular health, physical and social activity, sensory function and mental health have been associated with improved cognitive and general health outcomes across the ageing trajectory (255–257).

Primary care providers, particularly general practitioners and nurses, are well-positioned to identify and address modifiable dementia risk factors, provide person-centred care and facilitate access to relevant health and community support (182,255,258).

Evidence-based interventions for dementia

Interventions for managing modifiable risk factors

Dementia prevention is increasingly understood through a life course lens with evidence suggesting that up to 40% of dementia cases could be prevented or delayed by modifying key risk factors (255), see *Figure 4.1*. These interventions target pathways including cardiovascular health, neuroplasticity, inflammation, social engagement and cognitive reserve. The most promising approaches combine risk factor modification, behavioural change and long-term engagement, often in multidisciplinary settings.

Hearing health is among the most significant modifiable midlife risk factors. A meta-analysis conducted for the 2020 Lancet Commission estimated a pooled relative risk of 1.94 for dementia associated with hearing loss which is highly prevalent in adults over 55 years of age (255). While the effectiveness of hearing aids in preventing dementia is not yet confirmed in large-scale trials, early identification and support for hearing impairment may reduce risk through improved communication, reduced cognitive load and increased social participation.

Physical activity consistently demonstrates protective effects. Meta-analyses of cohort studies show a 28–38% reduction in dementia incidence among older adults engaging in regular physical activity (259,260). Exercise may influence brain health through improved cerebral perfusion, reduced vascular risk and neurotrophic factor expression, with additional benefits for mood, balance and function.

Dietary interventions, particularly adherence to a Mediterranean diet, have been linked to improved cognitive outcomes (261–263). In a randomised trial of older adults at high cardiovascular risk, adherence to a Mediterranean diet supplemented with extra virgin olive oil or mixed nuts was associated with better cognitive performance over four years. Although no participants developed dementia, findings suggest potential for delaying cognitive ageing (261).

Depression and social isolation are recognised risk factors for dementia, though the direction of causality remains contested (264,265). Longitudinal studies indicate that both midlife and late-life depression are associated with increased dementia risk, potentially through mechanisms such as hippocampal atrophy, chronic inflammation, vascular damage and dysregulation of stress hormones (264,266). The timing of depression may be important, with late-life depression potentially representing both a risk factor and an early manifestation of dementia. The RACGP recommends that GPs remain alert to the various symptoms of depression, including low mood, substance use, insomnia, anhedonia, suicidal thoughts, fatigue and persistent somatic complaints and use validated mental health assessment tools where indicated to support diagnosis and care planning (267).

Social isolation has also been associated with elevated dementia risk. A meta-analysis reported increased relative risks for individuals with limited social activity and infrequent social contact, highlighting the potential role of social engagement in maintaining cognitive health (268). The mechanisms linking social isolation and dementia include reduced cognitive stimulation, increased depressive symptoms and negative effects on cardiovascular and mental health.

Evidence indicates that experiencing depression at various stages of life may elevate the risk of developing dementia; however, variability in study design and the overall quality of evidence necessitate cautious interpretation of this relationship (265). Adopting a life course perspective in managing and preventing depression may help mitigate future dementia risk, especially when mental health services are accessible, culturally safe and tailored to the needs of at-risk groups. Targeting modifiable risk factors such as depression, high blood pressure and social disconnection from midlife aligns with growing evidence supporting proactive and sustained prevention strategies (264,269).

Pharmacological therapies

Pharmacological treatments for dementia provide symptomatic relief but have not been shown to alter disease progression. Acetylcholinesterase inhibitors such as donepezil, rivastigmine and galantamine and the NMDA receptor antagonist memantine are the main classes of medications used to manage symptoms of Alzheimer’s disease. These agents may support cognitive function and daily activities in mild to moderate dementia, though their effects are often limited in duration (182,270).

Antihypertensive medications remain the most consistent pharmacological intervention with evidence for reducing dementia risk. Meta-analyses have found a modest but statistically significant reduction in dementia incidence associated with blood pressure control, particularly among older adults with elevated systolic blood pressure (264,271).

By contrast, pharmacological agents such as non-steroidal anti-inflammatory drugs, statins, oestrogen therapy, vitamins and ginkgo biloba have not demonstrated consistent benefits in preventing or treating dementia (264,272). A recent systematic review concluded that pharmacological interventions have limited impact on improving quality of life among people living with dementia (273).

Antipsychotics may be prescribed in the management of behavioural and psychological symptoms of dementia when symptoms are severe or cause risk of harm. However, their use is associated with increased risk of cerebrovascular events, sedation and mortality, highlighting the need for cautious prescribing and regular review (182).

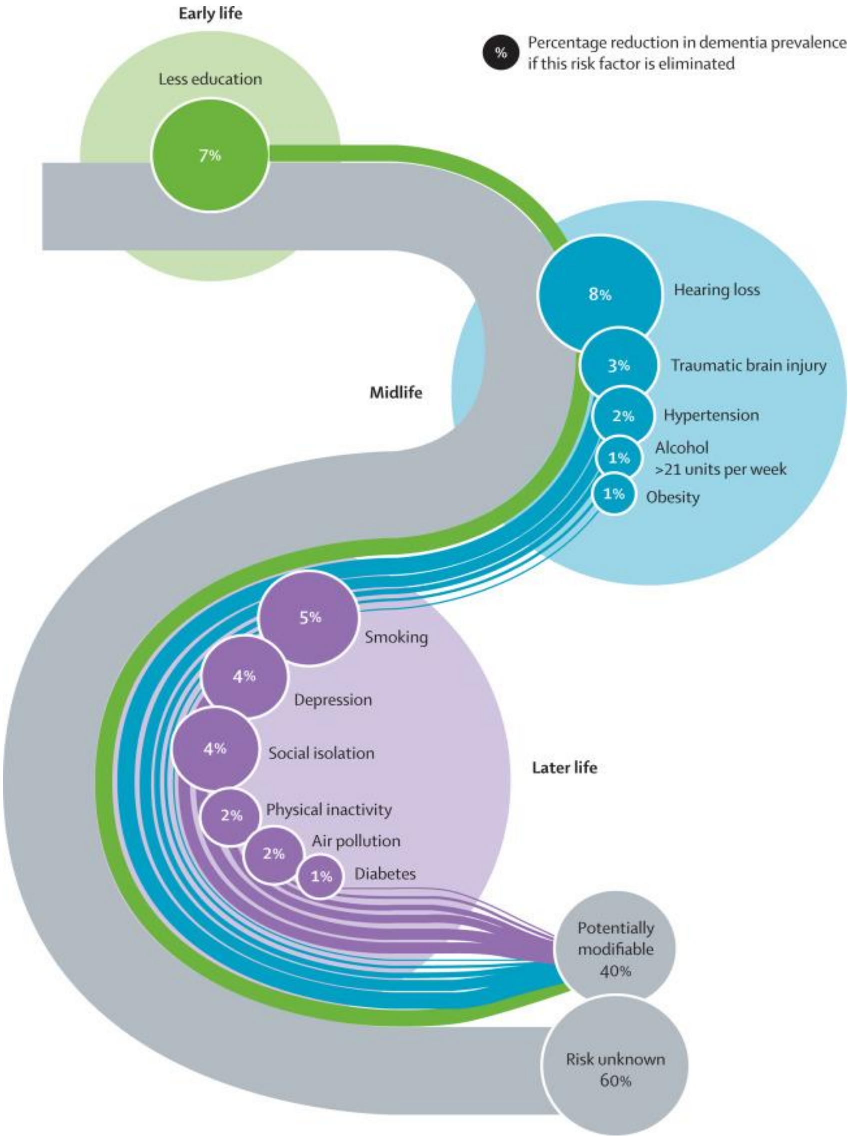
Cognitive training

Cognitive training has shown mixed results in dementia prevention. While some interventions improve cognitive function in healthy older adults, their effectiveness in reducing dementia incidence remains uncertain. Early evidence suggested that high cognitive reserve, comprising education, complex occupational roles and cognitively stimulating activities was associated with a 46% reduced risk of developing dementia (274). More recent studies have expanded this evidence base. A meta-analysis by Wang et al. (2019) of 17 randomized controlled trials found that cognitive training yielded small to moderate improvements in global cognition and memory among older adults without dementia, particularly when interventions were multidomain and sustained over time (199). Similarly, a recent umbrella review by Paggeti et al. (2024) concluded that while cognitive training interventions improve cognitive outcomes, their effect on delaying dementia onset remains limited and highly variable across populations and delivery formats (275).

Program intensity, frequency and individual characteristics such as baseline cognitive status and comorbidities may influence outcomes. Additionally, cognitive training appears more effective when combined with other lifestyle interventions such as physical activity or diet, as demonstrated in multimodal studies like FINGER (276).

Collectively, these findings suggest that effective dementia prevention requires early, sustained and multi-domain strategies. While further evidence is needed to determine optimal timing, delivery and population targeting, many interventions already confer additional benefits for healthy ageing, supporting their broader integration into primary care and population health strategies.

Figure 4.1. Life-course model of contribution of modifiable risk factors to dementia. Figure shows potentially modifiable or non-modifiable risk factors (277)



Emerging or innovative approaches

Body Brain Life – A multidomain risk reduction program

The Body Brain Life program is an Australian multidomain dementia risk reduction intervention developed by the Centre for Research on Ageing, Health and Wellbeing at the Australian National University. It targets modifiable risk factors through a structured, web-based program integrating modules on physical activity, diet, cognitive engagement and health management (278). The program uses principles of adult learning and behaviour change to guide participants through goal-setting and tailored activities over an eight-week period (279).

A randomized controlled trial involving 176 community-dwelling adults aged 50–60 years found that participants in the BBL group experienced significantly reduced overall dementia risk scores compared to a control group receiving health education alone (278). Follow-up results from subsequent iterations (BBL-Memory and BBL-Koori) have demonstrated feasibility, cultural adaptability and sustained risk reduction in diverse populations, including Aboriginal and Torres Strait Islander communities

(280,281). This highlights the potential for digital, scalable and personalised interventions to reduce dementia risk in midlife through education, behavioural activation, and lifestyle change.

Mediterranean and MIND Diets – nutritional interventions for cognitive health

Dietary interventions are gaining recognition as modifiable approaches to cognitive health. The Mediterranean diet, characterised by high consumption of vegetables, fruits, legumes, nuts, fish and olive oil, has been associated with improved cognitive outcomes and reduced dementia risk. A Spanish randomized trial (PREDIMED) involving older adults at cardiovascular risk found that those following a Mediterranean diet supplemented with either extra virgin olive oil or mixed nuts performed better on cognitive assessments after four years compared to a control group (261).

Building on this foundation, the MIND diet (Mediterranean-DASH Intervention for Neurodegenerative Delay) was developed to emphasise brain-healthy foods, such as leafy greens and berries, while limiting red meat, sweets and fried foods (282). In a prospective cohort study of over 900 older adults, high adherence to the MIND diet was associated with a 53% reduction in Alzheimer's disease risk (283). Meta-analyses have since confirmed these associations across multiple populations, showing positive effects on global cognition and reduced dementia incidence (284–286).

General practitioners and practice nurses are often the first point of contact for individuals presenting with cognitive concerns, enabling them to identify symptoms early and initiate appropriate assessment and referral pathways (287).

Although awareness of modifiable risk factors and the importance of a life-course approach to dementia prevention is increasing, the integration of risk reduction strategies into routine primary care remains limited. Godbee et al. (2024) report that primary care providers recognise the relevance of dementia prevention but face barriers such as time constraints, competing priorities, and limited access to supporting resources and referral networks (287).

Several system-level enablers have been identified to support primary care teams in delivering dementia-related care. These include targeted education and training to build diagnostic confidence, use of clinical decision-support tools such as the NHMRC guidelines and the Cognitive Decline Partnership Centre resources, and structured referral pathways to multidisciplinary services including memory clinics and allied health. Incorporating dementia prevention into existing chronic disease management structures, including the 75+ Health Assessment, may also facilitate more consistent risk factor identification and management in older adults (270,287,288).

Team-based approaches, including nurse-led assessments and care coordination, have been described as potential mechanisms to enhance continuity and capacity in primary care dementia care. As noted in the literature, strengthening these elements may improve the feasibility of delivering proactive, person-centred care across the disease trajectory (287).

Resources and tools to support dementia care in primary care

A range of clinical tools, evidence-based guidelines and decision-support resources are available to assist general practitioners, nurses, and allied health professionals in delivering high-quality dementia care. These include:

- Dementia Australia provides a comprehensive suite of clinical decision-support tools, screening checklists, care planning templates, and culturally inclusive resources tailored for general practice. These support earlier identification of cognitive impairment and guide communication with patients and carers (289).

- NHMRC Clinical Practice Guidelines and Principles of Care for People with Dementia, developed in partnership with the Cognitive Decline Partnership Centre (CDPC), provide evidence-based recommendations for diagnosis, pharmacological and non-pharmacological interventions, care coordination and carer support (290).
- Cognitive Decline Partnership Centre (CDPC) Guidelines also hosts a suite of implementation resources, including clinical pathways, tools for advance care planning, and training materials that support guideline uptake in primary and aged care settings (291).

Barriers and enablers to dementia care in primary care

Primary care is a key setting for health promotion, prevention and early intervention for dementia. However, implementation is affected by a range of systemic and practice-level factors. Although somewhat dated, Travers, Martin-Khan and Lie (2009) identified barriers and enablers to the effective delivery of dementia-related prevention and early intervention services in Australian primary care (292):

Barriers included:

- limited time during consultations, making it difficult to address preventive care alongside immediate clinical concerns;
- fragmented service coordination, particularly between general practice, specialist care and community services;
- inadequate training and limited confidence among GPs and practice nurses in addressing dementia prevention or risk factor modification;
- lack of clear guidelines or frameworks specific to dementia prevention and early detection in primary care.

Enablers included:

- practice-level leadership and team-based care, particularly where practice nurses supported preventive and screening activities;
- incentives and funding mechanisms, such as structured health assessments (e.g. the 75+ Health Assessment) and care planning items, which support longer and more comprehensive consultations;
- use of screening tools embedded within routine health checks to identify early cognitive decline and modifiable risk factors;
- multidisciplinary collaboration, including clear referral pathways to memory clinics and allied health providers.

References

1. Sims J. Australian Family Physician. The Royal Australian College of general Practitioners; 2017 [cited 2025 Jun 2]. Healthy ageing. Available from: https://www.racgp.org.au/afp/2017/january-february/healthy-ageing
2. Australian Government Department of Health and Aged. Australia’s Primary Health Care 10 Year Plan 2022–2032 [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2025 Jun 5]. Available from: https://www.health.gov.au/resources/publications/australias-primary-health-care-10-year-plan-2022-2032?language=en

3. Australian Government Department of Health and Aged. National Preventive Health Strategy 2021–2030 [Internet]. Australian Government Department of Health and Aged Care; 2021 [cited 2025 Jun 11]. Available from: https://www.health.gov.au/resources/publications/national-preventive-health-strategy-2021-2030?language=en
4. Australian Institute of Health and Welfare. General practice, allied health and other primary care services [Internet]. 2025 [cited 2025 May 20]. Available from: https://www.aihw.gov.au/reports/primary-health-care/general-practice-allied-health-primary-care
5. Australian Commission on safety and Quality in HealthCare. Australian Charter of Healthcare Rights | Australian Commission on Safety and Quality in Health Care [Internet]. [cited 2025 Jul 23]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/australian-charter-healthcare-rights
6. Australian Commission on Safety and Quality in Health Care. Partnering with Consumers Standard [Internet]. [cited 2025 Jul 23]. Available from: https://www.safetyandquality.gov.au/standards/nsqhs-standards/partnering-consumers-standard
7. Access and Quality of Care for Older Adults in 10 Countries [Internet]. 2025 [cited 2025 Jun 2]. Available from: https://www.commonwealthfund.org/publications/surveys/2025/apr/access-quality-care-older-adults-10-countries-2024-survey
8. UN Decade of Healthy Ageing: Plan of Action (2021-2030) [Internet]. [cited 2025 Jun 2]. Available from: https://www.who.int/westernpacific/publications/m/item/un-decade-of-healthy-ageing-plan-of-action-2021-2030
9. Beard JR, Officer A, De Carvalho IA, Sadana R, Pot AM, Michel JP, et al. The World report on ageing and health: a policy framework for healthy ageing. The Lancet. 2016 May;387(10033):2145–54.
10. Seah SJ, Harding SC, Pay JY, Wang J, Aw S, Lam J, et al. Sociodemographic characteristics associated with self-care and quality of life among community-dwelling older adults with type 2 diabetes. Prim Care Diabetes. 2022 Feb;16(1):179–87.
11. RACGP. Putting prevention into practice: guidelines for the implementation of prevention in the general practice setting. Third edition. East Melbourne, Victoria: RACGP; 2018.
12. RACGP. RACGP - What's new in the 10th Ed Red Book [Internet]. [cited 2025 Jul 2]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/what-s-new-in-the-10th-ed-red-book
13. RACGP - Handbook of Non-Drug Interventions (HANDI) [Internet]. [cited 2025 Aug 13]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/handi
14. Australian Government Department of Health and Aged Care. Catch-up vaccination | The Australian Immunisation Handbook [Internet]. 2025 [cited 2025 May 21]. Available from: https://immunisationhandbook.health.gov.au/contents/catch-up-vaccination
15. Prodanovic D, Lapham K, Keenan R, Austin C, Hertz J, Booy R, et al. Enhancing Adult Vaccination Coverage Rates in Australia [Internet]. Immunisation Coalition. 2021 [cited 2025 May 26]. Available from: https://www.immunisationcoalition.org.au/enhancing-adult-vaccination-coverage-rates-in-australia/
16. Australian Government Department of Health D and A. Infectious respiratory disease: vaccination eligibility and access for older people [Internet]. 2025 [cited 2025 Jul 17]. Available from: https://www.health.gov.au/resources/publications/infectious-respiratory-disease-vaccination-eligibility-and-access-for-older-people?language=en
17. Administration (TGA) TG. 2025 Seasonal influenza vaccines | Therapeutic Goods Administration (TGA) [Internet]. Therapeutic Goods Administration (TGA); 2025 [cited 2025 May 26]. Available from: https://www.tga.gov.au/resources/publication/publications/2025-seasonal-influenza-vaccines
18. Australian Technical Advisory, Group On Immunisation. Statement On Covid-19 Vaccine Administration In 2025. 2025. https://www.health.gov.au/resources/publications/atagi-statement-on-the-administration-of-covid-19-vaccines-in-2025?language=en
19. El Banhawi H, Besley S, Bell E, Brassel S, Steuten L. Socio-Economic Value of Adult Immunisation Programmes. Available from: https://www.ohe.org/publications/the-socio-economic-value-of-adult-immunisation-programmes/
20. Australian Journal of General Practice [Internet]. [cited 2025 Jul 22]. Response rates to computer decision support. Available from: https://www1.racgp.org.au/ajgp/2022/november/response-rates-to-computer-decision-support
21. Australian Government Department of Health and Aged Care. Immunisation information for health professionals [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2025

May 26]. Available from: https://www.health.gov.au/topics/immunisation/immunisation-information-for-health-professionals
22. Lin CJ, Nowalk MP, Pavlik VN, Brown AE, Zhang S, Raviotta JM, et al. Using the 4 pillars™ practice transformation program to increase adult influenza vaccination and reduce missed opportunities in a randomized cluster trial. BMC Infect Dis. 2016 Nov 3;16(1):623.
23. Zimmerman RK, Brown AE, Pavlik VN, Moehling KK, Raviotta JM, Lin CJ, et al. Using the 4 Pillars Practice Transformation Program to Increase Pneumococcal Immunizations for Older Adults: A Cluster-Randomized Trial. J Am Geriatr Soc. 2017 Jan;65(1):114–22.
24. Vann JCJ, Jacobson RM, Coyne-Beasley T, Asafu-Adjei JK, Szilagyi PG. Patient reminder and recall interventions to improve immunization rates - Jacobson Vann, JC - 2018 | Cochrane Library. [cited 2025 Jul 23]; Available from: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003941.pub3/full
25. Thomas RE, Lorenzetti DL. Interventions to increase influenza vaccination rates of those 60 years and older in the community. Cochrane Database Syst Rev. 2018 May 30;5(5):CD005188.
26. Jacobson Vann JC, Jacobson RM, Coyne-Beasley T, Asafu-Adjei JK, Szilagyi PG. Patient reminder and recall interventions to improve immunization rates. Cochrane Database Syst Rev. 2018 Jan 18;2018(1):CD003941.
27. Briggs L, Fronek P, Quinn V, Wilde T. Perceptions of influenza and pneumococcal vaccine uptake by older persons in Australia. Vaccine. 2019 Jul 26;37(32):4454–9.
28. Glenton C, Carlsen B, Lewin S, Wennekes MD, Winje BA, Eilers R. Healthcare workers' perceptions and experiences of communicating with people over 50 years of age about vaccination: a qualitative evidence synthesis. Cochrane Database Syst Rev. 2021 Jul 20;2021(7):CD013706.
29. Opportunistic Immunisation Toolkit for local health districts [Internet]. [cited 2025 Jul 23]. Available from: https://www.health.nsw.gov.au:443/immunisation/Pages/toolkit-oppurtunistic-vaccination.aspx
30. Kirubarajan A, Lynch M, Nasreen S, Gebretekle GB, Fadel SA, Crowcroft NS, et al. Increasing pneumococcal vaccine uptake in older adults: a scoping review of interventions in high-income countries. BMC Geriatr. 2023 Jan 2;23(1):2.
31. Australian Journal of General Practice [Internet]. [cited 2025 Jul 23]. Immunising older Australians. Available from: https://www1.racgp.org.au/ajgp/2022/october/immunising-older-australians
32. Raina MacIntyre C, Menzies R, Kpozehouen E, Chapman M, Travaglia J, Woodward M, et al. Equity in disease prevention: Vaccines for the older adults – a national workshop, Australia 2014. Vaccine. 2016 Nov 4;34(46):5463–9.
33. Immunisation Action Week [Internet]. Immunisation Coalition. [cited 2025 Jul 23]. Available from: https://www.immunisationcoalition.org.au/event-category/immunisation-action-week/
34. CDC. Vaccines & Immunizations. 2025 [cited 2025 Jul 23]. Ensuring Vaccine Access for All People. Available from: https://www.cdc.gov/vaccines/basics/vaccine-equity.html
35. Australia H. Shingles [Internet]. Healthdirect Australia; 2024 [cited 2025 May 26]. Available from: https://www.healthdirect.gov.au/shingles
36. Eyting M, Xie M, Michalik F, Heß S, Chung S, Geldsetzer P. A natural experiment on the effect of herpes zoster vaccination on dementia. Nature. 2025 May;641(8062):438–46.
37. Michalik F, Xie M, Eyting M, Heß S, Chung S, Geldsetzer P. The effect of herpes zoster vaccination on the occurrence of deaths due to dementia in England and Wales. medRxiv. 2023 Sep 8;2023.09.08.23295225.
38. Roberts J. NewsGP. [cited 2025 Jul 23]. newsGP - Shingles vaccine linked to dementia risk reduction. Available from: https://www1.racgp.org.au/newsgp/clinical/shingles-vaccine-linked-to-dementia-risk-reduction
39. Immunisation Coalition. White Paper on Adult Immunisation in Australia: A Call to Action to Improve Coverage and Policy. [Internet]. 2023. Available from: https://www.immunisationcoalition.org.au
40. Healthy ageing and functional ability [Internet]. [cited 2025 Jun 11]. Available from: https://www.who.int/news-room/questions-and-answers/item/healthy-ageing-and-functional-ability
41. Ottawa charter for health promotion [Internet]. [cited 2025 Jun 5]. Available from: https://www.who.int/publications/i/item/WH-1987
42. Marmot M. Health equity in England: the Marmot review 10 years on. 2020 Feb 25 [cited 2025 Jun 5]; Available from: https://www.bmj.com/content/368/bmj.m693
43. World Health Organization. Integrated care models: an overview. 2016;
44. Muhl C, Mulligan K, Bayoumi I, Ashcroft R, Godfrey C. Establishing Internationally Accepted Conceptual and Operational Definitions of Social Prescribing Through Expert Consensus: A Delphi Study Protocol. Int J Integr Care. 2023;23(1):3.

45. NASP. Evidence programme - The National Academy for Social Prescribing [Internet]. [cited 2025 Jun 5]. Available from: https://socialprescribingacademy.org.uk/evidence-on-social-prescribing/
46. Australian Government Department of Health and Aged Care. For older Australians (65 years and over) [Internet]. Australian Government Department of Health and Aged Care; 2021 [cited 2025 May 26]. Available from: https://www.health.gov.au/topics/physical-activity-and-exercise/physical-activity-and-exercise-guidelines-for-all-australians/for-older-australians-65-years-and-over
47. Adja KYC, Lenzi J, Sezgin D, O'Caoimh R, Morini M, Damiani G, et al. The Importance of Taking a Patient-Centered, Community-Based Approach to Preventing and Managing Frailty: A Public Health Perspective. Front Public Health. 2020 Nov 12;8:599170.
48. Sherrington C, Whitney JC, Lord SR, Herbert RD, Cumming RG, Close JCT. Effective Exercise for the Prevention of Falls: A Systematic Review and Meta-Analysis. J Am Geriatr Soc. 2008 Dec;56(12):2234–43.
49. AIHW. Australian Institute of Health and Welfare. 2025 [cited 2025 May 20]. General practice, allied health and other primary care services. Available from: https://www.aihw.gov.au/reports/primary-health-care/general-practice-allied-health-primary-care
50. RACGP aged care clinical guide (Silver Book) - Part A - Common clinical conditions in aged care | Aged Care Quality and Safety Commission [Internet]. [cited 2025 Jun 2]. Available from: https://www.agedcarequality.gov.au/quality-standards/racgp-aged-care-clinical-guide-silver-book-part-common-clinical-conditions-aged-care
51. Langhammer B, Bergland A, Rydwik E. The Importance of Physical Activity Exercise among Older People. BioMed Res Int. 2018 Dec 5;2018:7856823.
52. Talar K, Hernández-Belmonte A, Vetrovsky T, Steffl M, Kałamacka E, Courel-Ibáñez J. Benefits of Resistance Training in Early and Late Stages of Frailty and Sarcopenia: A Systematic Review and Meta-Analysis of Randomized Controlled Studies. J Clin Med. 2021 Apr 12;10(8):1630.
53. Hurst C, Robinson SM, Witham MD, Dodds RM, Granic A, Buckland C, et al. Resistance exercise as a treatment for sarcopenia: prescription and delivery. Age Ageing. 2022 Feb 1;51(2):afac003.
54. Iliffe S, Kendrick D, Morris R, Griffin M, Haworth D, Carpenter H, et al. Promoting physical activity in older people in general practice: ProAct65+ cluster randomised controlled trial. Br J Gen Pract J R Coll Gen Pract. 2015;65(640):e731–8.
55. Duckham RL, Masud T, Taylor R, Kendrick D, Carpenter H, Iliffe S, et al. Randomised controlled trial of the effectiveness of community group and home-based falls prevention exercise programmes on bone health in older people: the ProAct65+ bone study. Age Ageing. 2015 Jul;44(4):573–9.
56. Orton E, Audsley S, Coupland C, Gladman JRF, Iliffe S, Lafond N, et al. "Real world" effectiveness of the Falls Management Exercise (FaME) programme: an implementation study. Age Ageing. 2021 Jun 28;50(4):1290–7.
57. Harris T, Kerry SM, Victor CR, Ekelund U, Woodcock A, Iliffe S, et al. A primary care nurse-delivered walking intervention in older adults: PACE (pedometer accelerometer consultation evaluation)-Lift cluster randomised controlled trial. PLoS Med. 2015 Feb 17;12(2):e1001783.
58. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, et al. ESPEN guideline on clinical nutrition and hydration in geriatrics. Clin Nutr Edinb Scotl. 2019 Feb;38(1):10–47.
59. Tikkinen KAO, Johnson TM, Tammela TLJ, Sintonen H, Haukka J, Huhtala H, et al. Nocturia frequency, bother, and quality of life: how often is too often? A population-based study in Finland. Eur Urol. 2010 Mar;57(3):488–96.
60. Australian Institute of Health and Welfare. Overweight and obesity, Summary [Internet]. 2024 [cited 2025 May 21]. Available from: https://www.aihw.gov.au/reports/overweight-obesity/overweight-and-obesity/contents/summary
61. Gomes LA, Gregório MJ, Iakovleva TA, Sousa RD de, Bessant J, Oliveira P, et al. A Home-Based eHealth Intervention for an Older Adult Population With Food Insecurity: Feasibility and Acceptability Study. J Med Internet Res. 2021 Aug 31;23(8):e26871.
62. RACGP. Management of type 2 diabetes: A handbook for general practice [Internet]. Available from: https://www.racgp.org.au/getattachment/7c05e922-ab1f-4301-aab7-f4f9b638cb66/Management-of-type-2-diabetes-A-handbook-for-general-practice.aspx
63. Schuetz P, Fehr R, Baechli V, Geiser M, Deiss M, Gomes F, et al. Individualised nutritional support in medical inpatients at nutritional risk: a randomised clinical trial. The Lancet. 2019 Jun 8;393(10188):2312–21.
64. Lindner-Rabl S, Wagner V, Matijevic A, Herzog C, Lampl C, Traub J, et al. Clinical Interventions to Improve Nutritional Care in Older Adults and Patients in Primary Healthcare - A Scoping Review of Current Practices of Health Care Practitioners. Clin Interv Aging. 2022;17:1–13.

65. Krznarić Ž, Vranešić Bender D, Blaž Kovač M, Cuerda C, van Ginkel-Res A, Hiesmayr M, et al. Clinical nutrition in primary care: ESPEN position paper. Clin Nutr. 2024 Jun 1;43(6):1678–83.
66. Matek Sarić M, Sorić T, Sarić A, Smoje P, Rozić A, Matković M, et al. Healthcare and non-healthcare professionals' knowledge about nutrition in older adults: a cross-sectional study. BMC Public Health. 2025 Jan 24;25(1):308.
67. Aged Care Quality and Safety Commission. Nutrition and older adults [Internet]. [cited 2025 Jul 24]. Available from: https://www.agedcarequality.gov.au/resource-library/nutrition-and-older-adults
68. Dietitians Australia [Internet]. 2022 [cited 2025 Jul 24]. Older people and aged care role statement |. Available from: https://dietitiansaustralia.org.au/working-dietetics/standards-and-scope/role-statements/older-people-and-aged-care-role-statement
69. Schneyder A. Malnutrition and nutritional supplements. Aust Prescr [Internet]. 2014 Aug 4 [cited 2025 Jul 24];37(4). Available from: https://australianprescriber.tg.org.au/articles/malnutrition-and-nutritional-supplements
70. World Health Organization. Supplemental nutrition with dietary advice for older people affected by undernutrition [Internet]. [cited 2025 Jul 24]. Available from: https://www.who.int/tools/elena/interventions/nutrition-older-people
71. O'Brien WJ, Jellicoe J, Mazahery H, Wham C. Tackling malnutrition with a new compact oral nutrient supplement among residents in aged care: a pilot study. J Prim Health Care. 2022 Nov 14;14(4):363–7.
72. Walton K, do Rosario VA, Pettingill H, Cassimatis E, Charlton K. The impact of home-delivered meal services on the nutritional intake of community living older adults: a systematic literature review. J Hum Nutr Diet Off J Br Diet Assoc. 2020 Feb;33(1):38–47.
73. Nykänen I, Rissanen TH, Sulkava R, Hartikainen S. Effects of individual dietary counseling as part of a comprehensive geriatric assessment (CGA) on nutritional status: a population-based intervention study. J Nutr Health Aging. 2014 Jan;18(1):54–8.
74. Pond CD, Regan C. Improving the delivery of primary care for older people. Med J Aust. 2019;211(2):60.
75. Addressing malnutrition in older people: a vital focus for quality care | Aged Care Quality and Safety Commission [Internet]. [cited 2025 May 21]. Available from: https://www.agedcarequality.gov.au/providers/food-nutrition-dining-information-providers/food-thought-positive-stories/addressing-malnutrition-older-people-vital-focus-quality-care
76. Middleton G, Patterson KA, Muir-Cochrane E, Velardo S, McCorry F, Coveney J. The Health and Well-being Impacts of Community Shared Meal Programs for Older Populations: A Scoping Review. Lee MA, editor. Innov Aging. 2022 Oct 1;6(7):igac068.
77. Clancy A, Walton K, Charlton K, McMahon AT, Williams P, Tapsell LC. Development of the Australian National Meal Guidelines for home-delivered and centre-based meal programs for older adults. Health Promot J Aust Off J Aust Assoc Health Promot Prof. 2022 Jan;33(1):194–201.
78. RACGP - Nutrition [Internet]. [cited 2025 Jul 2]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/metabolic/nutrition
79. Jih J, Nguyen A, Woo J, Tran WC, Wang A, Gonzales N, et al. A photo-based communication intervention to promote diet-related discussions among older adults with multi-morbidity. J Am Geriatr Soc. 2023 Feb;71(2):577–87.
80. Li J, Vitiello MV, Gooneratne N. Sleep in Normal Aging. Sleep Med Clin. 2018 Mar;13(1):1–11.
81. Casagrande M, Forte G, Favieri F, Corbo I. Sleep Quality and Aging: A Systematic Review on Healthy Older People, Mild Cognitive Impairment and Alzheimer's Disease. Int J Environ Res Public Health. 2022 Jul 11;19(14):8457.
82. Chung F, Abdullah HR, Liao P. STOP-Bang Questionnaire: A Practical Approach to Screen for Obstructive Sleep Apnea. Chest. 2016 Mar;149(3):631–8.
83. Obstructive Sleep Apnoea [Internet]. [cited 2025 Jul 24]. Available from: https://www.sleepprimarycareresources.org.au/osa
84. GP Guideline on obstructive sleep apnoea and insomnia [Internet]. [cited 2025 Jul 24]. Available from: https://sleep.org.au/Public/Public/Resource-Centre/GP-guideline.aspx
85. Ong JC, Crawford MR. Insomnia and Obstructive Sleep Apnea. Sleep Med Clin. 2013 Sep 1;8(3):389–98.
86. Posadas T, Oscullo G, Zaldívar E, Garcia-Ortega A, Gómez-Olivas JD, Monteagudo M, et al. Treatment with CPAP in Elderly Patients with Obstructive Sleep Apnoea. J Clin Med. 2020 Feb 17;9(2):546.
87. Crawford-Achour E, Dauphinot V, Martin MS, Tardy M, Gonthier R, Barthelemy JC, et al. Protective Effect of Long-Term CPAP Therapy on Cognitive Performance in Elderly Patients with Severe OSA: The PROOF Study. J Clin Sleep Med JCSM Off Publ Am Acad Sleep Med. 2015 Apr 15;11(5):519–24.

88. Australian Sleep Association. Sleep Health Primary Care Resources [Internet]. Available from: https://www.sleepprimarycareresources.org.au/
89. Irwin MR, Olmstead R, Carrillo C, Sadeghi N, Breen EC, Witarama T, et al. Cognitive behavioral therapy vs. Tai Chi for late life insomnia and inflammatory risk: a randomized controlled comparative efficacy trial. Sleep. 2014 Sep 1;37(9):1543–52.
90. Yang FC, Desai AB, Esfahani P, Sokolovskaya TV, Bartlett DJ. Effectiveness of Tai Chi for Health Promotion of Older Adults: A Scoping Review of Meta-Analyses. Am J Lifestyle Med. 2021 Mar 24;16(6):700–16.
91. Australian Journal of General Practice [Internet]. [cited 2025 May 26]. Behavioural treatment for insomnia in Australian general practice. Available from: https://www1.racgp.org.au/ajgp/2021/may/behavioural-treatment-for-insomnia-in-australian-g
92. RACGP. About HANDI : What is the HANDI project? [Internet]. 2025. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/handi/about-handi/about-handi
93. SA Halth. Insomnia for clinicians [Internet]. 2025. Available from: https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/clinical+resources/clinical+programs+and+practice+guidelines/medical+conditions/sleep/insomnia+for+clinicians
94. American Academy of Sleep Medicine. Sleep Diary Template [Internet]. 2025. Available from: https://sleepeducation.org/docs/default-document-library/sleep-diary.pdf
95. Oberlin LE, Jaywant A, Wolff A, Gunning FM. Strategies to Promote Cognitive Health in Aging: Recent Evidence and Innovations. Curr Psychiatry Rep. 2022 Sep;24(9):441–50.
96. Hedden T, Gabrieli JDE. Insights into the ageing mind: a view from cognitive neuroscience. Nat Rev Neurosci. 2004 Feb;5(2):87–96.
97. Global status report on the public health response to dementia [Internet]. [cited 2025 May 21]. Available from: https://www.who.int/publications/i/item/9789240033245
98. GBD 2019 Dementia Forecasting Collaborators. Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. Lancet Public Health. 2022 Feb;7(2):e105–25.
99. Prince MJ, Acosta D, Guerra M, Huang Y, Jacob KS, Jimenez-Velazquez IZ, et al. Intrinsic capacity and its associations with incident dependence and mortality in 10/66 Dementia Research Group studies in Latin America, India, and China: A population-based cohort study. PLoS Med. 2021 Sep 14;18(9):e1003097.
100. Prince JB, Davis HL, Tan J, Muller-Townsend K, Markovic S, Lewis DMG, et al. Cognitive and neuroscientific perspectives of healthy ageing. Neurosci Biobehav Rev. 2024 Jun;161:105649.
101. Siette J, Taylor N, Deckers K, Köhler S, Braithwaite J, Valenzuela M, et al. Advancing Australian public health initiatives targeting dementia risk reduction. Australas J Ageing. 2022;41(2):e190–5.
102. Dorresteijn TAC, Zijlstra GAR, Ambergen AW, Delbaere K, Vlaeyen JWS, Kempen GIJM. Effectiveness of a home-based cognitive behavioral program to manage concerns about falls in community-dwelling, frail older people: results of a randomized controlled trial. BMC Geriatr. 2016 Jan 6;16:2.
103. Brodaty H, Chau T, Heffernan M, Ginige JA, Andrews G, Millard M, et al. An online multidomain lifestyle intervention to prevent cognitive decline in at-risk older adults: a randomized controlled trial. Nat Med [Internet]. 2025 Jan 28 [cited 2025 Feb 17]; Available from: https://www.nature.com/articles/s41591-024-03351-6
104. Potential Public Health Relevance of Social Isolation and Loneliness: Prevalence, Epidemiology, and Risk Factors | Public Policy & Aging Report | Oxford Academic [Internet]. [cited 2025 May 21]. Available from: https://academic.oup.com/ppar/article-abstract/27/4/127/4782506?redirectedFrom=fulltext
105. Galvez-Hernandez P, González-de Paz L, Muntaner C. Primary care-based interventions addressing social isolation and loneliness in older people: a scoping review. BMJ Open. 2022 Feb 4;12(2):e057729.
106. Poscia A, Stojanovic J, La Milia DI, Duplaga M, Grysztar M, Moscato U, et al. Interventions targeting loneliness and social isolation among the older people: An update systematic review. Exp Gerontol. 2018 Feb;102:133–44.
107. Thompson C, Halcomb E, Masso M. The contribution of primary care practitioners to interventions reducing loneliness and social isolation in older people-An integrative review. Scand J Caring Sci. 2023 Sep;37(3):611–27.
108. Gaggioli A, Morganti ,Luca, Bonfiglio ,Silvio, Scaratti ,Chiara, Cipresso ,Pietro, Serino ,Silvia, et al. Intergenerational Group Reminiscence: A Potentially Effective Intervention to Enhance Elderly Psychosocial Wellbeing and to Improve Children’s Perception of Aging. Educ Gerontol. 2014 Jul 1;40(7):486–98.
109. Moody E, Phinney A. A community-engaged art program for older people: fostering social inclusion. Can J Aging Rev Can Vieil. 2012 Mar;31(1):55–64.

110. Sen K, Prybutok G, Prybutok V. The use of digital technology for social wellbeing reduces social isolation in older adults: A systematic review. SSM - Popul Health. 2021 Dec 30;17:101020.
111. Windsor T, Gordon PS, Champion DS, Rosso DE. Factors influencing older adults' decisions to volunteer.
112. Morgan L. NewsGP. 2024 [cited 2025 Jun 12]. Primary care at the heart of social prescribing national rollout. Available from: https://www1.racgp.org.au/newsgp/clinical/primary-care-at-the-heart-of-social-prescribing-na
113. Baker JR, Bissett M, Freak-Poli R, Dingle GA, Zurynski Y, Astell-Burt T, et al. Australian link worker social prescribing programs: An integrative review. Ager ME, editor. PLOS ONE. 2024 Nov 11;19(11):e0309783.
114. ASPIRE Australian Social Prescribing Institute of Research and Education [Internet]. [cited 2025 Jun 5]. Available from: https://www.creatingopportunitiestogether.com.au/
115. Hong JH, Nakamura JS, Berkman LF, Chen FS, Shiba K, Chen Y, et al. Are loneliness and social isolation equal threats to health and well-being? An outcome-wide longitudinal approach. SSM - Popul Health. 2023 Sep;23:101459.
116. Gardiner C, Geldenhuys G, Gott M. Interventions to reduce social isolation and loneliness among older people: an integrative review. Health Soc Care Community. 2018;26(2):147–57.
117. Australian Government Department of Health and Aged Care. About the Aged Care Volunteer Visitors Scheme (ACVVS) [Internet]. Australian Government Department of Health and Aged Care; 2025 [cited 2025 May 26]. Available from: https://www.health.gov.au/our-work/aged-care-volunteer-visitors-scheme-acvvs/about
118. Monash University [Internet]. [cited 2025 May 26]. Evaluation of the Aged Care Volunteer Visitors Scheme (ACVVS). Available from: https://research.monash.edu/en/projects/evaluation-of-the-aged-care-volunteer-visitors-scheme-acvvs
119. National Academies of Sciences, Engineering, and Medicine. Social Isolation and Loneliness in Older Adults: Opportunities for the Health Care System | The National Academies Press [Internet]. [cited 2025 Jun 12]. Available from: https://nap.nationalacademies.org/download/25663
120. Leach C, Jankowski TB. Older Adults as Key Assets in a Community-Based Participatory Needs Assessment: How Partnering With Older Residents Improves Local Aging Policy and Practice. Gerontol Geriatr Med. 2024 Jan. Doi: 1;10:23337214241234237.
121. López MJ, Lapena C, Sánchez A, Continente X, Fernández A, Sánchez A, et al. Community intervention to reduce social isolation in older adults in disadvantaged urban areas: study protocol for a mixed methods multi-approach evaluation. BMC Geriatr. 2019 Feb 18;19(1):44.
122. Lapena C, Continente X, Sánchez Mascuñano A, Pons Vigués M, Pujol Ribera E, López MJ. Qualitative evaluation of a community-based intervention to reduce social isolation among older people in disadvantaged urban areas of Barcelona. Health Soc Care Community. 2020 Sep;28(5):1488–503.
123. Exploring good practice in life story work with people with dementia: The findings of a qualitative study looking at the multiple views of stakeholders - Kate Gridley, Yvonne Birks, Gillian Parker, 2020 [Internet]. [cited 2025 May 22]. Available from: https://journals.sagepub.com/doi/full/10.1177/1471301218768921
124. What We Do | Life Story Club [Internet]. 2023 [cited 2025 May 22]. Available from: https://lifestoryclub.org/what-we-do/
125. Gridley K, Brooks J, Birks Y. Improving Care for People with Dementia:development and initial feasibility study for evaluation of life story work in dementia care [Internet]. 2016 [cited 2025 May 22]. Available from: https://www.researchgate.net/publication/310824426_Improving_Care_for_People_with_Dementiadevelopment_and_initial_feasibility_study_for_evaluation_of_life_story_work_in_dementia_care
126. A toolkit on how to implement social prescribing [Internet]. [cited 2025 Jun 5]. Available from: https://www.who.int/publications/i/item/9789290619765
127. Wadman A, Palmer-Fluevog A, Allison S, Fowler B. Conceptualizing and Implementing Social Prescribing Programs Guidance From Our Community of Practice. 2023; Available from: https://teambasedcarebc.ca/wp-content/uploads/Conceptualizing-and-Implementing-Social-Prescribing-Programs.pdf
128. Chatterjee H, Camic P, Lockyer B, Thomson J. Non-clinical community interventions: a systematised review of social prescribing schemes [Internet]. [cited 2025 Jun 5]. Available from: https://www.tandfonline.com/doi/full/10.1080/17533015.2017.1334002
129. iLA. LiveUp [Internet]. [cited 2025 Jun 5]. Available from: https://www.liveup.org.au
130. Strength and Exercise for Healthy Ageing | LiveUp [Internet]. [cited 2025 Jun 5]. Available from: https://www.liveup.org.au

131. Australian Men’s Shed Association [Internet]. [cited 2025 Jun 5]. Australian Men’s Shed Association (AMSA) - Join Our Community. Available from: https://mensshed.org/
132. Shann C. STRENGTHENING MENS HEALTH AND WELLBEING THROUGH COMMUNITY SHEDS [Internet]. [cited 2025 Jun 5]. Available from: https://mensshed.org/wp-content/uploads/2022/05/Strengthening-Mens-Health-and-Wellbeing-through-Community-Sheds-Clar....pdf
133. Misan G. Men’s sheds - a strategy to improve men’s health.
134. Ormsby J, Stanley M, Jaworski K. Older men’s participation in community-based men’s sheds programmes. Health Soc Care Community. 2010 Nov;18(6):607–13.
135. Spanner in the Works? - Men’s health [Internet]. [cited 2025 Jun 5]. Home. Available from: https://malehealth.org.au/
136. Baldivis & Districts Community Men’s Shed Inc. The Men’s Shed Guide To Living Well – Baldivis Men’s Shed [Internet]. [cited 2025 Jun 5]. Available from: https://baldivismensshed.org.au/mens-guide-to-well-living/
137. Victorian Sheds Mates Program - Victorian Men’s Shed Association [Internet]. 2024 [cited 2025 Jun 5]. Available from: https://www.vmsa.org.au/victorian-sheds-mates-program/
138. home | parkrun Australia [Internet]. [cited 2025 Jun 5]. Available from: https://www.parkrun.com.au/
139. Palmer T. Why do people participate in Parkrun? A Systematic Review | BSPHN [Internet]. [cited 2025 Jun 5]. Available from: https://www.bsphn.org.uk/publication/why-do-people-participate-in-parkrun-a-systematic-review
140. Grunseit A, Richards J, Merom D. Running on a high: parkrun and personal well-being. BMC Public Health. 2017 Jul 25;18(1):59.
141. McPhee JS, French DP, Jackson D, Nazroo J, Pendleton N, Degens H. Physical activity in older age: perspectives for healthy ageing and frailty. Biogerontology. 2016 Jun 1;17(3):567–80.
142. Spiteri K, Broom D, Bekhet AH, de Caro JX, Laventure B, Grafton K. Barriers and Motivators of Physical Activity Participation in Middle-aged and Older-adults - A Systematic Review. J Aging Phys Act. 2019 Sep 1;27(4):929–44.
143. Alcohol and Drug Foundation and, National Drug and Alcohol Research Centre. Summary Report: Older adults, alcohol and other drugs [Internet]. 2024 [cited 2025 Jun 17]. Available from: https://adf.org.au/resources/publications/
144. Australian Institute of Health and Welfare [Internet]. 2025 [cited 2025 Jun 17]. National Drug Strategy Household Survey 2022–2023, About. Available from: https://www.aihw.gov.au/reports/illicit-use-of-drugs/national-drug-strategy-household-survey/contents/about
145. Rao R, Schofield P, Ashworth M. Alcohol use, socioeconomic deprivation and ethnicity in older people. BMJ Open. 2015 Aug 24;5(8):e007525.
146. Australian Government Department of Health and Aged. National Alcohol Strategy 2019–2028 [Internet]. Australian Government Department of Health and Aged Care; 2023 [cited 2025 Jun 19]. Available from: https://www.health.gov.au/resources/publications/national-alcohol-strategy-2019-2028?language=en
147. Humeniuk R, Henry-Edwards S, Ali R, Poznyak V, Monteiro MG, World Health Organization. The ASSIST-linked brief intervention for hazardous and harmful substance use: a manual for use in primary care / prepared by R. HumeniukƯ [et al]. Interv Breve Vinculada ASSIST Para El Consumo Riesgoso Nocivo Sust Man Para Uso En Aten Primaria. 2010;40.
148. Saitz R. Screening and brief intervention enter their 5th decade. Subst Abuse. 2007;28(3):3–6.
149. Senthilkumar H, Haidar AA, Kauffman B, Peterson R, Bharati R. Increasing Alcohol Screening and Brief Intervention Rates Using the Office Champions Model in Family Medicine Practices. Fam Pract Manag. 2022 Jul;29(4):25–30.
150. CDC. Alcohol and Pregnancy. 2025 [cited 2025 Jun 19]. Alcohol Screening and Brief Intervention (SBI). Available from: https://www.cdc.gov/alcohol-pregnancy/hcp/alcoholsbi/index.html
151. Alcohol: E-Screening, Brief Intervention | The Community Guide [Internet]. 2025 [cited 2025 Jun 19]. Available from: https://www.thecommunityguide.org/findings/alcohol-excessive-consumption-electronic-screening-and-brief-interventions-e-sbi.html
152. Knight A, Tam CWM, Liaw ST. Australian Family Physician. The Royal Australian College of general Practitioners; 2016 [cited 2025 Jun 19]. Alcohol screening and brief interventions in primary care – Evidence and a pragmatic practice-based approach. Available from: https://www.racgp.org.au/afp/2016/october/alcohol-screening-and-brief-interventions-in-p-2
153. Rodgers C. Brief interventions for alcohol and other drug use. Aust Prescr. 2018 Aug 1;41(4):117–21.
154. Tam CWM, Knight A, Liaw ST. Alcohol screening and brief interventions in primary care - Evidence and a pragmatic practice-based approach. Aust Fam Physician. 2016 Oct;45(10):767–70.

155. Schröder S, Westhoff MS, Pfister T, Seifert J, Bleich S, Koop F, et al. Drug safety in older patients with alcohol use disorder: a retrospective cohort study. Ther Adv Psychopharmacol. 2024 Dec 1;14:20451253241232563.
156. Bright S, Milroy J, Walsh K, Blatchford E. Medication use among older Australians seeking alcohol and other drug treatment. Australas J Ageing. 2020 Sep;39(3):287–91.
157. Alrawiai S. Deprescribing, shared decision-making, and older people: perspectives in primary care. J Pharm Policy Pract. 2023 Nov 27;16(1):153.
158. Bruyère Research Institute. Shared Decision-Making in Medication Management: A Guide for Long-Term Care [Internet]. Available from: https://deprescribing.org/wp-content/uploads/2021/07/SDM-Medication-Management-Plain-language-process-guide-July-6-2021.pdf
159. RACGP - Deprescribing [Internet]. [cited 2025 Jun 19]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/silver-book/part-a/deprescribing
160. Pharmaceutical Society of Australia. Guidelines for Comprehensive Medication Management Reviews [Internet]. [cited 2025 Jun 19]. Available from: https://my.psa.org.au/s/article/guidelines-for-comprehensive-mmr
161. Akyön ŞH, Sılay K, Thürmann PA. Tools to reduce inappropriate drug use in geriatric patients: PRISCUS 2.0 list updates. Arch Gerontol Geriatr Plus. 2024 Dec 1;1(4):100052.
162. Liu BM, Kouladjian O'Donnell L, Redston MR, Fujita K, Thillainadesan J, Gnjidic D, et al. Association of the Drug Burden Index (DBI) exposure with outcomes: A systematic review. J Am Geriatr Soc. 2024;72(2):589–603.
163. NSW Ministry of Health. Alcohol and other drugs psychosocial interventions: practice guide [Internet]. St Leonards, NSW: NSW Ministry of Health; 2023. Available from: https://www.health.nsw.gov.au/aod/resources/Publications/nsw-health-psychosocial-interventions.pdf
164. AIHW. Australian Institute of Health and Welfare. 2024 [cited 2025 Jun 19]. Alcohol and other drug treatment services in Australia annual report. Available from: https://www.aihw.gov.au/reports/alcohol-other-drug-treatment-services/alcohol-other-drug-treatment-services-australia/contents/treatment-types/counselling
165. Schwenker R, Dietrich CE, Hirpa S, Nothacker M, Smedslund G, Frese T, et al. Motivational interviewing for substance use reduction. Cochrane Database Syst Rev. 2023 Dec 12;12(12):CD008063.
166. Australian Journal of General Practice [Internet]. [cited 2025 Jun 19]. Lifestyle interventions for substance use disorder. Available from: https://www1.racgp.org.au/ajgp/2022/august/lifestyle-interventions-for-substance-use-disorder
167. Alcohol and Drug Foundation. Why older adults have a high risk of alcohol and drug harm and how to support them - Alcohol and Drug Foundation [Internet]. 2025 [cited 2025 Jun 19]. Available from: https://adf.org.au/insights/older-adults-aod-harm/
168. VAADA. Vaada. [cited 2025 Jun 23]. Age-relevant drug and alcohol recovery support for older people. Available from: https://www.vaada.org.au/age-relevant-drug-and-alcohol-recovery-support-for-older-people/
169. Victorian Department of Health. Strengthening lifelong Aboriginal health and wellbeing of Aboriginal Victorians through access to early intervention and holistic care | health.vic.gov.au [Internet]. [cited 2025 Jun 23]. Available from: https://www.health.vic.gov.au/aboriginal-health/strengthening-lifelong-aboriginal-health-and-wellbeing-of-aboriginal-victorians
170. Australian NSP Survey National Data Report 2019 – 2023 | Kirby Institute [Internet]. [cited 2025 Jun 23]. Available from: https://www.kirby.unsw.edu.au/research/reports/australian-nsp-survey-national-data-report-2019-2023
171. NCETA - The National Centre for Education and Training on Addiction [Internet]. [cited 2025 Jun 23]. NCETA - The National Centre for Education and Training on Addiction - Alcohol and Drug Use in Ageing Populations. Available from: https://nceta.flinders.edu.au/about-aod/community/alcohol-and-drug-use-ageing-populations
172. de Siqueira Silva Í, de Araújo AJ, Lopes RH, Silva CRDV, Xavier PB, de Figueirêdo RC, et al. Digital home care interventions and quality of primary care for older adults: a scoping review. BMC Geriatr. 2024 Jun 10;24(1):507.
173. Kiluk BD, Benitez B, DeVito EE, Frankforter TL, LaPaglia DM, O'Malley SS, et al. A Digital Cognitive Behavioral Therapy Program for Adults With Alcohol Use Disorder: A Randomized Clinical Trial. JAMA Netw Open. 2024 Sep 3;7(9):e2435205.

174. Backåberg S, Strandberg S, Freeman G, Katz L, Rafiei Milajerdi H, Wylant B, et al. Facilitating co-design among older adults in a digital setting: methodological challenges and opportunities. CoDesign. 2025 Jan 2;21(1):118–35.
175. Gushken F, Costa GPA, Souza A de P, Heringer D, Anand A. Internet-based cognitive behavioral therapy for alcohol use disorder: A systematic review of evidence and future potential. J Subst Use Addict Treat [Internet]. 2025 Apr 1 [cited 2025 Jun 23];171. Available from: https://www.jsatjournal.com/article/S2949-8759(25)00006-2/fulltext
176. Hyland K, Romero D, Andreasson S, Hammarberg A, Hedman-Lagerlöf E, Johansson M. Individual differences in treatment effects of internet-based cognitive behavioral therapy in primary care: a moderation analysis of a randomized clinical trial. Addict Sci Clin Pract. 2025 Feb 14;20(1):17.
177. Australian Institute of Health and Welfare [Internet]. 2022 [cited 2025 Jul 22]. Australian Burden of Disease Study 2022, Summary. Available from: https://www.aihw.gov.au/reports/burden-of-disease/australian-burden-of-disease-study-2022/contents/summary
178. RACGP. Guidelines for preventive activities in general practice, Vision(Red book) [Internet]. [cited 2025 Jun 2]. Available from: https://hw.qld.gov.au/blog/ch-resource/guidelines-for-preventive-activities-in-general-practice-red-book/
179. Australian Government Department of Health and Aged Care. Primary care [Internet]. Australian Government Department of Health and Aged Care; 2025 [cited 2025 Jun 11]. Available from: https://www.health.gov.au/topics/primary-care
180. Borozan S, Kamrul-Hasan ABM, Pappachan JM. Hormone replacement therapy for menopausal mood swings and sleep quality: The current evidence. World J Psychiatry. 2024 Oct 19;14(10):1605–10.
181. Whitson HE, Cronin-Golomb A, Cruickshanks KJ, Gilmore GC, Owsley C, Peelle JE, et al. American Geriatrics Society and National Institute on Aging Bench-to-Bedside Conference: Sensory Impairment and Cognitive Decline in Older Adults. J Am Geriatr Soc. 2018 Nov;66(11):2052–8.
182. RACGP - Brain health, cognition and dementia [Internet]. [cited 2025 Jun 2]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/national-guide/the-health-of-older-people/brain-health-cognition-and-dementia
183. Fiske M, Moen A, Mdala I, Straand J. Malnutrition and Polypharmacy in Older Adult Patients Receiving Home Care Nursing Services: A Cross-sectional Study. J Am Med Dir Assoc. 2024 Mar;25(3):526–31.
184. Lung Foundation Australia. COPD-X Plan Guidelines | COPD-X [Internet]. 2024 [cited 2025 Jun 2]. Available from: https://copdx.org.au/copd-x-plan/
185. AIHW. Australian Institute of Health and Welfare. 2024 [cited 2025 Jun 23]. Heart, stroke and vascular disease: Australian facts, Summary. Available from: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/hsvd-facts/contents/summary
186. Coslov N, Richardson MK, Woods NF. Symptom experience during the late reproductive stage and the menopausal transition: observations from the Women Living Better survey. Menopause N Y N. 2021 Jul 26;28(9):1012–25.
187. Duralde ER, Sobel TH, Manson JE. Management of perimenopausal and menopausal symptoms. BMJ. 2023 Aug 8;382:e072612.
188. Coslov N, Richardson MK, Woods NF. Symptom experience during the late reproductive stage and the menopausal transition: observations from the Women Living Better survey. Menopause N Y N. 2021 Jul 26;28(9):1012–25.
189. Symptoms on the Path to Menopause: Research - Women Living Better [Internet]. 2020 [cited 2025 Jun 16]. Available from: https://womenlivingbetter.org/research-understanding-womens-experience-from-35-55-the-2020-wlb-survey/
190. Santoro N, Epperson CN, Mathews SB. Menopausal Symptoms and Their Management. Endocrinol Metab Clin North Am. 2015 Sep;44(3):497–515.
191. Jean Hailes [Internet]. [cited 2025 May 26]. Creating a healthier future for all women. Available from: https://www.jeanhailes.org.au/
192. RANZCOG. Managing menopausal symptoms. 2020 Sep; Available from: https://ranzcog.edu.au/wp-content/uploads/Managing-Menopausal-Symptoms.pdf
193. Magraith K, Stuckey B. Making choices at menopause. Aust J Gen Pract [Internet]. 2019 [cited 2025 Jul 3]; Available from: https://www1.racgp.org.au/ajgp/2019/july/making-choices-at-menopause
194. Baber RJ, Panay N, Fenton A, IMS Writing Group. 2016 IMS Recommendations on women's midlife health and menopause hormone therapy. Climacteric J Int Menopause Soc. 2016 Apr;19(2):109–50.
195. Chlebowski RT, Aragaki AK. Menopausal Hormone Therapy and Breast Cancer Findings: Clinical Practice Implications. Curr Obstet Gynecol Rep. 2025 Feb 12;14(1):8.

196. Davis SR, Taylor S, Hemachandra C, Magraith K, Ebeling PR, Jane F, et al. The 2023 Practitioner's Toolkit for Managing Menopause. Climacteric. 2023 Nov 2;26(6):517–36.
197. Djapardy V, Panay N. Alternative and non-hormonal treatments to symptoms of menopause. Best Pract Res Clin Obstet Gynaecol. 2022 May 1;81:45–60.
198. Green SM, Donegan E, Frey BN, Fedorkow DM, Key BL, Streiner DL, et al. Cognitive behavior therapy for menopausal symptoms (CBT-Meno): a randomized controlled trial. Menopause N Y N. 2019 Sep;26(9):972–80.
199. Wang H, Wang H, Kwok JYY, Tang S, Sun M. The effectiveness of mindfulness-based interventions on menopausal symptoms: A systematic review and meta-analysis of randomized controlled trials. J Affect Disord. 2025 Jul 15;381:337–49.
200. Daley A, Stokes-Lampard H, Thomas A, MacArthur C. Exercise for vasomotor menopausal symptoms. Cochrane Database Syst Rev. 2014 Nov 28;2014(11):CD006108.
201. Dutoglu E, Soysal P, Smith L, Arik F, Kalan U, Kazancioglu RT, et al. Nocturia and its clinical implications in older women. Arch Gerontol Geriatr. 2019;85:103917.
202. Komleva Y, Gollasch M, König M. Nocturia and frailty in older adults: a scoping review. BMC Geriatr. 2024 Jun 6;24(1):498.
203. Pedler K, Rashid P. Nocturia A guide to assessment and management. Aust Fam Physician [Internet]. 2012 [cited 2025 Jul 3]; Available from: https://www.racgp.org.au/afp/2012/june/nocturia-a-guide-to-assessment-and-management
204. Bower W, Everaert K, Ong T, Ervin C, Norgaard J, Whishaw M. Australian Journal of General Practice. 2018 [cited 2025 May 26]. Questions to ask a patient with nocturia. Available from: https://www1.racgp.org.au/ajgp/2018/july/questions-to-ask-a-patient-with-nocturia
205. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 Jun 25]. Chronic musculoskeletal conditions : Osteoporosis and minimal trauma fractures. Available from: https://www.aihw.gov.au/reports/chronic-musculoskeletal-conditions/osteoporosis
206. Healthy Bones Australia [Internet]. 2025 [cited 2025 Jun 25]. Osteoporosis Prevention - Healthy Bones for Life without Fracture. Available from: https://healthybonesaustralia.org.au/
207. Wong P, Chen W, Ewald D, Girgis C, Rawlin M, Tsingos J, et al. 2024 Royal Australian College of General Practitioners and Healthy Bones Australia guideline for osteoporosis management and fracture prevention in postmenopausal women and men over 50 years of age. Med J Aust. 2025 May 19;222(9):472–80.
208. Hejazi K, Askari R, Hofmeister M. Effects of physical exercise on bone mineral density in older postmenopausal women: a systematic review and meta-analysis of randomized controlled trials. Arch Osteoporos. 2022 Jul 27;17(1):102.
209. Falls prevention | International Osteoporosis Foundation [Internet]. [cited 2025 Jul 3]. Available from: https://www.osteoporosis.foundation/health-professionals/fragility-fractures/falls-prevention
210. Cornelissen D, de Kunder S, Si L, Reginster JY, Evers S, Boonen A, et al. Interventions to improve adherence to anti-osteoporosis medications: an updated systematic review. Osteoporos Int J Establ Result Coop Eur Found Osteoporos Natl Osteoporos Found USA. 2020 Sep;31(9):1645–69.
211. Shu ADH, Stedman MR, Polinski JM, Jan SA, Patel M, Truppo C, et al. Adherence to Osteoporosis Medications After Patient and Physician Brief Education: Post Hoc Analysis of a Randomized Controlled Trial. Am J Manag Care. 2009 Jul;15(7):417–24.
212. Nielsen D, Ryg J, Nielsen W, Knold B, Nissen N, Brixen K. Patient education in groups increases knowledge of osteoporosis and adherence to treatment: A two-year randomized controlled trial. Patient Educ Couns. 2010 Nov 1;81(2):155–60.
213. Laird C, Benson H, Williams KA. Pharmacist interventions in osteoporosis management: a systematic review. Osteoporos Int. 2023 Feb 1;34(2):239–54.
214. RACGP. RACGP - Osteoporosis risk assessment, diagnosis and management flow chart [Internet]. 2024 [cited 2025 Jun 25]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/osteoporosis/osteoporosis-risk-assess-diagnosis-and-management
215. Healthy Bones Australia. Fact sheets [Internet]. 2025. Available from: https://healthybonesaustralia.org.au/resource-hub/fact-sheets/
216. de Melo L, Hunter D, Fortington L, Peeters A, Seward H, Vertullo C, et al. Australian Journal of General Practice. 2020 [cited 2025 Jun 25]. National Osteoarthritis Strategy brief report: Prevention of osteoarthritis. Available from: https://www1.racgp.org.au/ajgp/2020/may/national-osteoarthritis-strategy

217. ACI Musculoskeletal Network. Musculoskeletal Network: Osteoarthritis Chronic Care Program model of care. Chatswood, N.S.W.: Agency for Clinical Innovation; 2012.
218. Arthritis Australia [Internet]. [cited 2025 Jun 25]. Home page. Available from: https://arthritisaustralia.com.au/
219. RACGP. RACGP - Guideline for the management of knee and hip osteoarthritis [Internet]. 2018 [cited 2025 Jun 25]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/knee-and-hip-osteoarthritis
220. Healthy Weight for Life. Healthy Weight For Life. [cited 2025 Jun 25]. Healthy Weight For Life. Available from: https://healthyweightforlife.com.au/
221. The Arthritis Movement. About us [Internet]. 2025. Available from: https://www.arthritis.org.au/about-us/
222. Kim DH, Rockwood K. Frailty in Older Adults. N Engl J Med. 2024 Aug 7;391(6):538–48.
223. Veronese N, Pilotto A. The Importance of Multidimensional Frailty in Clinical Practice. J Clin Med. 2024 Dec 16;13(24):7645.
224. Gordon EH, Hubbard RE. Frailty: understanding the difference between age and ageing. Age Ageing. 2022 Aug 2;51(8):afac185.
225. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 Jun 23]. Injury in Australia: Falls. Available from: https://www.aihw.gov.au/reports/injury/falls
226. Australian Frailty Network [Internet]. [cited 2025 Jun 23]. What is frailty? Available from: https://www.afn.org.au/what-is-frailty/
227. Sherrington C, Fairhall NJ, Wallbank GK, Tiedemann A, Michaleff ZA, Howard K, et al. Exercise for preventing falls in older people living in the community. Cochrane Database Syst Rev. 2019 Jan 31;1(1):CD012424.
228. Primary Health Network [Internet]. [cited 2025 Jun 23]. Early Intervention Pilot Program Targets Frailty Among Aging Population. Available from: https://thephn.com.au/news/early-intervention-pilot-program-targets-frailty-among-aging-population
229. Primary Health Network [Internet]. [cited 2025 Jun 23]. PHN Launches Frailty Early Intervention Program. Available from: https://thephn.com.au/news/phn-launches-frailty-early-intervention-program
230. New Edge Performance [Internet]. [cited 2025 Jun 23]. Still Standing. Available from: https://www.newedgeperformance.com.au/stillstanding
231. Australian Bureau of Statistics. National Health Survey, 2022 [Internet]. 2024 [cited 2025 Jun 23]. Available from: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey/latest-release
232. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. Nat Rev Nephrol. 2020 Apr;16(4):223–37.
233. Ghodeshwar GK, Dube A, Khobragade D. Impact of Lifestyle Modifications on Cardiovascular Health: A Narrative Review. Cureus. 15(7):e42616.
234. The Heart Foundation. Walking Wins: the next big step in fight against heart disease [Internet]. [cited 2025 Jun 23]. Available from: https://www.heartfoundation.org.au/media-releases/walking-wins-the-next-step-in-fight-against-heart-disease
235. Walking Wins - Heart Foundation Walking [Internet]. [cited 2025 Jun 23]. Available from: https://campaign.heartfoundation.org.au/walking-wins
236. Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, et al. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. N Engl J Med. 2001 Jan 4;344(1):3–10.
237. Soltani S, Chitsazi MJ, Salehi-Abargouei A. The effect of dietary approaches to stop hypertension (DASH) on serum inflammatory markers: A systematic review and meta-analysis of randomized trials. Clin Nutr Edinb Scotl. 2018 Apr;37(2):542–50.
238. The DASH Meal Plan | Heart Smart Australia [Internet]. 2022 [cited 2025 Jun 23]. Available from: https://www.miyagi.coach/blog/dash-meal-plan-healthy-eating-to-lower-your-blood-pressure/
239. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 Jun 25]. Older Australians, Health – selected conditions. Available from: https://www.aihw.gov.au/reports/older-people/older-australians/contents/health/health-disability-status
240. Kiely K, Anstey K. Putting age-related hearing loss on the public health agenda in Australia. Public Health Res Pr [Internet]. 2021 Dec 2 [cited 2025 Jun 25]; Available from: https://www.phrp.com.au/issues/december-2021-volume-31-issue-5/putting-age-related-hearing-loss-on-the-public-health-agenda-in-australia/

241. RACGP. Guidelines for preventive activities in general practice, Hearing [Internet]. [cited 2025 Jun 25]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/miscellaneous/hearing
242. Sternasty K, Dhar S. Barriers to Hearing Aid Adoption Run Deeper Than the Price Tag. JAMA Otolaryngol--Head Neck Surg. 2021 Jun 1;147(6):498–9.
243. Bothe E, Bennett ,Rebecca J., Sherman ,Kerry A., Timmer ,Barbra H. B., Myers ,Bronwyn, and Ferguson MA. “I feel a little bit clueless” perceived barriers and enablers to help-seeking and informed decision-making in hearing care: a qualitative study. Int J Audiol. 0(0):1–10.
244. Alcido. Forbes Health. 2024 [cited 2025 Jun 25]. Forbes Health Survey: Nearly Half Of People With Hearing Loss Believe There Is A Hearing Aid Stigma. Available from: https://www.forbes.com/health/hearing-aids/hearing-aids-stigma-survey/
245. Hearing Australia - General Practitioners Guide - Hearing Australia [Internet]. [cited 2025 Jun 25]. Available from: https://www.hearing.com.au/health-professionals/general-practitioners/
246. Vision Australia | Vision Australia. Blindness and low vision services [Internet]. [cited 2025 Jun 25]. Available from: https://www.visionaustralia.org/
247. Easton G, Leverton T. Supporting adults with hearing loss in primary care: new NICE guideline. Br J Gen Pract. 2018 Nov;68(676):516–7.
248. Able Australia. Ageing and Dual Sensory Loss [Internet]. 2019. Available from: https://ableaustralia.org.au/wp-content/uploads/2019/12/Ageing_Dual_Sensory_2019.pdf
249. AIHW. Australian Institute of Health and Welfare. 2024 [cited 2025 Jun 24]. Chronic respiratory conditions: Chronic obstructive pulmonary disease. Available from: https://www.aihw.gov.au/reports/chronic-respiratory-conditions/copd
250. Australian Commission on Safety and Quality in Health Care. Chronic Obstructive Pulmonary Disease Clinical Care Standard 2024. 2024 Oct.
251. COPD Foundation. Quitting Smoking [Internet]. 2021 [cited 2025 Jun 24]. Available from: https://www.copdfoundation.org/Learn-More/I-am-New-to-COPD/Quitting-Smoking.aspx
252. NSW Health. Chronic obstructive pulmonary disease (COPD) [Internet]. 2024 [cited 2025 Jun 25]. Available from: https://www.health.nsw.gov.au:443/lumos/Pages/chronic-obstructive-pulmonary-disease.aspx
253. Australian Government Department of Health D and A. National Dementia Action Plan 2024–2034 [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Jun 26]. Available from: https://www.health.gov.au/our-work/national-dementia-action-plan
254. Australian Institute of Health and Welfare. Dementia in Australia [Internet]. 2024 [cited 2025 Jun 26]. Available from: https://www.aihw.gov.au/reports/dementia/dementia-in-aus/contents/about
255. Livingston G, Sommerlad A, Orgeta V, Costafreda SG, Huntley J, Ames D, et al. Dementia prevention, intervention, and care. Lancet Lond Engl. 2017 Dec 16;390(10113):2673–734.
256. Lipnicki DM, Crawford J, Kochan NA, Trollor JN, Draper B, Reppermund S, et al. Risk Factors for Mild Cognitive Impairment, Dementia and Mortality: The Sydney Memory and Ageing Study. J Am Med Dir Assoc. 2017 May 1;18(5):388–95.
257. Dyer SM, Laver K, Pond CD, Cumming RG, Whitehead C, Crotty M. Clinical practice guidelines and principles of care for people with dementia in Australia. Aust Fam Physician. 2016 Dec;45(12):884–9.
258. Fernandes B, Goodarzi Z, Holroyd-Leduc J. Optimizing the diagnosis and management of dementia within primary care: a systematic review of systematic reviews. BMC Fam Pract. 2021 Aug 11;22:166.
259. Blondell SJ, Hammersley-Mather R, Veerman JL. Does physical activity prevent cognitive decline and dementia?: A systematic review and meta-analysis of longitudinal studies. BMC Public Health. 2014 May 27;14:510.
260. Iso-Markku P, Kujala UM, Knittle K, Polet J, Vuoksimaa E, Waller K. Physical activity as a protective factor for dementia and Alzheimer’s disease: systematic review, meta-analysis and quality assessment of cohort and case–control studies. Br J Sports Med. 2022 Jun;56(12):701–9.
261. Martínez-Lapiscina EH, Clavero P, Toledo E, Estruch R, Salas-Salvadó J, San Julián B, et al. Mediterranean diet improves cognition: the PREDIMED-NAVARRA randomised trial. J Neurol Neurosurg Psychiatry. 2013 Dec;84(12):1318–25.
262. Wu L, Sun D. Adherence to Mediterranean diet and risk of developing cognitive disorders: An updated systematic review and meta-analysis of prospective cohort studies. Sci Rep. 2017 Jan 23;7:41317.
263. Li L, Zheng X, Ma H, Zhu M, Li X, Feng X. Correlation of cognitive impairment with Mediterranean diet and mortality: a prospective cohort study. Front Aging Neurosci. 2025 Apr 9;17:1556608.

264. Livingston G, Huntley J, Sommerlad A, Ames D, Ballard C, Banerjee S, et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. The Lancet. 2020 Aug 8;396(10248):413–46.
265. Brain J, Alshahrani M, Kafadar AH, Tang EY, Burton E, Greene L, et al. Temporal dynamics in the association between depression and dementia: an umbrella review and meta-analysis. eClinicalMedicine [Internet]. 2025 Jun 1 [cited 2025 Jun 30];84. Available from: https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(25)00198-1/fulltext
266. Ownby RL, Crocco E, Acevedo A, John V, Loewenstein D. Depression and risk for Alzheimer disease: systematic review, meta-analysis, and metaregression analysis. Arch Gen Psychiatry. 2006 May;63(5):530–8.
267. RACGP. Guidelines for preventive activities in general practice: Mental health and substance use [Internet]. [cited 2025 Sep 23]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/mental-health
268. Kuiper JS, Zuidersma M, Oude Voshaar RC, Zuidema SU, van den Heuvel ER, Stolk RP, et al. Social relationships and risk of dementia: A systematic review and meta-analysis of longitudinal cohort studies. Ageing Res Rev. 2015 Jul;22:39–57.
269. Livingston G, Sommerlad A, Orgeta V, Costafreda SG, Huntley J, Ames D, et al. Dementia prevention, intervention, and care. The Lancet. 2017 Dec;390(10113):2673–734.
270. RACGP aged care clinical guide (Silver Book) - Part A - Frailty | Aged Care Quality and Safety Commission [Internet]. [cited 2025 Jun 23]. Available from: https://www.agedcarequality.gov.au/quality-standards/racgp-aged-care-clinical-guide-silver-book-part-frailty
271. Peters R, Beckett N, Forette F, Tuomilehto J, Clarke R, Ritchie C, et al. Incident dementia and blood pressure lowering in the Hypertension in the Very Elderly Trial cognitive function assessment (HYVET-COG): a double-blind, placebo-controlled trial. Lancet Neurol. 2008 Aug;7(8):683–9.
272. McGuinness B, O'Hare J, Craig D, Bullock R, Malouf R, Passmore P. Statins for the treatment of dementia. Cochrane Database Syst Rev. 2010 Aug 4;(8):CD007514.
273. Luxton D, Thorpe N, Crane E, Warne M, Cornwall O, El-Dalil D, et al. Systematic review of the efficacy of pharmacological and non-pharmacological interventions for improving quality of life of people with dementia. Br J Psychiatry J Ment Sci. 2025 Apr 1;1–13.
274. Valenzuela MJ, Sachdev P. Brain reserve and dementia: a systematic review. Psychol Med. 2006 Apr;36(4):441–54.
275. Paggetti A, Druda Y, Sciancalepore F, Della Gatta F, Ancidoni A, Locuratolo N, et al. The efficacy of cognitive stimulation, cognitive training, and cognitive rehabilitation for people living with dementia: a systematic review and meta-analysis. GeroScience. 2024 Nov 1;47(1):409–44.
276. Ngandu T, Lehtisalo J, Solomon A, Levälahti E, Ahtiluoto S, Antikainen R, et al. A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at-risk elderly people (FINGER): a randomised controlled trial. Lancet Lond Engl. 2015 Jun 6;385(9984):2255–63.
277. Livingston G, Huntley J, Sommerlad A, Ames D, Ballard C, Banerjee S, et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. The Lancet. 2020 Aug;396(10248):413–46.
278. Anstey KJ, Bahar-Fuchs A, Herath P, Kim S, Burns R, Rebok GW, et al. Body brain life: A randomized controlled trial of an online dementia risk reduction intervention in middle-aged adults at risk of Alzheimer's disease. Alzheimers Dement N Y N. 2015 Jun;1(1):72–80.
279. McMaster M, Kim S, Clare L, Torres SJ, D'Este C, Anstey KJ. Body, Brain, Life for Cognitive Decline (BBL-CD): protocol for a multidomain dementia risk reduction randomized controlled trial for subjective cognitive decline and mild cognitive impairment. Clin Interv Aging. 2018;13:2397–406.
280. Radford K, Allan W, Donovan T, Delbaere K, Garvey G, Broe G, et al. Sharing the Wisdom of our Elders - Understanding and Promoting Healthy Ageing with Older Aboriginal and Torres Strait Islander Australians - Compass [Internet]. [cited 2025 Jul 1]. Available from: https://www.compass.info/resources/resource/sharing-the-wisdom-of-our-elders-understanding-and-promoting-healthy-ageing-with-older-aboriginal-and-torres-strait-islander-australians/
281. The Koori Growing Old Well Study: investigating aging and dementia in urban Aboriginal Australians - ScienceDirect [Internet]. [cited 2025 Jul 1]. Available from: https://www.sciencedirect.com/science/article/pii/S1041610224002990?via%3Dihub
282. Healthline [Internet]. 2017 [cited 2025 Jul 1]. The MIND Diet. Available from: https://www.healthline.com/nutrition/mind-diet

283. Morris MC, Tangney CC, Wang Y, Sacks FM, Barnes LL, Bennett DA, et al. MIND diet slows cognitive decline with aging. Alzheimers Dement J Alzheimers Assoc. 2015 Sep;11(9):1015–22.
284. Hosking DE, Eramudugolla R, Cherbuin N, Anstey KJ. MIND not Mediterranean diet related to 12-year incidence of cognitive impairment in an Australian longitudinal cohort study. Alzheimers Dement J Alzheimers Assoc. 2019 Apr;15(4):581–9.
285. Arjmand G, Abbas-Zadeh M, Eftekhari MH. Effect of MIND diet intervention on cognitive performance and brain structure in healthy obese women: a randomized controlled trial. Sci Rep. 2022 Feb 21;12:2871.
286. Holthaus TA, Kashi M, Cannavale CN, Edwards CG, Aguiñaga S, Walk ADM, et al. MIND Dietary Pattern Adherence Is Selectively Associated with Cognitive Processing Speed in Middle-Aged Adults. J Nutr. 2023 Jan 14;152(12):2941–9.
287. Godbee K, Palmer VJ, Gunn JM, Lautenschlager NT, Francis JJ. Supporting primary care practitioners to promote dementia risk reduction in Australian general practice: outcomes of a cross-sectional, non-randomised implementation pilot study. Aust J Prim Health [Internet]. 2024 Sep 30 [cited 2025 Jul 1];30(5). Available from: https://www.publish.csiro.au/py/PY24063
288. RACGP. Mental health and substance use; Depression.
289. Dementia Australia. Dementia information and education sessions | [Internet]. [cited 2025 May 20]. Available from: https://www.dementia.org.au/get-support/dementia-information-and-education-sessions
290. Guideline Adaptation Committee. Clinical Practice Guidelines and Principles of Care for People with Dementia. NHMRC Partnership Centre for Dealing with Cognitive and Related Functional Decline in Older People; 2016 Feb.
291. Cognitive Decline Partnership Centre. About us [Internet]. 2025. Available from: https://cdpc.sydney.edu.au/
292. Travers C, Martin-Khan M, Lie D. Barriers and enablers of health promotion, prevention and early intervention in primary care: Evidence to inform the Australian national dementia strategy. Australas J Ageing. 2009;28(2):51–7.

Chapter 5: Integrating technology in prevention and care for healthy ageing

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Background

This chapter reviews published evidence on the role of technology in supporting coordinated, person-centred primary care, particularly in the context of healthy ageing and reports on relevant emerging technologies. While the focus is primarily on digital health technologies, it also acknowledges broader technological innovations that support care integration and system improvement. It explores five interconnected domains: empowering individuals, enhancing team-based care, practice-level improvement, moving from practice to population and integrating digital health. These sections present insights from the literature on how technology and digital tools can strengthen care delivery across multiple levels of the health system.

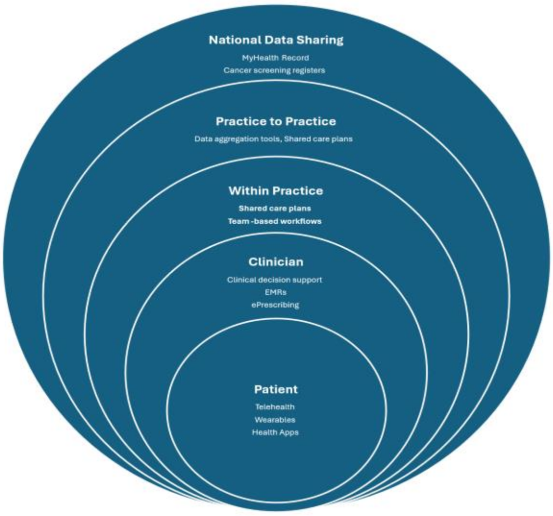
Co-designing digital health tools with consumers, particularly older people and their carers, ensures that technology meets real-world needs. Embedding lived experience perspectives from the outset helps improve usability, trust, and uptake, especially among those with low digital literacy, complex health conditions, or diverse cultural needs (1,2).

The chapter draws on peer-reviewed and authoritative sources to demonstrate the potential of digital tools throughout the care continuum. In some cases, emerging or commercial technologies are mentioned to offer additional context or help clinicians access further information. This chapter is divided into three parts:

- **Part 1** of this chapter describes the current needs and challenges related to sharing information in modern primary health care.
- **Part 2** reviews the literature on digital technologies for promoting healthy ageing in primary care as it applies to the care of older patients.
- **Part 3** describes recent digital health tools, products, and enabling technologies that are being applied or have potential to be applied in primary health care, with relevance to multidisciplinary care, health promotion, disease prevention and effective care.

Fig. 5.1 illustrates the relationship of digital technology to health care from the individual patient level through to national population health information and application and also illustrates the review of literature and emerging technologies in this chapter.

Figure 5.1. Enabling Connected Care: Technology Across the Continuum



Part 1: Challenges in information sharing in complex health care

Preventive and proactive primary care is essential for fostering and supporting healthy ageing. Care coordination and continuity of care, built on person-centred care, patient engagement and empowerment, are increasingly recognised as necessary for optimal treatment, management and support of health conditions as people age. Each of these aspects of primary health care depends on the timely provision of shared health information within primary care settings and with other healthcare providers. However, across Australia, evidence shows that care remains fragmented and gaps in sharing health information between professionals continue to limit patient care coordination, quality and safety (3).

The Australian Institute of Health and Welfare (AIHW) has reported that nearly one in four patients aged 45 and over reported that their general practitioner (GP) or usual place of care was not informed of their recent visit to the emergency department. Fourteen percent of hospitalised patients indicated that their follow-up care needs were not adequately communicated to their GP or primary care team (4). These breakdowns disrupt continuity, place additional burdens on patients to act as intermediaries and increase the risk of suboptimal care.

These issues are more pronounced in remote and very remote areas, where patients more often report that their GP was unaware of specialist consultations, hospital admissions or changes to medication. High staff turnover, limited provider availability and reliance on fly-in, fly-out services further exacerbate the communication gap. Allied health professionals who play an essential role in multidisciplinary care are not always required to report to GPs unless part of a formal Medicare-funded plan. As a result, many aspects of care remain siloed and patients frequently bear the responsibility of coordinating their health records (4).

While national digital platforms like My Health Record aim to support continuity of care, inconsistent provider engagement limits their effectiveness. This often means patients must repeat their medical history at each new encounter, contributing to inefficiencies, duplicated efforts, and a fragmented care experience (5). Survey data also reinforce concerns around uneven delivery of patient-centred care. More than one-quarter of patients did not share their health information with their GP. Individuals who consulted naturopaths, osteopaths or acupuncturists rated their GP consultations lower in patient-centredness, expressing a desire for care that recognised the underlying causes of their conditions and respected their preferences and lived experience (5).

As rates of chronic disease, multimorbidity and complex health conditions continue to rise, particularly among older Australians, addressing these gaps in care coordination is increasingly important. High-quality, person-centred care depends on timely access to relevant information, strong communication between providers and active participation by patients in decisions about their care. Without these elements, opportunities for prevention, early intervention and coordinated management are often missed (4).

Development of digital technologies used in primary care

The literature on emerging digital technologies in the care of older people in Australian primary care settings describes a digital health development timeline from foundational explorations of telehealth and electronic health records (EHRs) to sophisticated integrations of artificial intelligence (AI) and data-driven care coordination.

Early studies focused on the feasibility and opportunities of telehealth and electronic frailty indexes, while the COVID-19 pandemic accelerated the adoption and evaluation of virtual care models. Recent research emphasises user experience, integration challenges, ethical considerations and the potential of AI-driven solutions to enhance personalised care. Policy frameworks and multi-stakeholder collaborations are increasingly supporting the scaling and sustainability of these digital interventions.

Partnering with consumers as co-creators, not just end-users, enables digital health innovations that are both clinically relevant and personally meaningful. For example, co-designing telehealth platforms with older adults has led to better accessibility features and increased engagement (1,6).

Table 5.1. Emerging digital technologies in older people care

Year Range	Research Focus	Description
2004–2013	Foundational ICT and telehealth exploration	Initial studies examined the potential of information and communication technologies and telehealth in improving healthcare access, particularly through video consultations and electronic health initiatives in primary care. Emphasis was on overcoming geographic and mobility barriers for older adults and exploring impacts on traditional care relationships.
2017–2019	Electronic Health Records and Frailty identification	Research focused on the feasibility of deriving electronic frailty indexes from primary care records and implementing centralised client management systems to support aged care service integration. These studies highlighted data quality challenges, workflow adaptations, and the role of ICT in improving care coordination and efficiency.
2020–2021	COVID-19 driven telehealth expansion and digital intervention adoption	The onset of the pandemic catalysed rapid telehealth adoption across primary care, leading to qualitative assessments of provider adaptability, sustainability challenges, and early digital interventions to promote care coordination. Emphasis was placed on system readiness and addressing barriers such as digital literacy and technology access among older adults.
2022	Broad expansion into digital health tools, AI, and data platforms	A surge in research investigated diverse digital health technologies, including AI applications in diagnosis and care management, linked EHR data platforms, shared care digital ecosystems, and digital cognitive screening tools. Studies addressed implementation challenges, patient engagement and the impact of digital tools on quality and integration of care.
2023–2024	Advanced integration, user experience and ethical implications	Recent works explore the prioritisation of virtual care initiatives, emphasising telehealth and remote monitoring, alongside challenges such as data sharing, platform usability and digital literacy. Increasing focus on ethical considerations, AI's transformative role, and tailored digital interventions for frailty and chronic conditions. Stakeholder perspectives and co-design approaches inform policy and sustainability efforts in Australian primary care.

Uptake of digital technology in Australian primary health care

The use of digital technologies in primary care in Australia is advanced. Almost 87% of general practitioners have reported full clinical digitalisation and 98% regularly use desktop computers (7).

Additionally, uptake of the Australian Government-supported platform for electronic prescriptions (eScripts) in primary health care is increasing despite some barriers (8). Whilst electronic prescribing was widely promoted during the COVID-19 pandemic to maintain access for patients, the aims of electronic prescribing include convenience and choice for patients, as well as greater efficiency and improved safety in prescribing and dispensing medications (9). A small qualitative study of GPs and community pharmacists has reported that convenience for both health professionals and patients, as well as a simpler process, were strengths of the electronic prescription platform. However, reluctance among some health professionals and patients to change, as well as perceived loss of opportunities for best practice care, were identified as barriers (8).

Digital technologies are increasingly recognised for their ability to promote independence, enable timely intervention, improve care coordination and enhance health literacy among older adults (10,11). These tools support more person-centred, integrated models of care aligned with the WHO's Healthy Ageing Framework and Australia's National Preventive Health Strategy (12,13).

The literature encompasses a range of technologies, including wearable devices, telehealth platforms, EHRs, predictive analytics and shared care tools. Each of these is relevant to strengthening the role of primary care in managing chronic conditions, preventing functional decline and supporting ageing in place. However, consistent barriers, including digital health literacy, system interoperability, and access disparities, are also identified, particularly affecting older adults in rural, remote, and lower socioeconomic communities (14,15).

Key enablers and implementation considerations

Literature consistently calls for implementation strategies grounded in co-design, equity and continuous quality improvement. Key enablers include:

- **Training and digital literacy:** Health professionals and patients require support to confidently use digital health tools (15).
- **Interoperability**: Seamless information sharing between systems remains a significant barrier and opportunity, with initiatives such as Sparked (Australia's first ‘Fast Healthcare Interoperability Resources’ accelerator) aiming to establish consistent standards (16).
- **Privacy and governance**: Protecting sensitive health information remains a cornerstone of building public trust in digital health. National legislation and privacy frameworks must continue to safeguard data while enabling responsible sharing between providers to support more coordinated care (17).
- **Sustainable funding**: Digital health infrastructure requires stable, long-term funding. Investment in system upgrades, workforce development and innovation is critical to embedding digital tools into routine care and scaling their use to improve access and outcomes (18).

Digital health offers significant potential to enhance healthy ageing by improving access to care, enabling earlier intervention and supporting more personalised and team-based approaches within primary care. The Digital Health Blueprint 2023–2033 emphasises the need for cross-sector partnerships, bringing together Government, clinicians, industry, and consumers, to create a connected and responsive health system that supports older Australians at every stage of their care journey (19).

Part 2: Digital technologies for promotion of healthy ageing in primary care

This section provides an overview of the literature on the application of different types of emerging digital technologies relevant to the care of older people in Australia in primary care settings. This review aimed to taxonomise digital technologies, assess contemporary evidence on the benefits and challenges of telehealth and AI, identify adoption barriers and user experiences, synthesise the impacts on care coordination and outcomes, and benchmark integration strategies and policies. A systematic analysis of Australian studies employing qualitative, quantitative and mixed methods was conducted, focusing on primary care contexts and interdisciplinary collaboration.

Diverse technologies include telehealth, EHRs, AI, and remote monitoring, with telehealth and EHRs being the most prevalent. Adoption barriers encompass digital literacy deficits, sensory impairments, privacy concerns, and infrastructural limitations, while facilitators include co-design, training, and policy support.

Evidence suggests improved care coordination, access, and patient satisfaction, although long-term clinical outcomes and scalability remain under-evaluated. Integration success depends on organisational readiness, interoperability and sustainable funding. Inequities persist across rural and socioeconomically disadvantaged populations.

Lived experience feedback has identified that older Australians and their carers value the transparency My Health Record offers but often require clearer onboarding, better language accessibility, and tailored support. Ongoing co-design with consumers is critical to refining platform usability and ensuring equity in access (20).

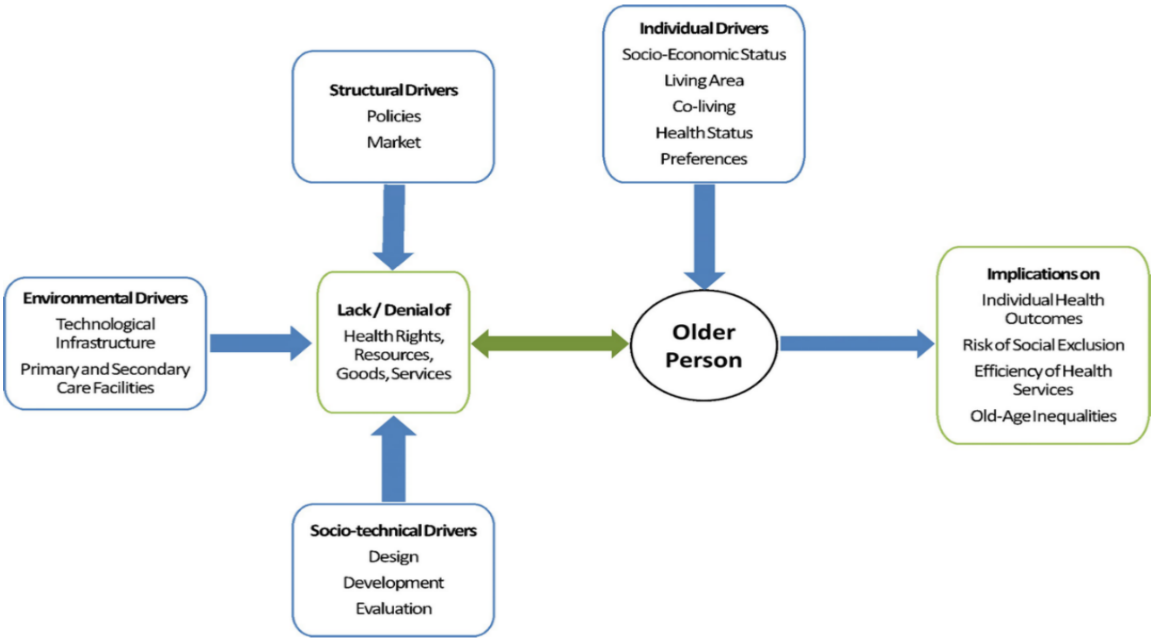
The study of emerging digital technologies for aged care in Australia has become a critical research priority, driven by a rapidly ageing population and the rising prevalence of complex chronic diseases. (7,21). Over the past decade, digital health innovations such as telehealth, EHRs and remote monitoring have evolved from niche applications to integral components of primary care delivery (22) (23). The COVID-19 pandemic accelerated this transformation, prompting widespread adoption of virtual care modalities to maintain service continuity while minimising infection risks (24,25). This shift holds significant practical implications, as approximately 34% of GP consultations transitioned to telehealth during the pandemic, highlighting the potential for sustained integration of digital solutions in primary care (25). Moreover, digital technologies promise to enhance accessibility, coordination and quality of care for older adults, a population often facing mobility and geographic barriers (22,26).

Emerging evidence suggests that older people’s positive telehealth experiences are strongly linked to services co-designed with their input, including support for hearing or cognitive impairment, interpreter services, and trusted carer involvement (27,28).

Despite these advances, challenges remain in understanding the effectiveness, acceptability, and equitable implementation of digital technologies tailored to older adults within Australian primary care settings (21,29,30). Existing literature reveals a knowledge gap regarding the breadth of digital interventions currently in use, their impact on care coordination, and the barriers faced by older users, including digital literacy and sensory impairments (21,24,31). Controversies persist around the digital divide, with some studies emphasising technology’s potential to reduce health disparities, while others caution that inadequate infrastructure and user support may exacerbate inequities (24,32,33). Additionally, the integration of AI and electronic frailty indices into primary care remains underexplored, despite their promise for personalised and proactive care (34–36). The consequences of these gaps include suboptimal adoption of digital tools and missed opportunities to improve health outcomes for older Australians (29,30).

This chapter adopts the conceptual framework from Poli et al (Figure 5.2) (37) integrating digital health technologies, primary care delivery and geriatric care principles to examine how emerging digital tools support older adults in primary care settings (31,38,39).

Figure 5.27. Receiving Care Through Digital Health Technologies: Drivers and Implications of Old-Age Digital Health Exclusion



Digital health encompasses telehealth, eHealth platforms, and AI-driven tools that facilitate communication, monitoring and decision-making (34,40). Primary care serves as the frontline for managing chronic conditions and coordinating multidisciplinary care for older adults (31,39). The framework emphasises the interplay between technology usability, care coordination and patient engagement, along with their underlying drivers, to guide a systematic evaluation of digital interventions (31,32).

This review provides an overview of different types of emerging digital technologies employed in the care of older people within Australian primary care settings, focusing on their implementation, challenges and potential for scale-up (21,30). Diverse evidence on telehealth, eHealth, AI and frailty assessment tools, in the context of Australian health care (34,36) is considered and implications for effective digital strategies to enhance care quality and accessibility for older adults are identified (24,26).

This chapter includes peer-reviewed and grey literature from 2010 onwards, with inclusion criteria targeting digital interventions relevant to older adults in primary care (21,30). Analytical frameworks included the World Health Organization's digital health evaluation framework and Donabedian's model of healthcare quality (30,32). Findings from the literature are organised thematically (see Appendix) to elucidate technology types, implementation contexts, user experiences and systemic barriers, providing a comprehensive synthesis to guide practice implementation and research (21,31).

The aim of this chapter is:

- To taxonomise different types of emerging digital technologies currently utilised in Australian primary care for older adults.
- To assess the benefits and challenges associated with telehealth and artificial intelligence applications in geriatric primary care.
- To identify user experiences and barriers influencing the adoption of digital health interventions among older populations.

- To synthesise evidence on the impact of digital technologies on care coordination, patient engagement and health outcomes.
- To benchmark integration strategies and policy frameworks supporting digital health implementation in primary care settings.

The questions leading to the overview of different types of emerging digital technologies in the care of older people in Australia, focusing on primary care settings, were:

- What innovative digital technologies, including artificial intelligence and telehealth, are currently being utilised in the primary care of older adults in Australia, and what are their respective benefits and challenges?
- What are the innovative applications of AI and digital technologies in geriatric care within primary care settings, particularly focusing on their implementation, challenges and benefits for older adults in Australia?
- What are the implications of integrating telehealth and artificial intelligence in enhancing patient engagement and service delivery for older adults in primary care settings across Australia?
- What are the effectiveness, user experiences, and integration challenges of innovative digital technologies, including AI and telehealth, in enhancing the primary care of older adults in Australia?

Integrating digital technologies into primary care - evidence, barriers, and implications for practice

The literature on emerging digital technologies in the care of older people within Australian primary care settings reveals a dynamic and rapidly evolving field marked by significant digital innovation alongside notable challenges. Digital interventions, such as telehealth, AI applications and EHRs, demonstrate potential to enhance care coordination, accessibility and patient engagement. However, the evidence base is often limited by methodological constraints, including a predominance of pilot studies and limited representation of diverse older populations. Additionally, barriers such as technological usability, data integration issues and policy or funding limitations temper the scalability and sustainability of these innovations. The synthesis highlights the critical need for robust, inclusive research designs and systemic approaches to implementation that address both technological and human factors.

Scope and diversity of digital technologies

Literature encompasses a wide range of digital tools including telehealth, AI-driven diagnostics, electronic frailty indices, remote monitoring and integrated EHRs in the care of older people in primary care (24,34,41,42). This diversity allows for tailored interventions targeting various aspects of care such as chronic disease management, cognitive screening and care coordination (31,34,43).

However, many studies focus on pilot or early-stage implementations, and there is limited evidence regarding long-term effectiveness and scalability (21,39). There is also a tendency to prioritise technology development over integration into routine care, with insufficient exploration of interoperability and system-wide adoption (24,39,44).

User experience and adoption barriers

Studies emphasise the importance of user-centred design and co-production with older adults and healthcare providers, which enhances the acceptability and usability of digital interventions (24,26,45). Telehealth and AI applications have demonstrated to improve access and convenience, especially during the COVID-19 pandemic (25,29,46).

Significant barriers persist, including technological literacy, physical and cognitive impairments, and digital divide issues that disproportionately affect vulnerable older adults (14,21,26). Challenges related to data sharing, platform user-friendliness and lack of tailored training for providers and patients impede widespread adoption (24,25,30). The sustainability of telehealth is also constrained by funding models and concerns about maintaining patient-provider relationships (25).

Impact on care coordination and health outcomes

Digital tools, such as shared electronic health records, AI-supported risk stratification, and precision public health interventions, demonstrate potential to improve care coordination, timely access, and personalised care planning (7,34,47). Evidence suggests that telehealth can maintain continuity of care and reduce exposure risks for older adults (29).

The impact on clinical outcomes and health service quality remains mixed and inconclusive, partly due to heterogeneity in study designs and outcome measures (30,39). There is limited robust evidence linking digital interventions directly to improved health outcomes or cost-effectiveness in primary care for older adults (21,39). Data integration challenges and fragmented systems limit the realisation of coordinated care benefits (24,44).

Policy, funding and implementation context

Australian policy initiatives and pandemic-driven funding reforms have accelerated the adoption of digital health, creating a favourable environment for innovation (23,25). Co-designed implementation strategies and participatory research approaches promote alignment with user needs and system priorities (24,45).

Persistent issues include inadequate reimbursement models, lack of standardised regulations, and insufficient infrastructure support, which hinder sustainable integration of digital technologies (25,30,48). The uneven distribution of digital health resources across metropolitan and rural areas exacerbates inequities (24,49). Organisational readiness and workforce digital competencies remain variable, affecting implementation success (44,50).

Ethical, privacy and equity considerations

Some studies acknowledge the importance of ethical data management, privacy protection, and equitable access, emphasising the need for transparent and accountable digital health practices (14,51,52). The involvement of older adults in design processes supports empowerment and dignity (26,52).

Ethical challenges related to data privacy, potential dehumanisation of care and digital exclusion are underexplored and inadequately addressed in many studies (51,52). The digital divide risks exacerbating health disparities among socioeconomically disadvantaged and less digitally literate older adults (14,33). There is a lack of comprehensive frameworks guiding the equitable deployment of digital health in primary care settings (14,51).

Future research directions and knowledge gaps

The literature identifies critical areas for future inquiry, including longitudinal effectiveness studies, evaluation of AI integration and strategies to enhance digital literacy among older adults (14,34,35). Calls for inclusive research designs and stakeholder engagement aim to improve relevance and uptake (24,31,53).

A paucity of high-quality evidence remains on the comparative effectiveness of different digital technologies and their impact on diverse older populations (14). Research often neglects the complex interplay between technology, care processes and social determinants of health (14,30). The need for standardised outcome measures and reporting transparency is unmet (14,34).

Consumer and carer voices must influence the development of the next generation of digital health technologies. This involves engaging them in advisory panels, user-testing prototypes and co-creating ethical governance frameworks. Incorporating lived experience into technology governance promotes person-centred care, protects rights and enhances public trust (54).

Emerging themes identified from the literature

The literature on emerging digital technologies in the care of older people within Australian primary care settings reveals several major themes. Primarily, telehealth and virtual care have been extensively adopted and studied, demonstrating benefits in accessibility and care coordination, while also highlighting challenges such as digital literacy and infrastructure gaps. Electronic Health Records (EHRs) and data integration technologies are emphasised for their role in improving frailty identification and care continuity, though concerns about data privacy and workflow integration persist. Artificial intelligence (AI) and advanced monitoring technologies present promising opportunities, albeit with underexplored implementation barriers and ethical considerations. Overall, user experience, workforce adaptation and policy frameworks emerge as critical cross-cutting factors influencing technology adoption and sustainability.

The following themes emerged from the literature:

Telehealth and virtual care adoption and sustainability

Telehealth has been widely implemented in Australian primary care, especially accelerated by the COVID-19 pandemic, providing increased access and continuity of care for older adults and others. Studies highlight its role in emergency care, chronic disease management and reducing exposure to high-risk settings, though challenges remain regarding funding models, patient-provider communication, and digital literacy barriers among older populations (24,25,29,46,48). Hybrid models combining telehealth with in-person visits are seen as promising for sustainability (25,29).

Electronic Medical Records (EMRs) and Electronic Health Records (EHR)

Electronic Health Records (EHRs) and Electronic Medical Records (EMRs) are often used interchangeably yet differ in scope. EMRs are systems used daily by clinicians to collect, manage and consult patient information in real time to support care delivery (55,56). By contrast, EHRs extend beyond individual providers, enabling interoperability and the secure exchange of health information across multiple care settings (56). EHR systems and linked data platforms facilitate the identification of frailty, improve care coordination and support comprehensive health management for older adults. Research demonstrates the feasibility of deriving electronic Frailty Indexes from routine data and underscores the need for interoperable systems to enable seamless data sharing across care settings (36,41,42,49). Privacy, data quality and workflow compatibility are ongoing concerns affecting implementation (24,26,44).

User experience, digital literacy and adoption barriers

Older adults face specific barriers in adopting digital health technologies due to sensory impairments, cognitive challenges and limited technological skills. Stakeholders advocate for user-friendly designs, co-production in technology development, tailored training and support to enhance acceptance and effective use (21,24,26,31,33). Providers also require adequate training and resources to integrate technologies effectively (25,50).

Artificial Intelligence and advanced digital tools

AI applications in primary care and specialist care, such as geriatric medicine, show potential in diagnostics, tailored care and predictive analytics. These innovations aim to improve patient outcomes while reducing clinician workload. However, widespread clinical implementation remains limited to date, with concerns about ethical implications, data privacy and the need for transparent algorithms (34,35,57). Emerging technologies like remote monitoring and sensor platforms are also promising, achieving data security standards but require further validation and integration strategies to demonstrate their effectiveness (24,58,59).

Care coordination and shared care models enhanced by digital technologies

Digital shared care models that leverage electronic communication, shared care plans, and telehealth enhance collaboration between primary care and specialists. These models address the complexities involved in managing multimorbidity and chronic conditions in older adults, improving access and reducing system burden (7,23,39). Policy and infrastructure support are essential for successful integration (7,30).

Impact of digital technologies on the quality of home-based primary care

Digital interventions in home-based primary care, where primary care services are delivered directly to a person’s home, particularly for individuals with chronic and complex health conditions such as dementia and older adults, have been shown to improve access, patient engagement, and care coordination. Positive outcomes include reduced social isolation and improved mental health, although evidence of a clinical impact on quality of life is mixed. Challenges include technological infrastructure, economic factors and the need for ethical safeguards (32,60–62).

Policy, organisational factors and implementation challenges

Successful integration of digital health into primary care relies on supportive policy frameworks, sustainable funding models and organisational readiness. Challenges such as data sharing barriers, lack of interoperability and misalignment between technology design and clinical workflows impede adoption. Ongoing evaluation and stakeholder engagement are essential for scaling up digital solutions (24,26,30,44).

Ethical, privacy and safety considerations in digital health

Digital health technologies raise important ethical questions related to privacy, data security and the potential for dehumanisation of care. Monitoring technologies and assistive devices pose risks of surveillance and data misuse, emphasising the necessity for robust protection measures and user control over personal data. Safety concerns also include potential harm from technological malfunctions (26,51,52).

Digital cognitive and frailty assessment tools

Digital approaches to cognitive screening and frailty assessment are feasible and acceptable in primary care, enabling earlier detection and monitoring. Self-administered online tools and provider-administered digital tests facilitate routine evaluation, potentially enhancing the timeliness of interventions for older adults (36,43,49).

Workforce adaptation and training for digital care

Healthcare providers require resilience, flexibility and targeted training to effectively adopt digital health technologies. Nursing staff in aged care settings emphasise the need for support to deliver compassionate care within technology-enhanced environments (25,50).

Agreement and divergence across studies

The reviewed literature generally agrees on the growing adoption and potential benefits of diverse digital technologies such as telehealth, electronic health records, AI, and remote monitoring in improving primary care for older Australians. There is consensus on key barriers, including digital literacy, user-friendliness and equitable access, alongside implementation challenges such as data sharing and integration across care settings. However, divergence arises particularly in the extent of evidence supporting clinical effectiveness, the prioritisation of specific technologies (e.g., telehealth vs remote monitoring), and the readiness of healthcare systems and users for widespread adoption. These discrepancies often stem from variations in study design, differences in population focus, and the maturity of technologies evaluated.

Technology uptake and application

Most studies identify telehealth, EHR, AI, remote monitoring and digital health apps as key emerging technologies in Australian primary care for older adults (7,21,24,32). Telehealth is consistently rated highly for scalability and current use (24,25).

Some studies prioritise remote monitoring and AI differently; while remote monitoring is important for managing chronic diseases, it is sometimes deprioritised compared to telehealth due to perceived complexity and costs (24,34,57). The potential of AI application is viewed as promising but still in the early stages (34,35,57).

Variations stem from differences in technology maturity, stakeholder perceptions, and specific care settings (e.g., emergency versus chronic care). Additionally, diverse study aims (e.g., implementation versus effectiveness) also influence the focus.

Adoption barriers and facilitators

Common barriers include digital literacy deficits among older adults, sensory and cognitive impairments affecting usability, infrastructure limitations and lack of integrated data systems (24–

26,32,52). Facilitators involve co-design with end-users, training and hybrid service models combining digital and in-person care (25,26).

Some studies emphasise privacy and security concerns more strongly as barriers, especially with monitoring technologies (24,52), while others note disparities in prioritisation of funding and resource allocation as critical (7,24).

Clinical and patient outcomes

Several studies report that digital interventions, especially telehealth, achieve similar or improved health and behavioural outcomes compared to in-person care and enhance healthcare accessibility (21,29,31,63). Positive impacts include better care coordination, increased patient engagement and improved management of chronic conditions (7,23,32,38).

There is divergence regarding the strength of evidence for long-term clinical outcomes, with some reviews noting a lack of high-quality randomised control trial (RCT) data and unclear impact on quality of life or mortality (7,14,34,64). Some report digital tools do not yet demonstrate significant improvements in clinical endpoints (30,32).

The swift adoption of technologies during the COVID-19 pandemic shortened the timeframes for comprehensive evaluation. Variability in outcome measures and heterogeneity of interventions also contribute to inconsistent results.

Integration and implementation strategies

There is agreement on the importance of integration of health information systems, interoperability and co-production involving older adults and healthcare professionals to support adoption and sustainability (7,24,26,44,45). Emphasis on policy frameworks supporting digital health implementation and funding models is common (7,24,25).

Divergence exists in the readiness of the Australian primary care infrastructure and workforce for digital integration; some highlight successful systems (e.g., carelink+), while others point to persistent fragmentation and workflow mismatches (24,44,45).

Differences stem from study settings (single provider vs. system-wide), a focus on technology versus processes, and stakeholder engagement levels, which influence the success of integration.

User experience and accessibility

There is consensus that usability and ease of use are critical to adoption among older adults and that sensory impairments and cognitive barriers necessitate tailored designs and training (24–26,33). Digital health literacy and trust in technology influence usage patterns (26,33).

Some discrepancies in perceptions of telehealth acceptability exist: while many older adults value telemedicine’s convenience, concerns about loss of face-to-face contact and communication challenges are highlighted (29,31,46). Accessibility issues vary by geography and socio-economic status, with some studies reporting no effect of remoteness on frailty identification, while others emphasise disparities (49).

Variation arises from heterogeneous populations studied (urban vs rural, community vs residential), differing digital platforms used and the timing relative to pandemic shifts in care delivery models.

Theoretical and practical implications

The synthesis of literature highlights the evolving conceptualisation of digital health as a socio-technical system, emphasising the interaction between technology, users, and healthcare contexts. This aligns with theories advocating for co-production and participatory design in digital health innovation, especially for older adults, underscoring the importance of addressing social determinants and user-centred challenges (24,26,52).

Evidence from studies on electronic Frailty Index implementation supports the theoretical framework that frailty can be effectively identified through routinely collected primary care data, reinforcing the validity of data-driven approaches in geriatric assessment and risk stratification (36,49). The integration of AI in primary care and geriatric medicine challenges traditional care models by introducing predictive analytics and decision support, which theoretically expand the scope of personalised and preventive care but also raise concerns about ethical, privacy and implementation complexities (34,35,57). Telehealth and virtual care findings contribute to the theoretical understanding of hybrid care models, where digital and in-person services coexist, necessitating frameworks that accommodate flexibility, accessibility and equity in healthcare delivery for older populations (25,29).

The literature reveals a gap between rapid technological adoption and the evidence base supporting clinical outcomes, suggesting a need for theoretical models that integrate implementation science with health technology assessment to better capture the impact pathways of digital interventions (7,30).

The role of digital shared care models in enhancing care coordination supports theories of integrated care, emphasising collaboration across primary and specialty providers facilitated by digital tools, which may improve system efficiency and patient-centeredness in aging populations (7,39).

Policymakers and healthcare organisations should prioritise co-design and participatory approaches involving older adults and frontline providers to ensure digital health technologies are user-friendly, address real-world needs and mitigate barriers related to digital literacy and accessibility (24,26,52).

The demonstrated feasibility of deriving the electronic Frailty Index eFI from Australian primary care records suggests that routine implementation could enable the early identification and management of frailty, informing targeted interventions and resource allocation across diverse geographic and socioeconomic contexts (49).

Telehealth services require sustainable funding models and ongoing provider training to maintain accessibility and quality, particularly for vulnerable older populations and to support hybrid care delivery that balances digital and face-to-face interactions (25,48).

The integration of AI and machine learning into primary care decision-making holds promise for enhancing diagnostic accuracy and personalised care, but it necessitates robust governance frameworks that address data privacy, ethical use, and clinician-patient relationships (34,35).

Digital shared care platforms should be developed with interoperability and data-sharing capabilities to support multidisciplinary collaboration, improve care coordination and reduce duplication of services, which is critical in managing complex chronic conditions among older adults (7,44).

Addressing challenges such as data quality, privacy concerns and technological infrastructure is essential for the successful scaling and sustainability of digital health interventions in primary care and aged care settings, requiring continuous evaluation and adaptation (24,44,52).

Limitations of the identified literature

Several studies focus predominantly on specific Australian states or regions, which limits the generalisability of findings to other states, territories or private sectors. This geographic concentration diminishes external validity and may overlook regional differences in technology adoption and healthcare delivery (24,44). Many studies identified also had minimal involvement of older adults as direct consumers or participants, often relying on healthcare providers' perspectives. This methodological constraint limits the understanding of user-specific challenges and preferences, reducing the applicability of findings to end-user experiences (24,26). In general, there was lack of diversity study populations, for instance, study samples often overrepresent younger, more affluent and digitally literate older adults, with limited inclusion of those with lower socioeconomic status, cultural and linguistic diversity, or advanced age. This sampling bias undermines the inclusivity and equity considerations critical to digital health interventions (14,32).

A large proportion of virtual care initiatives remain at the pilot or early implementation stage, limiting evidence on their long-term effectiveness, scalability, and sustainability. This restricts the robustness and external validity of conclusions regarding the impacts of digital technology (21). Insufficient evidence on clinical outcomes was also observed throughout the literature - many digital health studies emphasised process or soft outcomes rather than rigorous clinical endpoints, limiting the ability to ascertain true health benefits or harms. This gap affects the strength of evidence supporting technology adoption in primary care 14,30).

Diverse study designs, variable outcome measures and inconsistent reporting standards across studies complicate and limit synthesis and comparison of findings and weakening the overall evidence base (14,30,34). There are limited longitudinal and large-scale studies which restricts understanding of long-term impacts, cost-effectiveness and sustainability of digital health technologies in primary care for older adults (21,34,39).

Potential opportunities

Develop evidence on long-term effectiveness and scalability of digital health interventions

As most studies to date have focussed on pilot or early-stage implementations with limited evidence on long-term clinical outcomes and scalability in primary care for older adults (21,39), a longitudinal, large-scale study evaluating sustained clinical effectiveness, cost-effectiveness, and scalability of digital health technologies in Australian primary care settings is desirable. Robust evidence on long-term impacts is essential to justify investment and guide sustainable integration of digital tools for older adults (21,39).

Integration and interoperability of digital health systems

Fragmented systems and lack of interoperability hinder seamless data sharing and coordinated care among providers in primary care and aged care (24,26,44). The development and evaluation of interoperable digital platforms that enable secure, real-time data exchange across primary care, aged care, and specialist services, with a user-centred design, will advance integrated, coordinated primary health care for older people (24,44).

Digital literacy and accessibility barriers among older adults

Sensory impairments, cognitive decline and low digital literacy limit older adults' ability to use digital health technologies effectively (14,24,26). Addressing usability and literacy barriers is critical to equitable adoption and maximising the benefits of digital health for older populations (14,24). Investment in the design and evaluation of tailored digital literacy programs and age-appropriate interfaces, using co-design methods with older adults, including those with impairments, would enhance usability and accessibility.

Ethical, privacy, and data security concerns in digital health adoption

Privacy risks, data misuse, and surveillance concerns are underexplored and inadequately addressed in current digital health implementations (51,52). Ethical safeguards are necessary to protect vulnerable older adults and foster trust essential for digital health uptake (51,52). Comprehensive ethical frameworks and privacy-preserving technologies should be developed in collaboration with older adults to ensure their involvement in governance and consent processes, thereby ensuring trust and control over their data.

Inclusion of diverse and vulnerable older populations in research

Underrepresentation of culturally and linguistically diverse groups, socioeconomically disadvantaged and cognitively impaired older adults in digital health studies (14,24) is a significant limitation in the applicability of current evidence to practice. Inclusive research designs should be prioritised, engaging diverse older populations, evaluating differential impacts and tailoring interventions to address health inequities.

Evaluation of AI applications

AI tools show promise but lack rigorous validation, standardised reporting and guidance for ethical, bias-aware implementation in primary care (34,35,57). Clinical trials and implementation studies of AI tools should be undertaken to assess the capacity to enhance diagnosis and management without harm or bias.

Sustainability and funding models for digital health in primary care

Current funding and reimbursement models inadequately support ongoing use and integration of telehealth and digital interventions (25,30,48). An investigation should be undertaken into sustainable funding frameworks that incentivise quality outcomes and support hybrid care models combining digital and in-person services.

Impact of digital health on patient-provider relationships and communication

Concerns exist about the loss of personal contact, communication barriers, and the potential dehumanisation of care with digital modalities (29,65). Hybrid care models that balance digital and face-to-face interactions could be tested to examine their effects on therapeutic relationships and to develop communication training for providers.

Standardisation of outcome measures and reporting in digital health research

Heterogeneity in study designs and outcome metrics limits comparability and synthesis of evidence on digital health effectiveness (14,21,34). Development of consensus-based core outcome sets and reporting standards for digital health interventions targeting older adults in primary care could be undertaken.

Limited research on digital health for home-based primary care quality improvement

Digital interventions in home-based primary care show promise but lack a comprehensive evaluation of impacts on care quality and equity (32,61). Optimising digital tools for home-based care could improve outcomes and reduce inequities.

Part 3: Digital tools and enabling technology in prevention, treatment and management

In Australian primary care, digital technologies are applied across self-management, shared electronic records, telehealth and remote monitoring, and decision-support systems. Adoption has accelerated since the COVID-19 pandemic, but the strength of evidence remains variable; benefits are reported for access, coordination and medicines safety, while long-term effectiveness, cost-effectiveness and equity of use in older populations are inconsistently demonstrated. This section summaries the intended function, implementation context and evidentiary strength for selected tools and identifies implications for practice and policy. Part 3 discusses evidence of innovation and implementation of digital health technologies through a multilevel lens, examining tools that support individual clinician workflows, enhance multidisciplinary collaboration and enable population-level data sharing. Emerging technologies such as AI medical scribes, integrated preventive care platforms and data-sharing initiatives.

Empowering individuals: digital tools for self-management and preventative care

The integration of digital health technologies into primary care is reshaping the role of patients in managing health, particularly for older adults with chronic illness (66). Digital tools, including mobile apps, wearable devices, tailored health communication platforms, and electronic health records, are increasingly adopted into primary care to support self-management and preventive care. These technologies offer flexible, patient-directed access to information and feedback, fostering autonomy, engagement and health literacy (11,66–68).

Self-management is broadly defined as the actions individuals take to handle symptoms, treatment, physical, and emotional management, and lifestyle changes associated with living with a chronic condition (68) . Within the literature, self-management is recognised as a concept that intersects with preventive care, with digital health tools positioned to support both proactive health behaviours and chronic disease management. This is reflected in evidence that individuals are expected to be "digitally engaged in their own medical care and preventive health efforts" (68). Building on this, van Olmen et al. (2022) emphasises that digital self-management tools can improve specific health behaviours such as physical activity and medication adherence, while also enhancing subjective well-being (68).

Digital tools are reported to augment traditional self-management approaches by improving accessibility, customisation and patient-provider communication. These interventions can facilitate early detection of functional or cognitive decline, improve recall and adherence and provide timely education outside of consultations. Effective implementation requires integration into clinical workflow and co-designed with patients to ensure usability, trust, and relevance, especially for older adults (11,67).

The following section outlines examples of digital tools currently applied in Australian primary care, including electronic health records, health education platforms, and screening applications. These tools are discussed in terms of their contribution to enhancing health engagement, supporting preventive care, and facilitating the management of chronic conditions among older adults.

My Health Record - enabling consumer health information access

Digital health records are increasingly recognised as enablers of person-centred care, particularly in supporting continuity of care, enhancing medication safety and reducing duplication of tests and procedures (69,70). These types of records, such as the Australian My Health Record (MHR), can assist in preventive care and early intervention by consolidating health information in a single, accessible platform (68). For example, for people aged 45–49 years, information generated through the Medicare-funded 45–49 year old health check can be uploaded into MHR, enabling both consumers and clinicians to review risk factors for chronic disease and support follow-up care (71–73). The MHR achieves this by enabling consumers and clinicians to review test results, referrals, and care plans associated with this health check, facilitating follow-up actions and continuity of care (70,74).

My Health Record is part of Australia's broader digital health strategy, including the National Digital Health Strategy and related policies emphasising interoperability, consumer empowerment and improved care coordination (75). The system is designed to provide individuals with a degree of control over their centralised health information with the intended aim to provide health professionals with access to key clinical information and enable consumers to share relevant records across different providers. While individual users have significant say in managing their record – including opting out - some aspects are automated or controlled by healthcare providers and the system itself (7).

Shared documents may include discharge summaries, shared health summaries, event summaries, specialist letters, pathology and radiology results, PBS and MBS claims data, and consumer-entered information. In this way, the system is intended to improve continuity of care, reduce safety risks associated with incomplete patient histories, and lessen administrative burden for clinicians and patients (76,77). To date, approximately 24.53 million Australians have an active MHR, with over 1.9 billion documents uploaded in the system (78,79). However, specialist engagement lags behind that of general practice and there are issues with technical usability. As well, consumer use is low with only 24% of records actively reviewed by patients (80). These findings align with the global literature on shared care records, which emphasises the importance of user-centred design, semantic interoperability, and data governance frameworks to support uptake (75,81).

Walsh et al. (2021) highlight that while My Health Record offers significant potential to enhance health literacy through increased transparency and accessibility of personal health data, system-level challenges remain (82). These include usability barriers, especially for populations with low health literacy or digital literacy and the need for ongoing policy support to improve accessibility features, culturally appropriate resources and privacy protections. The study underscores the importance of continuous policy-driven investment to improve interface design, user support and tailored communication to ensure equitable benefits across diverse population groups (82).

To maximise its impact, governments have supported national rollout campaigns, tailored consumer resources and targeted digital literacy initiatives. These efforts aim to build trust, address privacy concerns and ensure equitable uptake across diverse populations. The Australian Digital Health Agency and Services Australia have collaborated with community organisations to ensure culturally responsive materials are available in multiple languages and accessible formats (75).

Evidence suggests that digital health records can enhance the accessibility of screening information, including participation in bowel cancer screening and immunisation history, which is pertinent to mid-life health management (79). Additionally, MHR provides access to Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) claims information, supporting shared decision-making and medication reconciliation (69).

Further highlighted by van Olmen et al. (2022), patient-accessible digital health tools, including electronic personal health records, can support self-management, particularly when combined with structured health interventions. Access to health information has been linked to increased patient engagement, improved understanding of one's medical history, and better management of chronic conditions (67,68). However, the same review identifies gaps in evidence concerning long-term outcomes related to self-management, well-being and digital tool use.

The Australian Digital Health Agency (2023) reports that MHR can support individuals in tracking their own health data, preparing for medical consultations and managing their health across multiple providers. For people managing complex health needs, MHR provides a single source of information that may reduce medication errors, prevent adverse events and streamline care (74,78).

Wearable devices and self-management

Wearable health devices are a rapidly evolving area of digital health with significant potential to support self-management in older adults (83). Wearables encompass a range of devices, including smartwatches, fitness trackers, biosensors and wearable bio-MEMS (biomedical microelectromechanical systems), designed to monitor health parameters, provide continuous feedback (84,85), and can provide real-time data to healthcare providers to enable timely interventions (86,87).

Wearable activity tracking (WAT) devices are used to monitor physical activity, heart rate, sleep patterns, oxygen saturation, and gait stability, delivering real-time data to users and clinicians. These technologies support the self-management of chronic conditions, such as hypertension, diabetes, and cardiac arrhythmias, and can assist in fall detection and emergency response (88). Evidence suggests that WATs can facilitate positive behaviour change when supported by effective motivational strategies, but their long-term utility depends on improvements in design, data accuracy and privacy protections to ensure user engagement and trust (84,89,90).

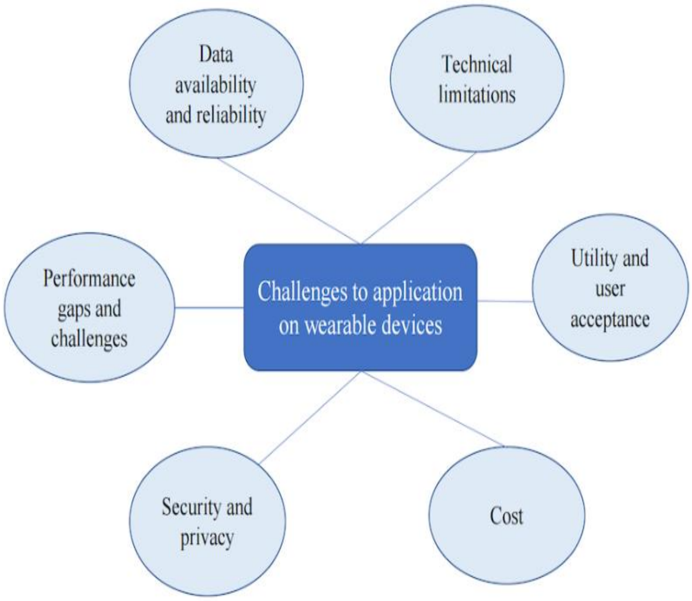
Some devices also incorporate motion tracking technologies that support rehabilitation and mobility assessment, contributing to frailty prevention strategies (85). Others are similar to portable diagnostics: these technologies enable on-the-spot health assessments, reducing the need for frequent hospital visits and allowing for more personalised care (86).

Studies suggest that wearable devices can support the early detection of health deterioration, facilitate preventive interventions and enhance adherence to healthy behaviours, including physical activity and medication management (90,91). For example, continuous monitoring of cardiovascular parameters enables the early identification of arrhythmias or hypertension, potentially reducing the risk of hospitalisation (92).

Despite the potential of these technologies and devices, the literature highlights barriers to widespread adoption of wearable technology among older adults (83). Usability concerns, digital literacy gaps, privacy issues and the need for device calibration and accuracy are consistently noted challenges (90–92).

While these technologies offer significant benefits, they also raise ethical and social concerns. Issues such as privacy, data security and the potential for increased social isolation due to reduced human interaction are critical considerations. Moreover, the digital divide can exacerbate inequalities, as not all older adults have equal access to or familiarity with these technologies (52,93). Therefore, it is essential to involve older adults in the design and implementation of these technologies to ensure they meet their needs and preferences (86,94). Co-design approaches and personalised support have been recommended to enhance the acceptability and effectiveness of wearable technologies in this population (90). This is illustrated in the ACTIVATE trial, a randomised controlled study by Lynch et al. (2019), which combined a Garmin Vivofit 2 activity tracker with health coaching. The intervention group significantly increased their moderate-to-vigorous physical activity by 69 minutes per week and reduced sedentary time by up to 42 minutes per day compared with controls, demonstrating the value of personalised support in improving health behaviours among cancer survivors (95).

Figure 5.3. Categorization of challenges to wearable applications (83)



Patient engagement tools

Software programs and mobile applications (apps) designed to support patient self-management are rapidly emerging through commercial innovation and production. Some examples of these are outlined here.

GoShare Healthcare

Go share is a digital health platform designed to strengthen patient self-management by delivering timely, credible and tailored health education via email or SMS (96,97). Developed by Healthily, an Australian company specialising in patient education, GoShare Healthcare is described as a customisable content distribution platform for health professionals to provide patients with evidence-based resources tailored to the needs of individual patients and carers (96). These resources are intended to complement in-person consultations and support ongoing engagement in health care. Another Healthily product, GoShare Plus, enables practices to collate patient lists and generate bundled content for delivery by sms to selected patient cohorts (98). GoShare Plus was used during the COVID-19 pandemic for a culturally tailored campaign involving community leaders from Aboriginal and Torres Strait Islander and culturally and linguistically diverse (CALD) communities shared video messages encouraging vaccination. 21 general practices across regions from Far North Queensland to South Australia sent 16 customised information packages to 10,978 patients due for a vaccination or booster. The campaign achieved SMS open rates ranging from 15 to 47 percent, and the development of a follow-up 'nudge' function ensured additional outreach to patients who had not initially opened the message (99).

Box 5.1. GoShare in Western Sydney Primary Health Network (WentWest)

WentWest funded access to the GoShare and GoShare Plus digital education platforms for all general practices in the region. These platforms allow health professionals to distribute tailored health resources to patients via email or SMS, supporting education and preventive care. A campaign conducted in collaboration with one general practice used GoShare to identify patients eligible for a Home Medicines Review (HMR). According to a practice report, 17% of recipients contacted their GP and were subsequently referred for a medication review; however, the basis for this figure, including the sample size and calculation, is not fully explained in the available documentation (97). WentWest has supported ongoing adoption of GoShare across general practices, linking its use to quality improvement activities associated with Medicare Benefits Schedule (MBS) items, including the 45–49 and 75+ health assessments, GP Management Plans, and Team Care Arrangements.

The NIH Toolbox

The NIH toolbox has been developed by the National Institutes of Health (NIH), United States of America (USA) to provide brief multi-dimensional measures to assess cognitive, emotional, motor and sensory functions for children and young people and adults through to age 85. The tools are designed to be administered using a digital tablet and facilitates both professional and patient administration. A scoping review of the use of the toolbox in clinical populations found that the tools for measurement of neurologic disorders were the most widely used. The review authors concluded that the NIH Toolbox measures were useful for research in clinical populations and for implementation in busy clinical settings as part of routine practice (100).

MyCog

Development of the neurologic tool, MyCog, was supported by the National Institute on Aging and the National Institute of Neurological Disorders and Stroke, USA, to provide a short, standard set of cognition screening measures for use in diverse population groups and settings. This is now available as a smartphone-based self-administered cognitive screening tool (MyCog Mobile) designed to support early detection of cognitive decline in adults aged 65 and over (101,102). The mobile app enables older adults to complete a brief cognitive assessment on their personal device before their annual wellness or primary care visit. This is intended to address a key barrier to routine screening in primary care, time constraints, while empowering patients to participate proactively in their health management. The app was developed in collaboration with clinicians, practice administrators and older adults and the proposed implementation model allows MyCog Mobile to be integrated into standard primary care processes with screening results available to clinicians before consultations. This is designed to enhance workflow efficiency and facilitate the longitudinal tracking of cognitive function. Clinical validation and large-scale pilots are in progress (103).

The past decade has seen a significant digital transformation in healthcare, characterised by the rapid adoption of eHealth technologies. eHealth, broadly defined as the delivery and support of health services through secure information and communication technologies (ICT), includes mobile health (mHealth) applications, telemedicine, EHRs, and cloud-based shared care systems (80). These technologies provide the infrastructure to support shared care models that enhance coordination between general practice, allied health, specialists and patients (80,104,105).

Shared Electronic Health Records

Shared EHRs are positioned as a key enabler of digital team-based care, intended to provide real-time access to patient data across multidisciplinary teams and thereby support more coordinated models of care (104). Evidence suggests that shared EHRs can lead to improved clinical outcomes, such as better glycaemic control and weight reduction in diabetes management (80).

Key components that support shared EHR success include (80):

- semantic interoperability -consistent terminology and structured data capture;
- adherence to FHIR (Fast Healthcare Interoperability Resources) standards for data exchange;
- data stewardship and governance -robust policies on privacy, access, and ethical data use.

Effective communication and structured collaboration are essential for delivering coordinated care to older adults with complex or chronic conditions. The literature consistently highlights the role of digital solutions in enhancing team-based care through shared information systems, real-time communication tools and interoperable health records (104–106).

Australian guidelines emphasise that multidisciplinary care requires clear communication pathways between GPs, allied health providers, non-GP specialists and community services (80,107,108). The National Safety and Quality Health Service, *Communicating for Safety Standard* outlines the need for structured communication tools during referrals and handovers to reduce fragmentation and ensure patient safety (109). Digital platforms that support these processes include secure electronic messaging, electronic referrals and shared documentation systems, which standardise information flow between providers.

Shared care models rely on collaborative treatment planning where tasks and responsibilities are clearly documented and accessible to all relevant clinicians. The Royal Australian College of General Practitioners' Shared Care Position Statement outlines that shared care arrangements should include electronic care planning, secure messaging and coordinated follow-up systems to support continuity of care (108).

The RACGP Silver Book (Part B) recommends team-based care approaches for managing frailty, cognitive decline and multimorbidity. This guidance emphasises the importance of timely, collaborative decision-making supported by digital tools (110). Multidisciplinary team meetings, virtual case conferences and remote monitoring dashboards are increasingly utilised to facilitate shared decision-making, reduce duplication, and improve patient outcomes.

Despite progress in digital integration, barriers persist. Evidence highlights challenges such as inconsistent adoption of secure electronic messaging, interoperability issues between software systems, and concerns regarding data governance and patient privacy (104,111). Successful implementation requires co-design with clinicians and patients to ensure usability and acceptability across various care settings (19,105,108).

HealthPathways

HealthPathways is a web-based clinical decision support and referral management platform that assists GPs, nurses and allied health providers in delivering locally relevant, evidence-based care. It was first developed in New Zealand and has since been adapted for use across more than 40 regions in Australia, including urban, regional and remote settings (112,113). HealthPathways offers region-specific clinical and referral guidance tailored to the local service landscape. Each pathway includes:

- clinical assessment and management protocols;
- referral criteria and service directories;
- patient information and health literacy resources.

This enables GPs and allied health professionals to navigate the complexity of local care systems, reduce inappropriate referrals and improve continuity of care (112,114).

Clinicians access HealthPathways through secure logins during consultations to assist with diagnosis, treatment, and referrals, thereby streamline care coordination across primary and secondary services (112,115).

HealthPathways is described as a trusted and practical resource that provides locally relevant information and can influence clinical decision-making (109). Stokes et al. (2018) found that GPs using this tool improved their knowledge of local services and informed their clinical management decisions. However, implementation was constrained by minimal end-user engagement, inadequate promotion and communication, and limited organisational readiness and incentives to support sustained uptake. Clinician trust was shaped by the degree of involvement in pathway development, the transparency of processes, and the perceived accuracy and relevance of information (116). While HeathPathways has been widely adopted across Australia, New Zealand and the United Kingdom, there is limited direct evidence of its impact on patient outcomes such as hospital or emergency department utilisation (116). Qualitative evaluations indicate that the tool can improve referral quality promote timely access to secondary care, and enhance integration between primary and secondary clinicians, provided that local implementation factors are addressed (116).

The RACGP provides specific guidance for integration of HealthPathways into general practice workflows, promoting its use as part of team-based care models and supporting the management of complex and chronic conditions (114).

HealthPathways has demonstrated multiple benefits:

- improved referral quality and reduced inappropriate referrals to secondary care;
- increased clinician confidence in managing complex patients within primary care;
- enhanced collaboration between GPs, allied health providers, and specialists;
- support for preventive care through structured pathways for chronic disease management, screening, and immunisation.

The development and early implementation of HealthPathways in Canterbury, New Zealand, is frequently cited as a leading example of system-level collaboration to support integrated care. In this model, primary care management and referral pathways were co-designed by general practitioners and hospital specialists, fostering shared decision-making and improving communication across care settings (117). The Canterbury experience showed how HealthPathways can serve not just as a clinical support tool but as a mechanism to align primary and secondary care and reduce fragmentation.

However, subsequent evaluations stress the need for ongoing clinician engagement, local adaptation and governance to sustain the model in different contexts (118).

Telehealth

Telehealth has become a component of team-based care, particularly in the management of older adults and people living with chronic conditions. Its widespread adoption during the COVID-19 pandemic accelerated the normalisation of remote consultations for follow-up care, results delivery and multidisciplinary case conferencing (80,119). Evidence suggests that telehealth reduces travel burden, improves access to specialist input and supports patient engagement, particularly in rural and remote areas (19, 39, 54-57). It can also reduce healthcare costs and avoid delays in care by facilitating timely, team-based decision-making (119,121,122).

Telehealth supports multiple aspects of team-based care, including:

- follow-up consultations;
- results delivery;
- multidisciplinary case conferencing;
- remote allied health support;
- proactive management of chronic and complex conditions.

A review of virtual care models suggests that telehealth enhances patient engagement and enables better health outcomes when integrated into routine primary care and supported by appropriate infrastructure and training (123,124). However, barriers such as digital literacy, technological access and funding models remain important considerations (78).

The Medicare Benefits Schedule (MBS) provides support for telehealth, both by video and by phone, for specific MBS item numbers and eligible patients, reflecting its importance in delivering accessible, person-centred care (119).

Revised Telehealth Guidelines introduced by the Medical Board of Australia in 2023, emphasise the need for safe, patient-centred telehealth practices, including appropriate documentation, clear communication and continuity of care (125).

For practical guidance on implementing telehealth in general practice, the RACGP provides detailed guidelines and resources, available at RACGP Telehealth Guidelines (126).

Software programs to support telehealth consultations are also emerging. The Patient Consult Summary application is a collaborative project developed to improve the patient experience in telehealth consultations. Led by the Digital Health Cooperative Research Centre (DHCRC) as the major funder, it was delivered in collaboration with Monash University, Monash Health, Healthdirect Australia, the University of Melbourne, and the Victorian Department of Health. It was designed to address gaps in communication and continuity of care in virtual settings. (127,128). The application enables clinicians to create a plain-language consultation summary during the telehealth encounter, which is shared with the patient prior to the consultation’s conclusion. This summary provides clear explanations of medical terms, actionable care instructions and follow-up plans. The aim is to reduce the common problem of patients forgetting or misinterpreting advice given during consultations, a particular concern in telehealth settings where non-verbal cues may be limited (127,128). The Patient Consult Summary is currently undergoing pilot testing across Victorian health services and may have potential for broader national application as part of Australia’s digital health transformation agenda.

In addition to publicly funded initiatives, commercial providers are offering app-based telehealth services. Australian Pharmaceutical Industries, a national wholesale and retail distribution company, has established InstantScripts, described as an online medical clinic, which provides fee-based, non-MBS eligible virtual consultations with medical and other health professionals on a fee-for-service basis. The app-based service also provides prescription services and health assessments via an app-based model (129). InstantScripts provides access to general practitioners for prescription renewals, minor illness management and health advice without in-person visits.

As telehealth has become a vital component of primary care, Virtual Reality (VR) and Augmented Reality (AR) are also emerging as tools for enhanced remote consultations and follow-ups with potential to benefit older adults with mobility issues (21). Virtual Reality (VR) and Augmented Reality (AR) technologies are used for rehabilitation and cognitive therapies, providing engaging and effective treatment options for older adults (86) (93).

Practice-level improvement: software enabling preventive and proactive care

Shifting from reactive treatment models to proactive, prevention-focused care is a key priority for primary care, especially in the context of an ageing population and rising rates of chronic disease. Practice-level improvement is supported by digital tools that facilitate systematic risk identification, preventive outreach and coordinated management (130,131).

The World Health Organization (WHO) has urged national health systems to shift towards preventive and anticipatory care models to address the needs of older populations (131–133). This shift requires structured, data-driven approaches that facilitate early detection of risk factors, prompt lifestyle interventions, and continuous monitoring of health status over time. Proactive care models decrease the likelihood of acute episodes and support functional ability in later life (131–133). However, evidence shows that translating these benefits into practice is inconsistent, with multiple studies reporting gaps in the delivery of preventive care at the practice level. Common barriers include limited time during consultations, lack of systematic prompts for prevention, and insufficient population-level data use (134,135).

A range of evidence-based electronic products are emerging in response to the growing focus on preventive health in primary care. Some examples of these are discussed.

Clinical decision support for preventive and proactive care

Primary Sense: is an Australian developed clinical decision support platform that was developed by the Gold Coast Primary Health Network and is now being increasingly supported by Primary Health Networks (PHNs) across Australia. The platform utilises evidence-based algorithms and de-identified data to deliver real-time medication safety alerts, patient care prompts and practice reports. The platform is integrated with the Johns Hopkins University ACG® population health analytics tool. The platform provides up-to-date reports on patients most likely to benefit from specific interventions or services and identifies potential medication safety issues.

ePREVENT-360 – leveraging digital innovation to prevent chronic disease in primary care

The ePREVENT-360 research project, launched in 2025, has developed a digital tool designed to support preventive care in general practice (136). Funded by the RACGP Foundation and the Hospital Contribution Fund (HCF) of Australia Ltd. Research Foundation through a 2023 grant, the project is a collaboration between the University of Wollongong and In2Health, an Australian digital health company. A pilot of the tool aims to evaluate the feasibility of In2Health's digital prevention platform, designed to identify chronic disease risk and deliver tailored interventions supporting proactive and personalised preventive care (74,75). Targeting adults aged 30 to 65, In2Health uses a clinically developed online health check that evaluates 128 risk and protective factors across 21 chronic conditions, including mental health. The platform generates a personalised health dashboard for patients, summarising risk scores, suggested screening and lifestyle recommendations, enabling patients to engage more actively in their health before attending a consultation. For clinicians, In2Health produces concise summaries of risk scores and evidence-based recommendations to inform and streamline care delivery. By integrating prevention into existing workflows, the platform supports GPs and nurses in delivering comprehensive risk assessments with minimal additional burden. Future system updates will enable integration with commonly used practice management software (136).

A distinctive feature of In2Health is its emphasis on sustained engagement. Patients receive quarterly "pulse check" assessments, allowing them to track progress over time and prompting timely updates to their personalised action plans. The platform also sends goal-setting reminders and screening nudges, supporting ongoing behaviour change between visits. These functions help to address time pressures in primary care while aligning with preventive care item numbers under the Medicare Benefits Schedule.

Through the patient-facing Thrive app, In2Health empowers patients to take ownership of their health and increases practice capacity to deliver preventive care. This model can improve health outcomes, enhance patient and clinician satisfaction and promote system-level sustainability by reducing the burden of preventable chronic disease.

A pilot of the tool aims to assess the feasibility of In2Health's digital prevention platform, which is designed to identify the risk of chronic diseases and provide tailored interventions to support proactive and personalised preventive care (137). The ePREVENT-360 study is anticipated to inform future implementation by examining consumer and clinician perspectives, as well as their engagement and uptake of the platform (136,137).

AI-enabled scribes in primary care

AI-enabled scribes are being increasingly developed and tested to streamline clinical documentation by reducing administrative burdens and supporting more meaningful patient interactions in healthcare settings. These systems utilise ambient AI to passively and automatically listen to patient–clinician conversations and generate structured clinical notes letters, and summaries during or immediately after the consultation (138,139).

A recent systematic review by Sasseville et al. (2025) reports the potential of AI scribes to streamline clinical documentation. The review analysed eight studies across various clinical settings and found consistent evidence of time savings, reduced clinician cognitive load and improved workflow efficiency. Clinicians reported high levels of satisfaction with AI scribes, particularly in primary care and allied health environments where documentation tasks can be repetitive and time-consuming (140).

In Australia, allied health professionals participating in a 2024 study found that AI scribes enhanced both workflow and patient rapport (138). By reducing the need to concentrate on typing or navigating screens, clinicians could maintain better eye contact, listen actively, and foster more collaborative conversations with patients. Patients also expressed positive perceptions of these tools, noting that consultations felt more personal and less transactional.

However, while AI scribes reduce the documentation burden, they are not yet fully autonomous. Clinicians must verify and edit AI-generated notes to ensure clinical accuracy and safety (138,139). This underscores the importance of maintaining professional oversight to prevent potential errors, especially in sensitive or complex clinical discussions.

The National Digital Health Strategy 2023–2028 positions AI as a vital enabler of smarter, more connected care (75). AI scribes support this initiative by facilitating improved care coordination, increasing clinical efficiency, and helping to reduce burnout associated with administrative overload. Their use complements other digital tools such as electronic health records, telehealth, and secure messaging systems (75,138,140).

Nonetheless, challenges persist. These encompass concerns regarding data privacy, medico-legal liability, interoperability with existing clinical systems, and equitable access, particularly for smaller practices or those with limited digital capabilities (139,140).

The Australian Institute of Digital Health, a membership body of health informatics and digital health professionals and organisations, has produced a guide to AI scribes in healthcare to resource professionals and services considering the application of AI scribes in their practice (141).

Commercial products are also emerging. An example of these is Heidi Health, an Australian-developed AI-powered medical scribe platform that integrates ambient artificial intelligence into general practice and multidisciplinary care settings. It aims to reduce clinical documentation burden, streamline workflows and improve communication across healthcare teams. Heidi operates by transcribing consultations in real-time, auto-generating structured clinical notes, referral letters, care plans, certificates, and billing documentation, while preserving the clinician’s focus on patient engagement (138,142). The platform uses a large language model to interpret conversations during consultations, summarising key clinical elements and producing drafts that clinicians can review and finalise. Clinicians can personalise documentation through reusable templates and specialty-specific tools, aligning with practice preferences and team-based care protocols (142).

Heidi Health aims to support multidisciplinary team coordination by embedding its AI scribe functionality within electronic medical record systems such as Best Practice (Bp Premier) and MediRecords (142,143) to enable real-time synchronisation of appointment lists, automatic note creation and direct upload of structured notes into the patient’s longitudinal health record (142). The product operates under data privacy and compliance provisions and is described as minimising post-visit tasks and helping multidisciplinary teams to access consistent and up-to-date information. (75,142).

A regional pilot conducted by the Hunter New England and Central Coast Primary Health Network (PHN) demonstrated significant benefits of Heidi Health for clinicians and patients. Practices reported a 51% reduction in documentation time, a 61% reduction in after-hours administrative load and a 45% improvement in clinician work-life balance (144–146). Clinicians also reported 38% higher satisfaction with their clinical notes, citing improved quality, accuracy and alignment with multidisciplinary workflows (147,148).

These outcomes echo broader findings from AI scribe research, which show improved patient-clinician communication, reduced clinician burnout and enhanced continuity of care when documentation is streamlined at the point of care (138,140).

From practice to population: data-sharing, collaboration and system integration

Primary care data, while routinely collected, remains a largely untapped resource for population health monitoring and quality improvement in Australia. According to the AIHW, there are significant gaps in the availability and linkage of general practice data at a national level. Current systems lack interoperability, resulting in fragmented information flows that inhibit effective service planning and outcome measurement (149).

A 2020 report by the Melbourne Academic Centre for Health identified structural and technological challenges in the capture and use of primary care data in Australia. These include inconsistent data standards, limitations in practice software and the absence of standardised mechanisms for consent and data sharing. The report also noted that while data is collected within general practices, it is often not linked with other health datasets, limiting opportunities for comprehensive population-level analysis (115).

The Australian Government Primary Health Care 10-Year Plan 2022–2032 emphasised the importance of digital health integration in supporting prevention, early intervention and system sustainability. The plan outlined a pathway for enhancing digital capabilities, fostering data integration and improving real-time information sharing across services (3).

National programs such as Primary Health Insights and initiatives supported by the Medical Research Future Fund (MRFF) are also supporting improved data utilisation. In 2024, the MRFF allocated over $22 million to research aimed at enhancing the utilisation of primary care data to support innovative models of care and reduce fragmentation (149). These projects focus on developing secure data environments, enhancing collaboration between clinicians and researchers and building capacity for data-driven healthcare delivery.

A 2024 article in the *Australian Journal of General Practice* reinforces the potential of general practice data to support both individual patient care and broader health system improvement. The authors highlight the value of structured, high-quality data for informing research, service delivery and population health management. However, they also note that significant challenges remain in areas such as coding consistency, workflow integration and clinician engagement with data-sharing processes (150).

These findings reflect a broader shift towards learning health systems where data is continuously collected and analysed to inform policy, guide practice and support health system improvement (3,115). Current national strategies, including the National Digital Health Strategy 2023–2028, further emphasise the importance of integrated digital infrastructure to enable better use of health information at the individual, service and population levels (75).

One example of a data curation and sharing platform relevant to primary care is the National Cancer Screening Register (NCSR).

The National Cancer Screening Register (NCSR)

The National Cancer Screening Register (NCSR) is a centralised digital platform designed to support Australia's national population-based cancer screening programs. (151,152).

The NCSR offers a unified, real-time electronic record for each individual participating in these programs. Its primary functions include sending invitations and reminders for screening, recording test results, monitoring follow-up activities, and providing healthcare providers with access to screening histories through secure portals or integrated clinical software systems (153).

Healthcare providers can interact with the NCSR via the Healthcare Provider Portal or through clinical software integration, including platforms such as Best Practice and Medical Director. This integration enables GPs, practice nurses and other authorised users to (153):

- register patients for screening programs;
- submit and access screening test results;
- update patient contact information and clinical details;
- record patient participation decisions (e.g., opting out or deferral).

This system reduces administrative burden and facilitates timely follow-up of screening and diagnostic processes, particularly for patients at higher risk or who require further assessment. Educational resources and software integration guides are available to assist healthcare providers in maximising the benefits of the NCSR (154).

The NCSR also plays a role in addressing inequities in cancer screening participation. Special initiatives such as outreach to under-screened populations in regional and remote Australia are supported through data-informed strategies to improve uptake (155). For example, the Achieving Cervical Screening Equity in Regional and Remote Australia initiative utilises NCSR data to identify service gaps and target interventions aimed at improving outcomes for Aboriginal and Torres Strait Islander women and other priority groups (156,157). The NCSR aligns with the priorities set out in the National Digital Health Strategy 2023–2028, which emphasises system interoperability, better use of real-time data and population-level health improvements through digital transformation (75). By consolidating national screening data and linking clinical practice with program administration, the NCSR supports preventive care at both the practice and population levels.

References

1. Darley A, Carroll Á. Conducting Co-Design with Older People in a Digital Setting: Methodological Reflections and Recommendations. Int J Integr Care [Internet]. [cited 2025 Aug 12];22(4):18. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9733123/
2. Høiseth M, Nakrem S. Co-creation in digital health services for older people: a realist review of enabling factors and barriers. Des Health. 2024 Sep 1;8(3):390–408.
3. Australian Government Department of Health. Australia's Primary Health Care 10 Year Plan 2022–2032. Australian Government Department of Health and Aged Care; 2024.
4. Australian Institute of Health and Welfare [Internet]. 2019 [cited 2025 May 27]. Coordination of health care: experiences of information sharing between providers for patients, Summary. Available from: https://www.aihw.gov.au/reports/primary-health-care/coordination-of-health-care-experiences-of-informa/contents/summary
5. Steel A, Foley H, Graham K, Harnett J, Adams J. Patient experiences of information-sharing and patient-centred care across the broad landscape of primary care practice and provision: a nationally representative survey of Australian adults. BMC Prim Care. 2024 May 4;25(1):151.
6. Turcotte S, Bouchard C, Rousseau J, DeBroux Leduc R, Bier N, Kairy D, et al. Factors influencing older adults' participation in telehealth interventions for primary prevention and health promotion: A rapid review. Australas J Ageing. 2024;43(1):11–30.
7. Homewood D, Keane KG, Haridy J, Valaydon Z, Manning T, Crowe J, et al. Updates in digital shared care: Launching into the 21st century. Aust J Gen Pract. 2024 Nov 1;53(11):872–8.
8. Lau P, Tran MT, Kim RY, Alrefae AH, Ryu S, Teh JC. E-prescription: views and acceptance of general practitioners and pharmacists in Greater Sydney. Aust J Prim Health [Internet]. 2023 Sep 15 [cited 2025 Jul 27];30(1). Available from: https://www.publish.csiro.au/PY/PY22240

9. Australian Government Department of Health D and A. Electronic prescribing [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Jul 31]. Available from: https://www.health.gov.au/our-work/electronic-prescribing
10. Alruwaili MM, Shaban M, Elsayed Ramadan OM. Digital Health Interventions for Promoting Healthy Aging: A Systematic Review of Adoption Patterns, Efficacy, and User Experience. Sustainability. 2023 Jan;15(23):16503.
11. Labrique A, Agarwal S, Tamrat T, Mehl G. WHO Digital Health Guidelines: a milestone for global health. Npj Digit Med. 2020 Sep 18;3(1):1–3.
12. Australian Government Department of Health and Aged Care. National Preventive Health Strategy 2021–2030 [Internet]. Commonwealth of Australia; 2021 [cited 2025 May 27]. Available from: https://www.health.gov.au/resources/publications/national-preventive-health-strategy-2021-2030?language=en
13. Beard JR, Officer A, De Carvalho IA, Sadana R, Pot AM, Michel JP, et al. The World report on ageing and health: a policy framework for healthy ageing. The Lancet. 2016 May;387(10033):2145–54.
14. De Santis KK, Mergenthal L, Christianson L, Busskamp A, Vonstein C, Zeeb H. Digital Technologies for Health Promotion and Disease Prevention in Older People: Scoping Review. J Med Internet Res. 2023 Mar 23;25:e43542.
15. Seah B, Kowitlawakul Y, Jiang Y, Ang E, Chokkanathan S, Wang W. A review on healthy ageing interventions addressing physical, mental and social health of independent community-dwelling older adults. Geriatr Nur (Lond). 2019 Jan 1;40(1):37–50.
16. Australian Digital Health Agency. Interoperability [Internet]. [cited 2025 May 28]. Available from: https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/interoperability
17. Australian Government Office of the Australian Information Commissioner. Independent national regulator for privacy and freedom of information. 2023 [cited 2025 May 28]. Guide to health privacy. Available from: https://www.oaic.gov.au/privacy/privacy-guidance-for-organisations-and-government-agencies/health-service-providers/guide-to-health-privacy
18. Digital Implementation Investment Guide (DIIG): Integrating Digital Interventions into Health Programmes [Internet]. [cited 2025 May 28]. Available from: https://www.who.int/publications/i/item/9789240010567
19. Australian Government Department of Health, Disability and Ageing. The Digital Health Blueprint and Action Plan 2023–2033 [Internet]. Canberra: Commonwealth of Australia; 2025 Mar [cited 2025 May 27]. Available from: https://www.health.gov.au/resources/publications/the-digital-health-blueprint-and-action-plan-2023-2033?language=en
20. Mylek M, Schirmer J. 2024 Carer Wellbeing Survey [Internet]. 2024 Oct [cited 2025 Jul 28]. Available from: https://www.carersaustralia.com.au/research/2024-carer-wellbeing-survey/
21. Savira F, Gupta A, Gilbert C, Huggins CE, Browning C, Chapman W, et al. Virtual Care Initiatives for Older Adults in Australia: Scoping Review. J Med Internet Res. 2023 Jan 18;25:e38081.
22. Raven M, Butler C, Bywood P. Video-based telehealth in Australian primary health care: current use and future potential. Aust J Prim Health. 2013;19(4):283.
23. Sturgiss E, Desborough J, Hall Dykgraaf S, Matenge S, Dut G, Davis S, et al. Digital health to support primary care provision during a global pandemic. Aust Health Rev. 2022 Mar 18;46(3):269–72.
24. Pu D, Palmer V, Greenstock L, Pigott C, Peeters A, Sanci L, et al. Identifying Public Healthcare Priorities in Virtual Care for Older Adults: A Participatory Research Study. Int J Environ Res Public Health. 2023 Feb 23;20(5):4015.
25. Ashley C, Williams A, Dennis S, McInnes S, Zwar NA, Morgan M, et al. Telehealth‘s future in Australian primary health care: a qualitative study exploring lessons learnt from the COVID-19 pandemic. BJGP Open. 2023 Jun;7(2):BJGPO.2022.0117.
26. Moyle W, Pu L, Murfield J, Sung B, Sriram D, Liddle J, et al. Consumer and Provider Perspectives on Technologies Used Within Aged Care: An Australian Qualitative Needs Assessment Survey. J Appl Gerontol. 2022 Dec;41(12):2557–65.
27. Wherton J, Sugarhood P, Procter R, Hinder S, Greenhalgh T. Co-production in practice: how people with assisted living needs can help design and evolve technologies and services. Implement Sci. 2015 May 26;10(1):75.
28. Leff B, Ritchie CS, Rising KL, Cannon K, Wardlow L. Addressing barriers to equitable telehealth for older adults. Front Med [Internet]. 2025 Jan 23 [cited 2025 Aug 12];12. Available from: https://www.frontiersin.org/journals/medicine/articles/10.3389/fmed.2025.1483366/full

29. Khanassov V, Rojas-Rozo L, Ruiz AGS, Ilali M, Le Berre M, Vedel I. Telemedicine for Older Adults in Primary Care Practice: Multi-Phase Study Results. In: Mixed methods research [Internet]. American Academy of Family Physicians; 2023 [cited 2025 Jul 31]. p. 3589. Available from: http://www.annfammed.org/lookup/doi/10.1370/afm.21.s1.3589
30. Fava VMD, Lapão LV. Provision of Digital Primary Health Care Services: Overview of Reviews. J Med Internet Res. 2024 Oct 29;26:e53594.
31. Hunsbedt Fjellså HM, Husebø AML, Braut H, Mikkelsen A, Storm M. Older Adults' Experiences With Participation and eHealth in Care Coordination: Qualitative Interview Study in a Primary Care Setting. J Particip Med. 2023 Oct 2;15:e47550.
32. De Siqueira Silva Í, De Araújo AJ, Lopes RH, Silva CRDV, Xavier PB, De Figueirêdo RC, et al. Digital home care interventions and quality of primary care for older adults: a scoping review. BMC Geriatr. 2024 Jun 10;24(1):507.
33. Frishammar J, Essén A, Simms C, Edblad R, Hardebro V. Older Individuals and Digital Healthcare Platforms: Usage Motivations and the Impact of Age on Postadoption Usage Patterns. IEEE Trans Eng Manag. 2023 Aug;70(8):2903–19.
34. Rahimi SA, Légaré F, Sharma G, Archambault P, Zomahoun HTV, Chandavong S, et al. Application of Artificial Intelligence in Community-Based Primary Health Care: Systematic Scoping Review and Critical Appraisal. J Med Internet Res. 2021 Sep 3;23(9):e29839.
35. Kaymakçı V, Kasap İ. The role and future of artificial intelligence in primary care. J Turk Fam Physician. 2024 Mar 31;15(1):26–37.
36. Luo J, Liao X, Zou C, Zhao Q, Yao Y, Fang X, et al. Identifying Frail Patients by Using Electronic Health Records in Primary Care: Current Status and Future Directions. Front Public Health. 2022 Jun 22;10:901068.
37. Poli A, Kostakis I, Barbabella F. Receiving Care Through Digital Health Technologies: Drivers and Implications of Old-Age Digital Health Exclusion. In: Walsh K, Scharf T, Van Regenmortel S, Wanka A, editors. Social Exclusion in Later Life [Internet]. Cham: Springer International Publishing; 2021 [cited 2025 Aug 1]. p. 169–81. (International Perspectives on Aging; vol. 28). Available from: http://link.springer.com/10.1007/978-3-030-51406-8_13
38. Guasti L, Dilaveris P, Mamas MA, Richter D, Christodorescu R, Lumens J, et al. Digital health in older adults for the prevention and management of cardiovascular diseases and frailty. *A clinical consensus statement from the ESC Council for Cardiology Practice/Taskforce on Geriatric Cardiology, the ESC Digital Health Committee and the ESC Working Group on e-Cardiology*. ESC Heart Fail. 2022 Oct;9(5):2808–22.
39. Jimenez G, Matchar D, Koh CHG, Van Der Kleij R, Chavannes NH, Car J. The Role of Health Technologies in Multicomponent Primary Care Interventions: Systematic Review. J Med Internet Res. 2021 Jan 11;23(1):e20195.
40. Neves AL, Burgers J. Digital technologies in primary care: Implications for patient care and future research. Eur J Gen Pract. 2022 Dec 31;28(1):203–8.
41. Andrew N, Beare R, Carver A, Ravipati T, Parker E, Collyer T, et al. An innovative linked Electronic Health Record derived data ecosystem for understanding the complexities of health and ageing. Int J Popul Data Sci [Internet]. 2024 Sep 10 [cited 2025 Aug 1];9(5). Available from: https://ijpds.org/article/view/2747
42. Ambagtsheer RC, Beilby J, Dabravolskaj J, Abbasi M, Archibald MM, Dent E. Application of an electronic Frailty Index in Australian primary care: data quality and feasibility assessment. Aging Clin Exp Res. 2019 May;31(5):653–60.
43. Thompson LI. Digital Assessment Approaches to Overcome Barriers to Cognitive Screening and Monitoring for Older Adults in Primary Care Settings. Alzheimers Dement. 2024 Dec;20(S8):e095393.
44. Douglas HE, Georgiou A, Tariq A, Prgomet M, Warland A, Armour P, et al. Implementing Information and Communication Technology to Support Community Aged Care Service Integration: Lessons from an Australian Aged Care Provider. Int J Integr Care. 2017 Apr 10;17(1):10.
45. Bail K, Merrick E, Gibson D, Hind A, Strickland K, Redley B. A co-designed health information system implementation into residential aged care: A mixed-method evaluation. J Nurs Scholarsh. 2023 Mar;55(2):521–35.
46. Khanassov V, Ilali M, Ruiz AS, Rojas-Rozo L, Sourial R. Telemedicine in primary care of older adults: a qualitative study. BMC Prim Care. 2024 Jul 17;25(1):259.
47. Andrade AQ, Calabretto JP, Pratt NL, Kalisch-Ellett LM, Le Blanc VT, Roughead EE. Precision public-health intervention for care coordination: a real-world study. Br J Gen Pract. 2023 Mar;73(728):e220–30.
48. Fisher K, Davey AR, Magin P. Telehealth for Australian general practice: The present and the future. Aust J Gen Pract. 2022 Aug 1;51(8):626–9.

49. Lewis ET, Williamson M, Lewis LP, Ní Chróinín D, Dent E, Ticehurst M, et al. The Feasibility of Deriving the Electronic Frailty Index from Australian General Practice Records. Clin Interv Aging. 2022 Nov;Volume 17:1589–98.
50. Vandersman P, Tieman J. 'Technology in end-of-life care is very important': the view of nurses regarding technology and end-of-life care. BMC Nurs. 2024 Nov 6;23(1):809.
51. Johnston C. Digital Health Technologies: Law, Ethics, and the Doctor-Patient Relationship [Internet]. 1st ed. London: Routledge; 2022 [cited 2025 Aug 1]. Available from: https://www.taylorfrancis.com/books/9781003220190
52. Fasoli A, Beretta G, Pravettoni G, Sanchini V. Mapping emerging technologies in aged care: results from an in-depth online research. BMC Health Serv Res. 2023 May 23;23(1):528.
53. Siette J, Adam PJ. Building digital solutions to support brain health prescribing in primary care: Where to begin? Alzheimers Dement Transl Res Clin Interv. 2024 Jan;10(1):e12447.
54. Council on the Ageing Australia. Consumer Engagement in Aged Care [Internet]. 2023 [cited 2025 Jul 31]. Available from: https://cota.org.au/report/consumer-engagement-in-aged-care/
55. Electronic Medical Record (eMR) [Internet]. [cited 2025 Sep 30]. Available from: https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/digital-health-standards/digital-health-standards-guidelines/get-started/5-standards-for-systems-and-technologies/electronic-medical-record-emr
56. MedicalDirector [Internet]. 2024 [cited 2025 Sep 30]. EHR vs EMR: What is the difference? | Medical Director. Available from: https://www.medicaldirector.com/news/clinical-practice/ehr-vs-emr/
57. Efendioğlu EM, Türkbeyler İH. Artificial intelligence in geriatric medicine. Exp Appl Med Sci. 2024 Jun 14;5(2):44–5.
58. Karunanithi Mohanraj, Zhang Qing. An Innovative Technology to Support Independent Living: The Smarter Safer Homes Platform. In: Studies in Health Technology and Informatics [Internet]. IOS Press; 2018 [cited 2025 Aug 1]. Available from: https://www.medra.org/servlet/aliasResolver?alias=iospressISBN&isbn=978-1-61499-844-0&spage=102&doi=10.3233/978-1-61499-845-7-102
59. Isaradech N, Sirikul W. Digital Health Tools Applications in Frail Older Adults - A Review Article [Internet]. Geriatric Medicine; 2024 [cited 2025 Aug 1]. Available from: http://medrxiv.org/lookup/doi/10.1101/2024.02.01.24302134
60. Hirmas-Adauy M, Castillo-Laborde C, Awad C, Jasmen A, Mattoli M, Molina X, et al. Navigating Through Innovation in Elderly's Health: A Scoping Review of Digital Health Interventions. Public Health Rev. 2024 Dec 19;45:1607756.
61. Silva ÍDS, Silva CRDV, Lopes RH, Araújo AJD, Figueirêdo RCD, Bay ODG, et al. Digital health interventions and quality of home-based primary care for older adults: A scoping review protocol. Front Public Health. 2023 Jan 9;10:1022587.
62. Linden T, Fisher R. Digital Platforms to Support Feedback Processing in Aged Care Homes: Friend or Foe? In: Daimi K, Alsadoon A, Seabra Dos Reis S, editors. Current and Future Trends in Health and Medical Informatics [Internet]. Cham: Springer Nature Switzerland; 2023 [cited 2025 Aug 1]. p. 93–107. (Studies in Computational Intelligence; vol. 1112). Available from: https://link.springer.com/10.1007/978-3-031-42112-9_5
63. Nautiyal S, Shrivastava A, Deka C, Chauhan P. Role of Digital Healthcare in the Well-being of Elderly People: A Systematic Review. In: Proceedings of the 13th Indian Conference on Human-Computer Interaction [Internet]. Hyderabad India: ACM; 2022 [cited 2025 Aug 1]. p. 30–41. Available from: https://dl.acm.org/doi/10.1145/3570211.3570214
64. Anikeeva O, Bywood P. eHealth technologies in primary health care: current strengths and limitations.
65. Gaby S. E-health: Transforming doctor-patient relationships with a dose of technology - UQ eSpace [Internet]. [cited 2025 Aug 1]. Available from: https://espace.library.uq.edu.au/view/UQ:166159
66. Wilson J, Heinsch M, Betts D, Booth D, Kay-Lambkin F. Barriers and facilitators to the use of e-health by older adults: a scoping review | BMC Public Health | Full Text [Internet]. [cited 2025 Jul 10]. Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-11623-w
67. Dineen-Griffin S, Garcia-Cardenas V, Williams K, Benrimoj SI. Helping patients help themselves: A systematic review of self-management support strategies in primary health care practice. PLoS ONE. 2019 Aug 1;14(8):e0220116.
68. van Olmen J. The Promise of Digital Self-Management: A Reflection about the Effects of Patient-Targeted e-Health Tools on Self-Management and Wellbeing. Int J Environ Res Public Health. 2022 Jan 26;19(3):1360.

69. PHN Eastern Melbourne. New toolkit and My Health Record empowering allied health professionals - EMPHN [Internet]. [cited 2025 Jul 14]. Available from: https://emphn.org.au/news/new-toolkit-and-my-health-record-empowering-allied-health-professionals/
70. McKeown S. Moving toward a more connected aged health system with My Health Record - Inside Ageing. 2024 Mar [cited 2025 Jul 14]; Available from: https://insideageing.com.au/moving-toward-a-more-connected-aged-health-system-with-my-health-record/
71. Amoroso C. The 45 year old health check - Feasibility and impact on practices and patient behaviour.
72. Medibank. Medibank Live Better. 2023 [cited 2025 Jul 14]. What is the 45-49 health assessment and am I eligible? | Live Better. Available from: https://www.medibank.com.au/livebetter/health-brief/health-check/45-to-49-health-assessment/
73. Note AN.0.38 | Medicare Benefits Schedule [Internet]. [cited 2025 Jul 14]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=note&q=AN.0.38&qt=noteID
74. Healthdirect Australia. About my health record – purpose, benefits and security [Internet]. Healthdirect Australia; 2025 [cited 2025 Jul 14]. Available from: https://www.healthdirect.gov.au/my-health-record
75. Australian Digital Health Agency. National Digital Health Strategy. Available from: https://www.digitalhealth.gov.au/sites/default/files/documents/national-digital-health-strategy-2023-2028.pdf
76. Tomlinson J. My Health Record implementation in private specialist practice. Med J Aust [Internet]. 2019 Apr [cited 2025 Sep 24];210(S6). Available from: https://onlinelibrary.wiley.com/doi/abs/10.5694/mja2.50030
77. Australian Government. Your My Health Record | myGov [Internet]. [cited 2025 Jul 14]. Available from: https://my.gov.au/en/services/health-and-disability/seeking-medical-help/accessing-your-medical-information/your-my-health-record
78. Australian Digital Health Agency. Australian Digital Health Agency [Internet]. 2025 [cited 2025 Jul 14]. Available from: https://www.digitalhealth.gov.au/australian-digital-health-agency
79. Australian Digital Health Agency. My Health Record Statistics [Internet]. 2025 [cited 2025 Jul 14]. Available from: https://www.digitalhealth.gov.au/initiatives-and-programs/my-health-record/statistics
80. Homewood D, Keane K, Haridy J, Valaydon Z, Manning T, Crowe J, et al. Updates in digital shared care: Launching into the 21st century. 2024 Nov [cited 2025 Jul 15]; Available from: https://www1.racgp.org.au/ajgp/2024/november/updates-in-digital-shared-care
81. Person-centred care in the Dutch primary care setting: Refinement of middle-range theory by patients and professionals - PMC [Internet]. [cited 2025 Jul 15]. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC9997984/
82. Walsh L, Hemsley B, Allan M, Dahm MR, Balandin S, Georgiou A, et al. Assessing the information quality and usability of My Health Record within a health literacy framework: What's changed since 2016? Health Inf Manag J. 2021 Jan 1;50(1–2):13–25.
83. Sun Y, Chen J, Ji M, Li X. Wearable Technologies for Health Promotion and Disease Prevention in Older Adults: Systematic Scoping Review and Evidence Map. J Med Internet Res. 2025 Jun 24;27:e69077.
84. Menassa M, Wilmont I, Beigrezaei S, Knobbe A, Arita VA, Valderrama JF, et al. The future of healthy ageing: Wearables in public health, disease prevention and healthcare. Maturitas. 2025 May 1;196:108254.
85. Abhinav V, Basu P, Verma SS, Verma J, Das A, Kumari S, et al. Advancements in Wearable and Implantable BioMEMS Devices: Transforming Healthcare Through Technology. Micromachines. 2025 May;16(5):522.
86. Abdi S, De Witte L, Hawley M. Emerging Technologies With Potential Care and Support Applications for Older People: Review of Gray Literature. JMIR Aging. 2020 Aug 11;3(2):e17286.
87. Jiang Y, Wang J. Technological Innovations and Data-Driven Support for Older Adults. JMIR Aging. 2023 May 10;6:e48547.
88. Gagnon MP, Ouellet S, Attisso E, Supper W, Amil S, Rhéaume C, et al. Wearable Devices for Supporting Chronic Disease Self-Management: Scoping Review. Interact J Med Res. 2024 Dec 9;13:e55925.
89. Shin G, Jarrahi MH, Fei Y, Karami A, Gafinowitz N, Byun A, et al. Wearable activity trackers, accuracy, adoption, acceptance and health impact: A systematic literature review. J Biomed Inform. 2019 May 1;93:103153.
90. Jafleh E, Alnaqbi F, Almaeeni H, Faqeeh S, Alzaabi M, Zaman K. The Role of Wearable Devices in Chronic Disease Monitoring and Patient Care: A Comprehensive Review - PMC. 2024 Sep [cited 2025 Jul 14]; Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11461032/
91. Olmedo-Aguirre JO, Reyes-Campos J, Alor-Hernandez G, Machorro-Cano I, Rodriguez-Mazahua L, Sanchez-Cervantes JL. Remote Healthcare for Elderly People Using Wearables: A Review - PMC. [cited 2025 Jul 14]; Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8869443/

92. Arzu A. Older Adult Care. 2025 [cited 2025 Jul 14]. Wearable Monitoring Devices for the Elderly. Available from: https://olderadultcare.com/wearable-monitoring-devices-for-the-elderly/
93. Neves BB, Vetere F. Ageing and Emerging Digital Technologies. In: Neves BB, Vetere F, editors. Ageing and Digital Technology [Internet]. Singapore: Springer Singapore; 2019 [cited 2025 Aug 1]. p. 1–14. Available from: http://link.springer.com/10.1007/978-981-13-3693-5_1
94. Tegart G. Smart technology for healthy longevity [Internet]. Australian Academy of Technological Sciences and Engineering; 2010 [cited 2025 Aug 1]. Available from: http://apo.org.au/node/23375
95. A randomized controlled trial of a wearable technology-based intervention for increasing moderate to vigorous physical activity and reducing sedentary behavior in breast cancer survivors: The ACTIVATE Trial [Internet]. [cited 2025 Sep 30]. Available from: https://acsjournals.onlinelibrary.wiley.com/doi/epdf/10.1002/cncr.32143
96. GoShare Healthcare [Internet]. Healthily. [cited 2025 May 28]. Available from: https://healthily.com.au/goshare/
97. GoShare – Digital Information Direct to Patients [Internet]. WentWest. 2021 [cited 2025 May 28]. Available from: https://wentwest.com.au/goshare-digital-information-direct-to-patients/
98. Evidence [Internet]. Healthily. [cited 2025 Oct 2]. Available from: https://healthily.com.au/evidence/
99. Simpson J. PHNs harness community leader messaging to address vaccine hesitancy within Aboriginal and Torres Strait Islander and CALD communities [Internet]. Healthily. 2021 [cited 2025 Oct 2]. Available from: https://healthily.com.au/vaccine-hesitancy/
100. Fox RS, Zhang M, Amagai S, Bassard A, Dworak EM, Han YC, et al. Uses of the NIH Toolbox® in Clinical Samples. Neurol Clin Pract. 2022 Aug;12(4):307–19.
101. MyCog [Internet]. NIH Toolbox. [cited 2025 May 28]. Available from: https://nihtoolbox.riverworks.biz/mycog/
102. Young SR, Lattie EG, Berry ABL, Bui L, Byrne GJ, Benavente JNY, et al. Remote Cognitive Screening Of Healthy Older Adults for Primary Care With the MyCog Mobile App: Iterative Design and Usability Evaluation. JMIR Form Res. 2023 Jan 10;7(1):e42416.
103. NIH Toolbox [Internet]. [cited 2025 Jul 14]. MyCog Overview of Development. Available from: https://nihtoolbox.riverworks.biz/mycog/
104. Greenhalgh T, Wherton J, Papoutsi C, Lynch J, Hughes G, A'Court C, et al. Beyond Adoption: A New Framework for Theorizing and Evaluating Nonadoption, Abandonment, and Challenges to the Scale-Up, Spread, and Sustainability of Health and Care Technologies. J Med Internet Res. 2017 Nov 1;19(11):e367.
105. Terry D, Hills D, Bradley C, Govan L. Nurse-led clinics in primary health care: A scoping review of contemporary definitions, implementation enablers and barriers and their health impact. J Clin Nurs. 2024 May;33(5):1724–38.
106. Grant A, Kontak J, Jeffers E, Lawson B, MacKenzie A, Burge F, et al. Barriers and enablers to implementing interprofessional primary care teams: a narrative review of the literature using the consolidated framework for implementation research. BMC Prim Care. 2024 Jan 12;25(1):25.
107. The Royal Australian College of General Practice. Aged care clinical guide (Silver Book) - Part A - Common clinical conditions in aged care | Aged Care Quality and Safety Commission [Internet]. [cited 2025 Jun 2]. Available from: https://www.agedcarequality.gov.au/quality-standards/racgp-aged-care-clinical-guide-silver-book-part-common-clinical-conditions-aged-care
108. The Royal Australian College of General Practice. Shared Care Model between GP and non-GP specialists for complex chronic conditions [Internet]. 2023. Available from: https://www.racgp.org.au/getmedia/e58af0d0-de01-4228-8064-468584f371be/Shared-Care-Model-between-GP-and-non-GP-specialists-for-complex-chronic-conditions.pdf.aspx
109. Australian Commission on Safety and Quality in Healthcare. Communicating for Safety Standard | Australian Commission on Safety and Quality in Health Care [Internet]. [cited 2025 Jul 17]. Available from: https://www.safetyandquality.gov.au/standards/nsqhs-standards/communicating-safety-standard
110. The Royal Australian College of General Practice. Silver Book - Part B [Internet]. [cited 2025 Jul 17]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/silver-book/silver-book-part-b
111. The Royal Australian College of General Practice. Collaboration and multidisciplinary team-based care [Internet]. [cited 2025 May 22]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/silver-book/silver-book-part-b/collaboration-and-multidisciplinary-team-based-car
112. HealthPathways. HealthPathways [Internet]. 2025 [cited 2025 Jul 21]. Available from: https://healthpathwaysglobal.org/

113. Love T. Implementing HealthPathways across Queensland: a case study. 2019 May.
114. Kruys E, Harper J. Australian Journal of General Practice. [cited 2025 Jul 21]. How to use community HealthPathways. Available from: https://www1.racgp.org.au/ajgp/2024/supplement-november/how-to-use-community-healthpathways
115. Canaway R, Manski-Nankervis J, Gray. Primary care data and linkage. Capacity Build [Internet]. 2020 Dec; Available from: https://machaustralia.org/wp-content/uploads/2021/05/Primary-care-data-and-linkage_Dec-2020.pdf
116. Stokes T, Tumilty E, Doolan-Noble F, Gauld R. HealthPathways implementation in a New Zealand health region: a qualitative study using the Consolidated Framework for Implementation Research. 2018 Dec 1 [cited 2025 Jul 21]; Available from: https://bmjopen.bmj.com/content/8/12/e025094.long
117. McGeoch G, Gullery C, Hamilton G. The Canterbury Initiative – implementation of integration. J Prim Health Care. 2022 Apr 13;14(1):6–9.
118. Robinson S, Varhol R, Bell A, Quirk F, Durrington L. HealthPathways: Creating a pathway for health systems reform. Aust Health Rev Publ Aust Hosp Assoc. 2014 Dec 1;39.
119. Australian Government Department of Health, Disability and Ageing. Telehealth [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Jul 17]. Available from: https://www.health.gov.au/topics/health-technologies-and-digital-health/about/telehealth
120. Kruse CS, Krowski N, Rodriguez B, Tran L, Vela J, Brooks M. Telehealth and patient satisfaction: a systematic review and narrative analysis. BMJ Open. 2017 Aug 3;7(8):e016242.
121. Snoswell CL, Chelberg G, De Guzman KR, Haydon HM, Thomas EE, Caffery LJ, et al. The clinical effectiveness of telehealth: A systematic review of meta-analyses from 2010 to 2019. J Telemed Telecare. 2023 Oct 1;29(9):669–84.
122. Snoswell CL, Taylor ML, Comans TA, Smith AC, Gray LC, Caffery LJ. Determining if Telehealth Can Reduce Health System Costs: Scoping Review. J Med Internet Res. 2020 Oct 19;22(10):e17298.
123. Smith AC, Thomas E, Snoswell CL, Haydon H, Mehrotra A, Clemensen J, et al. Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19). J Telemed Telecare. 2020 Mar 20;1357633X20916567.
124. Ezeamii VC, Okobi OE, Wambai-Sani H, Perera GS, Zaynieva S, Okonkwo CC, et al. Revolutionizing Healthcare: How Telemedicine Is Improving Patient Outcomes and Expanding Access to Care. Cureus. 16(7):e63881.
125. Australian Health Practitioner Regulation Agency. Revised telehealth guidelines now in effect [Internet]. [cited 2025 Jul 17]. Available from: https://www.ahpra.gov.au/sitecore/content/Medical/News/2023-09-01-Revised-telehealth-guidelines-now-in-effect.aspx
126. The Royal Australian College of General Practice. Telehealth [Internet]. [cited 2025 Jul 17]. Available from: https://www.racgp.org.au/running-a-practice/technology/clinical-technology/telehealth
127. Enhancing Telehealth [Internet]. [cited 2025 May 28]. Enhancing Telehealth. Available from: https://www.monash.edu/it/enhancing-telehealth#
128. Enhanced Telehealth Capabilities for Improved Patient and Clinician Experiences [Internet]. Digital Health CRC. [cited 2025 Jul 17].
129. InstantScripts - Fast, Safe & Secure Online Prescriptions in Australia [Internet]. 2022 [cited 2025 Jul 17]. Available from: https://www.instantscripts.com.au/
130. Willis VC, Thomas Craig KJ, Jabbarpour Y, Scheufele EL, Arriaga YE, Ajinkya M, et al. Digital Health Interventions to Enhance Prevention in Primary Care: Scoping Review. JMIR Med Inform. 2022 Jan 21;10(1):e33518.
131. Cohen-Stavi CJ, Balicer RD, Roberts ML. Innovation in health care for proactive care delivery and strategic clinical decision-making: integrating research, technology and practice. 2018;4(3).
132. World Health Organization. Framework to implement a life course approach in practice [Internet]. 2025 [cited 2025 Jul 17]. Available from: https://www.who.int/publications/i/item/9789240112575
133. World Health Organization. Primary health care measurement framework and indicators: monitoring health systems through a primary health care lens [Internet]. 2022. Available from: https://iris.who.int/bitstream/handle/10665/352205/9789240044210-engpdf?sequence=1
134. Gee PM, Greenwood DA, Paterniti DA, Ward D, Miller LMS. The eHealth Enhanced Chronic Care Model: A Theory Derivation Approach. J Med Internet Res. 2015 Apr 1;17(4):e86.
135. Baines R, Tredinnick-Rowe J, Jones R, Chatterjee A. Barriers and Enablers in Implementing Electronic Consultations in Primary Care: Scoping Review. J Med Internet Res. 2020 Nov 12;22(11):e19375.
136. In2health [Internet]. [cited 2025 May 28]. In2health. Available from: https://www.in2health.com

137. In2health [Internet]. [cited 2025 Jul 18]. ePREVENT 360 research project. Available from: https://www.in2health.com/eprevent360
138. Evans K, Papinniemi A, Ploderer B, Nicholson V, Hindhaugh T, Vuvan V, et al. Impact of using an AI scribe on clinical documentation and clinician-patient interactions in allied health private practice: perspectives of clinicians and patients. Musculoskelet Sci Pract. 2025 Aug;78:103333.
139. Shah SJ, Devon-Sand A, Ma SP, Jeong Y, Crowell T, Smith M, et al. Ambient artificial intelligence scribes: physician burnout and perspectives on usability and documentation burden. J Am Med Inform Assoc JAMIA. 2025 Feb 1;32(2):375–80.
140. Sasseville M, Yousefi F, Ouellet S, Naye F, Stefan T, Carnovale V, et al. The Impact of AI Scribes on Streamlining Clinical Documentation: A Systematic Review. Healthcare. 2025 Jun 16;13(12):1447.
141. Australasian Institute of Digital Health. Implementation of AI scribes in healthcare workflows [Internet]. [cited 2025 Aug 1]. Available from: https://digitalhealth.org.au/new-resource-ai-scribes-in-australian-healthcare/
142. Heidi Health - AI Medical Scribe for AU Clinicians [Internet]. [cited 2025 Jul 18]. Available from: https://www.heidihealth.com/au
143. Writers S. Heidi Health's AI Scribe now live within MediRecords [Internet]. Medical Republic. 2024 [cited 2025 Jul 18]. Available from: https://www.medicalrepublic.com.au/heidi-healths-ai-scribe-now-live-within-medirecords/112422
144. NewsGP [Internet]. [cited 2025 Jul 18]. newsGP - AI scribe initiative to assess impact of new technology. Available from: https://www1.racgp.org.au/newsgp/professional/ai-scribe-initiative-to-assess-impact-of-new-techn
145. The Hunter New England and Central Coast Primary Health Network. Primary Health Network. [cited 2025 Jul 18]. AI-Enabled General Practice Initiative launches across the region. Available from: https://thephn.com.au/news/ai-enabled-general-practice-initiative-launches-with-ten-practices-across-the-region
146. Heidi Health. AI and Healthcare Insights [Internet]. [cited 2025 Jul 18]. Available from: https://www.heidihealth.com/au/customers
147. Heidi Health Blog - AI and Healthcare Insights | Australia [Internet]. [cited 2025 Jul 18]. Available from: https://www.heidihealth.com/au/customers
148. A doctor's journey: Combining care with technology [Internet]. [cited 2025 Jul 18]. Available from: https://www.heidihealth.com/au/customers/gihan-de-mel-gp
149. Australian Institute of Health and Welfare [Internet]. 2025 [cited 2025 Jul 21]. Primary health care Data development. Available from: https://www.aihw.gov.au/reports-data/health-welfare-services/primary-health-care/primary-health-care-data-development
150. Australian Journal of General Practice [Internet]. [cited 2025 Jul 21]. Using primary care data for research.
151. The Royal Australian College of General Practice. RACGP supports national cancer screening bill [Internet]. [cited 2025 Jul 21]. Available from: https://www.racgp.org.au/gp-news/media-releases/2024-media-releases/march-2024/racgp-supports-national-cancer-screening-bill
152. Australian Government. National Cancer Screening Register. [cited 2025 Jul 19]. A single electronic record for each Australian taking part in the bowel, cervical and lung cancer screening programs. Available from: http://www.ncsr.gov.au/au/en.html
153. National Cancer Screening Register. National Cancer Screening Register. [cited 2025 Jul 21]. How to interact with the NCSR. Available from: http://www.ncsr.gov.au/about-us/how-to-interact-with-the-NCSR.html
154. National Cancer Screening Register. National Cancer Screening Register. [cited 2025 Jul 21]. Best Practice support materials. Available from: http://www.ncsr.gov.au/about-us/how-to-interact-with-the-NCSR/for-healthcare-providers/clinical-software-integration/best-practice-support-materials.html
155. Gertig D, Lee J. Supporting health care providers in cancer screening: the role of the National Cancer Screening Register. Med J Aust. 2023 Aug 7;219(3):94–8.
156. National Cancer Screening Register [Internet]. [cited 2025 Jul 21]. Achieving cervical screening equity in regional and remote Australia. Available from: http://www.ncsr.gov.au/about-us/news-and-media/achieving-cervical-screening-equity-in-regional-and-remote-austr.html
157. Dodd RH, Whop LJ, Smith MA. Facilitating uptake of cervical screening among Indigenous women to achieve equitable and timely elimination of cervical cancer. Lancet Reg Health – West Pac [Internet]. 2021 Aug 1 [cited 2025 Jul 21];13. Available from:
158. Haydon HM, Caffery LJ, Snoswell CL, Thomas EE, Taylor M, Budge M, et al. Optimising specialist geriatric medicine services by telehealth. J Telemed Telecare. 2021 Dec;27(10):674–9.

159. Pearce C, McLeod A, Rinehart N, Whyte R, Deveny E, Shearer M. Artificial intelligence and the clinical world: a view from the front line. Med J Aust [Internet]. 2019 Apr [cited 2025 Aug 1];210(S6). Available from: https://onlinelibrary.wiley.com/doi/abs/10.5694/mja2.50025

Appendix 5. Descriptive summary of the studies reviewed

This section maps the research landscape of the literature on overview of different types of emerging digital technologies in the care of older people in Australia, focusing on primary care settings, encompassing a diverse range of digital health innovations including telehealth, electronic health records, artificial intelligence, remote monitoring, and integrated care platforms. The studies predominantly employ qualitative, quantitative, and mixed-method approaches, with a strong focus on Australian primary care and aged care contexts, reflecting interdisciplinary collaboration among healthcare providers, policymakers, and researchers. This comparative analysis addresses key research questions by synthesizing evidence on technology typologies, adoption barriers, clinical outcomes, implementation strategies, and user experience, thereby informing future digital health integration for older Australians.

Appendix 5.1 Examples of emerging digital technologies from the included studies

Study	**Technology typology**	**Barriers and facilitators**	**Clinical and Patient Outcomes**	**Integration and Implementation Strategies**	**User Experience and Accessibility**
(Pu et al., 2023) (24)	Telehealth, remote monitoring, virtual emergency care	Sensory impairments, staff training, data sharing challenges	Telehealth prioritized; remote monitoring needs more evidence	Co-production approach; focus on scalability and cost	User-friendliness issues; digital literacy required
(Homewood et al., 2024) (7)	Shared electronic health records, telehealth, patient portals	Rural access barriers; need for clinician-patient collaboration	Improved care coordination and chronic disease management	Emphasis on interoperability and policy support	Patient-centric interfaces; digital divide concerns
(Andrade et al., 2023) (47)	Digital messaging integrated in clinical software	Delivery mode impacts uptake; digital messaging more effective	Earlier primary care appointments during COVID-19	Integration with GP software systems	Facilitates timely care; requires provider engagement
(Andrew et al., 2024) (41)	Linked EHR data platform with AI NLP	Data quality and linkage challenges	Enables population health research and service redesign	Multi-agency data linkage; governance frameworks	Supports research access; privacy considerations
(Ashley et al., 2023) (25)	Telehealth consultations in PHC	Funding models, provider support, hybrid models	Sustained telehealth use; improved access	Policy changes post-pandemic; hybrid service models	Provider resilience; need for training and support
(Ambagtsheer et al., 2019) (42)	Electronic Frailty Index from EHRs	Data extraction complexity; EHR variability	Accurate frailty identification; informs interventions	Feasibility in rural primary care; minimal infrastructure changes	Automated; requires data completeness
(Raven et al., 2013) (22)	Video-based telehealth consultations	Technological infrastructure; professional role shifts	High patient satisfaction; limited cost-effectiveness evidence	Integration in rural and remote primary care	Challenges in role adaptation; improves access

(Savira et al., 2022) (21)	Videoconference, telephone, apps, monitoring systems	Physical, cognitive impairments; staffing and legislative issues	Similar or better outcomes than in-person care	Pilot stage initiatives; need for embedded evaluation	Barriers include motivation and sensory impairments
(Silva et al., 2024) (32)	Video communication, apps, health monitoring	Access to technology; economic and team management challenges	Positive impacts on access and care coordination	Policy emphasis on equity and safety	Communication challenges; need for tailored ICT
(Sturgiss et al., 2022) (23)	Telehealth, point-of-care testing, e-prescriptions	Rapid implementation challenges; need for evaluation	Supports continuity of care during pandemic	Federal government digital health response	Acceptability and feasibility under study
(Fisher et al., 2022) (48)	Telehealth in general practice	Infrastructure gaps; privacy concerns; funding	Increased access; reduced infection risk	Permanent telehealth integration; training needed	Need for tailored training; hybrid models preferred
(Neves & Burgers, 2022)(40)	Patient access to records, big data, virtual care	Infrastructure, privacy, and equity challenges	Potential for safer, equitable care	Calls for stakeholder involvement and regulation	Digital literacy and support critical
(Jimenez et al., 2021) (39)	EHRs, monitoring tech, online portals	Limited maturity; policy and financial support needed	Improved continuity and patient satisfaction	Multicomponent interventions; evidence gaps	Mixed cost impacts; requires stakeholder advocacy
(Fava & Lapão, 2024) (30)	Telemedicine, decision support, self-care platforms	Lack of training; reimbursement issues	Mixed results on service quality and clinical outcomes	WHO encouragement; implementation barriers	User involvement lacking; digital literacy issues
(Moyle et al., 2022) (26)	Aged care technologies, digital management systems	Poor integration; user training; privacy concerns	Technology often unmet user needs; need for co-design	Calls for streamlined administration systems	Ease of use and training critical; human connection valued
(Bail et al., 2023) (45)	Co-designed health information system	Staff acceptance; workflow adaptation challenges	Improved efficiency and resident-focused care	Participatory action research; tailored implementation	Positive staff feedback; requires ongoing support
(Haydon et al., 2021) (158)	Telegeriatric video consultations	Mobility issues; need for integrated systems	Increased access to specialist care; stakeholder acceptance	Centralized team implementation; training emphasized	Hardware limitations; mobile solutions suggested
(Karunanithi & Zhang, 2018) (58)	Sensor-enabled home monitoring platform	User autonomy; technology acceptance	Supports independent living; pilot studies positive	Consumer-directed care; regional and remote validation	Unobtrusive sensors; shared data with carers
(Lewis et al., 2022) (49)	Electronic Frailty Index from GP records	Data completeness; socioeconomic disparities	High frailty prevalence; informs targeted interventions	Feasible in routine practice; supports policy planning	Automated; requires data quality and completeness
(Thompson, 2024) (43)	Digital cognitive screening tools	Space, time constraints; patient preference	Feasible and acceptable; preference for home screening	Integration with PCP visits; multiple administration modes	Self-administered preferred; coordination challenges

(Khanassov et al., 2023) (29)	Telemedicine in primary care	Visual contact loss; communication barriers	Maintains continuity; convenient for minor issues	Hybrid approach recommended; provider and patient perspectives	Hybrid model preferred; sensory and language barriers
(Fjellså et al., 2023) (31)	eHealth in care coordination	Capacity loss; system support needed	Supports participation and information needs	Emphasizes patient involvement; system support crucial	Digital engagement varies; loss of control concerns
(De Santis et al., 2023) (14)	Mobile/non-mobile health promotion tech	Digital divide; ethical data concerns	Potential health benefits; unclear clinical impact	Calls for tailored tech and outcome evaluation	Human support essential; digital competence variable
(Nautiyal et al., 2022) (63)	Various digital healthcare tools	Limited high-quality evidence; demographic focus	Improves elderly healthcare access and quality	Systematic review highlights research gaps	Need for broader demographic inclusion
(Siette & Adam, 2024) (53)	Digital tools for brain health	Implementation gap; clinician engagement needed	Supports lifestyle interventions; dementia risk reduction	Tailored digital solutions; shared decision-making	Personalised; requires clinician and patient buy-in
(Isaradech & Sirikul, 2024) (59)	Digital tools for frailty diagnosis	Knowledge gaps; need for integrated platforms	Exercise improves frailty; digital tools promising	Calls for personalised prevention and therapeutic platforms	Emerging evidence; need for integrated approaches
(Rahimi et al., 2021) (34)	AI in community primary care	Reporting variability; implementation gaps	Facilitates diagnosis and management; bias concerns	Need for development guidance; risk of bias highlighted	Diverse AI methods; ethical and practical challenges
(Kaymakçı & Kasap, 2024) (35)	AI in primary care	Data privacy; integration and ethical challenges	Enhances diagnostics, administration, personalised care	Emphasizes ethical AI use and human-centered care	Risk of over-reliance; transparency needed
(Efendioğlu, 2024) (57)	AI in geriatric medicine	Limited clinical adoption; potential for improvement	Supports dementia, delirium, falls management	Emerging applications; requires further validation	Potential to improve care; integration challenges
(Hirmas et al., 2024) (60)	Digital health initiatives mapping	Fragmented evidence; need for comprehensive synthesis	Broad range of innovations; caregiver support focus	Calls for coordinated research and policy frameworks	User engagement and accessibility emphasized
(Luo et al., 2022) (36)	EHR-based frailty assessment tools	Clinical workload; validation needs	Enables frailty screening; supports clinical decisions	Development and validation ongoing; primary care focus	Data-driven; requires clinical integration
(Vandersman & Tieman, 2024) (50)	Technology in end-of-life care	Ambivalence; training and support needs	Enhances care planning and coordination	Nurses' role critical; sector readiness required	Openness to tech; need for support and education
(Fasoli et al., 2023) (52)	Emerging technologies in aged care	Privacy, safety, and ethical concerns	Cost-efficiency and infection prevention benefits	Ethical considerations; need for user control	Privacy risks; training and mediation important

Chapter 6: Consumer and carer engagement in healthy ageing

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Background

Consumer and carer engagement has been widely recognised in literature as a significant component of high-quality, person-centred healthcare (1). In the context of healthy ageing, engagement refers to the involvement of older adults, carers and families in healthcare decisions, service planning and system governance. Evidence indicates that such engagement can support improved care coordination, responsiveness to individual preferences and enhanced health outcomes (2,3).

In Australian health policy, consumer engagement in their healthcare is formally recognised and supported in national frameworks. The *Partnering with Consumers Standard*, one of the eight National Safety and Quality Health Service (NSQHS) Standards, outlines expectations for health services to involve consumers in governance, shared decision-making, health literacy and service design (1). Complementing this, the *Australian Charter of Healthcare Rights* affirms consumer rights to access, respect, partnership and information, providing a legal and ethical basis for engagement across health system levels (4). These frameworks identify partnership as a shared responsibility between consumers and providers, including within primary care.

Informal carers play an integral role in supporting older adults navigate the health system. Carers frequently contribute to medication management, appointment attendance and advocacy in clinical settings, particularly in the presence of cognitive decline or multimorbidity (2). Data from the 2024 *Carer Wellbeing Survey* indicate that many carers of older Australians experience elevated psychological distress, reduced workforce participation and challenges in accessing and coordinating health services (5). Evidence indicates a link between carer inclusion in engagement strategies and improved outcomes and care continuity in primary and community care contexts (2,6).

A national research report by National Seniors Australia and EveryAGE Counts examined co-design approaches as a mechanism for strengthening consumer and carer engagement. Unlike consultation, which often involves one-off feedback, co-design entails the active and sustained involvement of consumers and carers in developing models of care, tools and service innovations (3). Drawing on survey responses from more than 4,500 older Australians, the report highlights strong consumer expectations for genuine co-design processes in developing improvements to the aged care system, outlining what constitutes genuine co-design, that report identifies several guiding principles including equity in participation, reciprocal learning and iterative feedback (3). Building on this, further literature highlights that co-design is an established approach for advancing healthy ageing, particularly through the development of accessible, person-centred and age-friendly primary care services (2,4,7).

This chapter reviews evidence relevant to consumer and carer engagement in healthy ageing across three interrelated levels: engagement in direct care, involvement in service design and improvement, and participation in system-level governance. Across these levels, five cross-cutting domains - personalised care, health literacy, shared decision-making, partnerships and organisational culture are applied. This approach enables a comprehensive exploration of how engagement at multiple levels supports healthy ageing outcomes in primary care and community-based contexts.

Across the literature, there is consensus that co-design, shared decision-making and authentic partnerships are critical levers for transforming health outcomes and enabling person-centred, age-friendly care (1,8).

Direct care level: participation in personal health and care decisions

At the direct care level, consumer and carer engagement centres on interactions between older people, carers and primary care professionals. The literature highlights the importance of enabling older adults and their informal carers to participate meaningfully in healthcare decisions, particularly in the context of supporting healthy ageing in primary care.

Personalised care

Personalised care is central to effective engagement at the point of care. Personalised care emphasises respect for the unique circumstances, values, identity and goals of each individual. This requires moving beyond standardised approaches and actively involving older people and, where appropriate, their carers in planning and decision-making about their care (9).

The Victorian *Partnering in Healthcare Framework* explicitly prioritises personalised care and states that personalised care is achieved through treating people with dignity and compassion, tailoring care to individual needs and preferences and enabling shared planning and goal-setting (9). For older adults in primary care, effective care planning incorporates not only clinical appropriateness but also attention to cultural safety, communication needs and individual preferences (6,9,10). Farmer et al. (2018) reinforce this by identifying personalised care as a core enabler of shared decision-making, noting that failure to recognise individuals' values and goals can undermine engagement efforts (6). For older adults, particularly those managing multiple chronic conditions or navigating frailty, the benefits of personalised care include greater satisfaction, increased adherence to treatment and improved functional outcomes (6).

A qualitative evidence synthesis conducted by Merner et al. (2023) demonstrates how co-design methods can be used to embed personalised care principles in clinical practice by drawing together consumer and provider perspectives on partnering to improve health service design, delivery and evaluation. The review emphasises that effective partnerships require addressing power imbalances and can strengthen the person-centredness of health service culture and design (10).

The Australian Charter of Healthcare Rights affirms every person’s right to be treated as an individual, with care that reflects personal beliefs and cultural identity (4). This is particularly relevant in primary care settings that support diverse populations, including older people from culturally and linguistically diverse backgrounds, Aboriginal and Torres Strait Islander communities and those living with disability (4,9,10).

Health literacy

Health literacy is an enabler of older adults’ participation in their own health and care decisions. Limited health literacy is relatively common among older people and can be associated with lack of familiarity with medical terminology and health information, sensory decline or cognitive changes, and can impede comprehension, reduce confidence and restrict meaningful involvement in care planning (4,11,12).

In primary care, low health literacy can diminish the effectiveness of engagement strategies and compromise autonomy, particularly when an individual has multiple chronic conditions (6,13). To address this, clinicians and care teams are increasingly using health literacy-sensitive practices that simplify, personalise and visually present information (14,15).

Evidence supports the use of co-designed communication aids that make care decisions more accessible. These include medication reminder tools, condition-specific visual diagrams and digital literacy support materials which have shown promise in improving shared understanding between older adults, carers and healthcare providers (15,16). Such approaches not only facilitate comprehension during consultations but also reinforce the capacity for informed decision-making between visits (17–20).

Tailoring communication to individual preferences, using plain language and involving carers where appropriate, supports health literacy and promotes trust, agency and autonomy which are recognised as core elements of quality care at the point of decision-making (7,9,11,21).

It is essential that health literacy approaches are inclusive of Australia's diverse populations. For Aboriginal and Torres Strait Islander peoples and individuals from culturally and linguistically diverse (CALD) communities, equitable communication requires approaches that are grounded in cultural respect, community engagement and reciprocal exchange (22). Research highlights that limited engagement with CALD consumers is linked to increased vulnerability to safety events in healthcare, underscoring the need for culturally responsive communication and system-level accountability (8). For Indigenous communities, co-designing interventions with community members and incorporating First languages, where possible, strengthens autonomy and ensures cultural relevance (22). These approaches reflect principles of cultural safety and humility, acknowledging the importance of power balance, mutual learning and trust in creating environments where people feel heard and respected (23,24). Tailoring messages to reflect cultural concepts of health and wellbeing, incorporating preferred languages and visual supports and creating safe spaces for dialogue improve understanding and support informed participation in health decisions (25,26).

Shared decision-making

Shared decision-making is increasingly recognised best practice to support autonomy, person-centred care and improved health outcomes for older adults. It involves a collaborative process in which clinicians and consumers work together to make health decisions, combining clinical evidence with a person's values, goals and preferences (1,9,27).

Safer Care Victoria (2019) identifies several key enablers of shared decision-making within clinical settings. These include the routine use of decision aids in practice, provision of reliable and balanced information on treatment options and associated uncertainties, clear documentation and communication of consumer preferences, and the integration of shared decision-making within clinical roles and performance expectations. To support effective implementation, services must foster respectful and psychologically safe environments, address inherent power imbalances and uphold the principle of "nothing about us without us" in all care decisions. Tailored approaches are particularly important to ensure that shared decision-making is inclusive, culturally responsive and accessible to diverse groups, including older adults and their carers (9).

While there is no single agreed-upon model for shared decision-making, it typically includes three core phases: *choice talk*, *option talk*, and *decision talk* (28). These phases guide clinicians to present choices clearly, explain the potential risks and benefits of each option and support older adults to deliberate and select the option that aligns best with their values. Effective shared decision-making relies on two-way communication, mutual respect and recognition of both clinical and lived experience expertise (7,28).

Older adults and carers commonly report being excluded from decision-making regarding treatments, medications, referrals and lifestyle changes, especially in general practice and community settings. This exclusion may limit adherence, reduce satisfaction with care and compromise outcomes (6,13). Tools such as question prompt lists and decision aids have been shown to enhance consumer engagement and understanding. Available in print or digital formats, decision aids support shared decision-making by providing structured information on options, risks and benefits, alongside exercises designed to help clarify preferences (1,29).

A Cochrane review found that compared to usual care, the use of decision aids improves individuals' knowledge, accuracy of risk perceptions, alignment of choices with personal values and participation in decision-making (29). The Royal Australian College of General Practitioners (RACGP) guidelines also reinforce the importance of shared decision-making in preventive activities, noting that decisions around screening and treatment should reflect individual risk profiles and preferences (30).

The practice of shared decision-making contributes to safer and higher-quality care. According to the Australian Commission on Safety and Quality in Health Care, shared decision-making is integral to patient-centred care and strengthens the therapeutic alliance, reduces decisional conflict and enhances satisfaction with services (1). However, shared decision-making does not occur simply through the use of decision aids, it requires deliberate, skilled communication and a commitment to partnership between health professionals and consumers (1,9,28,31).

Carer involvement and partnerships

Carers are critical enablers of healthy ageing, yet their involvement in direct care planning is frequently overlooked. Mylek et al. (2023) reported findings from the Carers Australia 2024 Carer Wellbeing Survey, identified that only 38% of carers felt adequately included in health-related discussions, despite playing essential roles in medication management, transport and communication (5). Evidence suggests that formal inclusion of carers in care planning, particularly at the general practice level can support continuity, reduce avoidable hospital admissions and improve carer wellbeing (5,32).

Research by Layton et al. (2023) demonstrates how co-designing carer-specific health and wellbeing clinics can address the distinct needs of older carers, particularly when they are supporting people with complex or chronic conditions (2). The Australian Helping Hand Consumer and Carer Engagement Framework (2018) advocates for purposeful and consistent engagement with carers at all levels of care delivery, especially in planning and evaluation. It argues that carers provide a unique perspective on the older person's needs, preferences and experiences - perspectives which, if captured systematically, can significantly improve the quality and safety of care (33).

State and national guidelines also recognise the structural supports needed to elevate carer engagement (34–36). Victoria's framework on consumer and carer participation in the health system outlines expectations for service providers to involve carers in shared care planning and clinical handover (35,37). Similarly, the National Carer Strategy emphasises carer recognition and inclusion in service delivery with principles that prioritise meaningful partnership and timely access to information (34).

Despite these frameworks, operationalising carer inclusion remains inconsistent. Integration into practice often relies on local champions, ad hoc tools and service-level protocols. Strengthening the systemic recognition of carers as partners in care requires alignment across policy, workforce development and funding incentives (33,34).

Healthcare culture

A health service's culture significantly shapes how consumer and carer engagement is enacted in primary care. Cultural norms including language, leadership behaviours and day-to-day routines can either support or undermine efforts to embed person-centred principles. In general practice and other community-based settings, a culture that values the voices of patients, carers and families enhances trust, continuity and shared decision-making (38,39).

Co-design work by the New South Wales (NSW) Agency for Clinical Innovation (31) highlights the central role of staff capability and everyday practices in embedding engagement, particularly in frontline care. Similarly, the *Partnering in Healthcare Framework* in Victoria underscores how primary care organisations can foster cultures of collaboration through training, leadership and structural supports (9). This requires active support from practice managers, GPs, nurses and administrative staff, who collectively create an environment in which patients are seen as partners, not passive recipients of care (1,9,40).

Creating a culture of engagement also involves recognising and addressing power differentials that may silence marginalised populations. The World Health Organization (2021) states that when engagement strategies do not consider local cultural contexts, they risk reinforcing systemic inequities, especially among vulnerable groups facing multiple pressures such as economic stress, housing instability or discrimination. In primary care this requires that patient and carer involvement efforts be inclusive, culturally safe and responsive to social complexity (40).

The literature further indicates that traditional, clinician-led approaches to quality improvement may not fully capture or prioritise consumer and carer experience. A shift toward authentic engagement, particularly in practices serving Aboriginal and Torres Strait Islander peoples, rural communities and those from CALD backgrounds, requires re-examining entrenched routines and assumptions (8,31,39,41). Qualitative approaches and lived experience narratives are particularly valuable in capturing the nuances of engagement and identifying culturally adaptive solutions in care delivery (5,10,40,42).

Service level: participation in design and quality improvement

At the service level, consumer and carer participation plays a critical role in shaping how care is delivered, evaluated and improved. This level of engagement moves beyond individual consultations to influence broader decisions about program design, information systems and continuous improvement initiatives. Involving older adults and their carers in the design and governance of services ensures that care models are culturally safe, age-friendly and responsive to the priorities of the populations they serve (9).

There is growing recognition that health services deliver better outcomes when people who use them are involved in their design and improvement (1). Evidence demonstrates that service-level partnerships with consumers can increase access, improve health literacy and self-efficacy and ensure that health services are responsive to the needs of diverse populations, particularly older adults and those with complex care needs (43,44). However, there is a noted deficit in the formal adoption of these principles in generalist primary care settings. While co-design is increasingly cited as good practice, implementation in primary care tends to be uneven and under-evaluated outside of Aboriginal-specific services (45,46). A 2022 review of engagement approaches in aged care noted a risk that co-design is "uncritically promoted as an ideal" without sufficient attention to its practical challenges in implementation and evaluation (47). Moreover, embedding co-production and strengths-based practice requires services to devolve power, accept risk and invest in trust-building infrastructure, factors that may be constrained by time and funding pressures (48).

To address these challenges, national initiatives are emerging to support consistent and evidence-based application of consumer and community involvement (CCI). To address these challenges, national initiatives are emerging to support the consistent and evidence-based application of consumer and community involvement. The Consumer and Community Involvement: Implementation Research for Impact (CCIRI) program, funded by the Medical Research Future Fund and delivered through the Australian Health Research Alliance, represents a key national effort to embed consumer and community involvement across health and medical research and healthcare improvement. The project applies implementation and behavioural science to strengthen CCI within systems, organisations and individual practice, supported by strategies such as policy development, education and training programs, and co-design tools, including a national digital knowledge hub. Framed as an exemplar of large-scale systems change, CCIRI seeks to generate broader organisational and policy learning to build sustainable, partnership-based models of care and research throughout Australia (49).

Personalised care

Safer Care Victoria identifies *"Personalised and Holistic Care"* as an essential component of the *Partnering in Healthcare Framework*, emphasising that consumer values, priorities and cultural context must guide service design, pathways and evaluation (9). Co-design initiatives that incorporate consumer perspectives, particularly those of Aboriginal and Torres Strait Islander peoples have demonstrated the capacity to shape services that are not only responsive to individual and community needs but also structurally and culturally appropriate (50).

Within National Aboriginal Community Controlled Health Organisations (NACCHOs), the integration of Elders and community voices into planning and quality improvement processes reflects a long-standing practice of self-determination in health care design (51). These efforts align with emerging evidence underscoring the importance of community-led health improvement and two-way learning, principles often underrepresented in mainstream *continuous quality improvement (CQI)* frameworks (50). Aboriginal and Torres Strait Islander primary health care services include macro- and meso-level system features, such as policy support and interdisciplinary teams with micro-level relational dimensions, including staff commitment, cultural humility and community trust-building. These latter elements are considered critical in high-functioning Aboriginal and Torres Strait Islander primary health care settings but are less commonly emphasised in other primary health care service settings (50,52).

Cultural respect emerges as a central theme across the CQI literature, particularly in Indigenous contexts, where it facilitates mutual learning, enables culturally appropriate care and builds sustainable service-user relationships (50). The literature highlights that respect is not merely an interpersonal construct, but a systemic condition required for effective CQI implementation. Respect supports continuity, cultural safety and embeddedness within the community, especially when combined with place-based workforce design and knowledge exchange (50).

Frameworks like He Pikinga Waiora developed for Māori health contexts in New Zealand, offer useful models as they embed self-determination, co-design and high-engagement strategies into their structural design. These approaches are increasingly recognised as applicable to Australian Aboriginal health services, especially where relational accountability and cultural responsiveness underpin service transformation (50,53).

While national policy frameworks promote consumer engagement and co-design, implementation remains inconsistent and insufficiently evaluated outside of NACCHOs (46,54). The 2021 Australian Health Consumer Sentiment Survey reported that over 20% of respondents experienced disrespect or discrimination when accessing care, with higher rates among people identifying as Aboriginal and/or Torres Strait Islander, those from CALD backgrounds and individuals with chronic conditions (54). The same survey found that people with lower health literacy and limited capacity for self-care, including younger people, those on low incomes and individuals with mental health conditions, may require additional support to navigate the health system and maintain their wellbeing (54). Literature suggests that constraints such as funding models, workforce capacity and limited access to co-design infrastructure contribute to the uneven uptake in primary health care of consumer engagement practices (55,56).

Health literacy

Health literacy is increasingly recognised as both a determinant and an outcome of effective consumer participation in healthcare design and delivery, particularly in primary care settings (9). The literature distinguishes between *individual health literacy*, referring to a person's ability to access, understand and use health information and *organisational health literacy*, which focuses on how well health services enable that process (57,58).

Several studies and frameworks emphasise the importance of consumer involvement in developing written and digital materials to improve health literacy. Co-design processes have been shown to increase the relevance, cultural safety and accessibility of materials such as care plans, educational brochures and navigation tools (9,57). Safer Care Victoria (2019) includes consumer involvement in health information development as a key domain of health literacy-responsive care (9).

Evidence supports a range of health service practices aimed at improving organisational health literacy. These include the use of plain language, teach-back methods, simplified consent forms and culturally tailored communication (57,59). Implementing these practices can improve medication adherence, reduce hospitalisations and support chronic disease self-management, particularly in older adults (9,57). However, their uptake in primary care remains inconsistent, with known barriers including limited workforce training, time constraints and system fragmentation (57).

Building on this, evidence advocates for a systems-level approach that integrates health literacy into continuous quality improvement processes (57). Strategies identified in the literature include incorporating health literacy into accreditation standards, monitoring it through consumer-reported measures, and embedding it in executive-level governance and staff performance expectation (57). Safer Care Victoria (2019) similarly highlights the need to align health literacy initiatives with broader patient safety and quality frameworks (9).

The literature emphasises that health literacy should be embedded into continuous quality improvement systems at the service level. Bush et al. (2014) argue for a shift from deficit-based screening models to system-wide approaches that frame health literacy as an asset (57). This approach aligns with principles of person-centred care, equity and shared accountability, particularly for older adults with complex health needs.

Internationally, the United States Centers for Disease Control and Prevention (CDC) provide a complementary framework that operationalises organisational health literacy through the *Ten Attributes of a Health Literate Organization*. These include embedding health literacy into mission and planning, preparing the workforce and designing accessible communications and environments (60). The CDC's tools support practical quality improvement initiatives in primary care, such as simplifying workflows, standardising plain-language protocols and routinely involving consumers in evaluation processes.

Together, these frameworks advocate for strategic leadership, staff capability-building and consumer co-leadership as key enablers of sustainable, health-literate organisations.

Shared decision-making

Shared decision-making extends beyond the clinical encounter to encompass consumer participation in the design, governance and continuous quality improvement of primary care services. The literature shows that embedding shared decision-making at the service level fosters a culture of partnership where patients' lived experiences and preferences actively shape healthcare delivery and policy (1,9). In primary care, where patient-centredness and continuity of care are foundational, involving consumers in organisational decision-making can enhance relevance, accessibility and responsiveness of services to community needs (30).

The *Partnering in Healthcare Framework* developed by Safer Care Victoria (2019) identifies core elements for operationalising shared decision-making at the organisational level, including shared governance, transparent communication and routine use of decision aids (9). This framework advocates for consumers' inclusion in advisory committees and policy development groups, ensuring that quality data such as patient-reported experience measures (PREMs), reflect patient priorities and guide service improvement (9). By positioning consumers as co-owners of quality, primary care organisations can move away from tokenistic engagement toward authentic partnership models that respect 'nothing about us without us' principles (1).

The RACGP's guidelines for preventive activities in general practice (the Red Book) reinforce that shared decision-making is integral to delivering preventive care and managing chronic conditions. The Red Book states that shared decision-making promotes better alignment between clinical evidence and patient values, which is particularly relevant in primary care contexts characterised by multimorbidity and complex care decisions (30). The guidelines recommend integrating decision aids, question prompt lists and decision coaching into routine practice, not only at the point of care but also within service design and patient education initiatives to empower consumers in navigating healthcare choices.

Joseph-Williams et al. (2021) present a practical implementation model emphasising a three-step communication process - choice talk, option talk and decision talk, that facilitates patient engagement by clarifying options, supporting deliberation and eliciting informed preferences. Although this model was developed with clinical encounters in mind, its principles can be extrapolated to service-level shared decision-making by ensuring organisational communications and policies transparently outline care options and actively solicit consumer input (61).

The NSW Agency for Clinical Innovation (2025) highlights organisational enablers necessary to support shared decision-making, including consumer education, workforce training and embedding shared decision-making metrics in performance frameworks (62). These align with Australian Commission on

Safety and Quality in Health Care's *Partnering with Consumers Standard*, which mandates that health services adopt governance processes that embed consumer participation in quality and safety initiatives (9). Primary care providers are encouraged to institutionalise shared decision-making not only through clinician-patient interactions but by creating systemic supports that ensure consumer voices inform continuous quality improvement (63).

Fuehrer et al. (2021) emphasise that effective shared decision-making is rooted in authentic patient-provider relationships characterised by respect, engaged curiosity, focused listening and mutual participation. These interpersonal elements are fundamental to creating the trust and rapport necessary for consumers to confidently express preferences and participate in decisions about their care and service delivery. Within primary care settings, fostering such relationships at both individual and organisational levels is critical to overcoming challenges such as patient hesitancy, low health literacy and perceived power differentials.

Collectively, the literature indicates that for shared decision-making to be meaningfully integrated at the primary care service level, organisations must prioritise:

- Structural inclusion of consumers in governance and quality improvement committees (9).
- Systematic use of decision aids and educational resources tailored to patient needs (30,61,62).
- Embedding shared decision-making within performance frameworks to track and incentivise consumer participation (62).
- Workforce training to develop clinicians' skills in facilitating shared decision-making and building authentic connections (63).

The literature consistently describes that implementing these elements can facilitate a transition from traditionally provider-led care models to more equitable structures where consumers actively contribute to service planning and quality improvement (1,9). Within primary care where services serve as the first point of contact and coordinator of ongoing care, this shift supports delivery models that are more responsive to individual preferences, health literacy needs and the complex care requirements of ageing populations (30,63).

Partnerships

Partnerships with consumers and carers at the service level underpin sustained improvements in care design, delivery and coordination. In the context of healthy ageing, these partnerships are particularly relevant when navigating transitions between general practice, hospital services and aged care services. Co-design initiatives led by Primary Health Networks have engaged carer networks in the development of navigation tools for people living with dementia, aiming to ensure that service touchpoints align with the priorities and lived experiences of those receiving and providing care (54).

The *Partnering in healthcare* framework developed by Safer Care Victoria (2021) provides a structured approach to embedding consumer partnership in service-level decisions. The *Partnering in Healthcare* framework (9) supports the implementation of system-level priorities and connects with foundational resources such as the Department of Health's *Public Participation Framework* (64) and *Stakeholder Engagement Toolkit* (65). These frameworks advocate for structured, collaborative approaches to quality improvement, recognising consumers and carers as partners in driving safer, person-centred care.

The ACSQHC (2021) highlights that partnership at the service level is critical to ensuring health services are person-centred, safe, and responsive to consumer needs (1). The Commission's *Partnering with*

Consumers Standard identifies structural elements required to facilitate consumer involvement in governance, design and evaluation activities. Within primary care settings, this includes mechanisms such as consumer advisory panels, experience-based co-design projects and carer engagement forums, which promote accountability and continuous improvement.

Further, Davidson et al. (2023) further illustrate the significance of including carers as active contributors to care planning and service coordination in primary care. The qualitative study highlights the roles carers play in advocating for patients, coordinating appointments, interpreting health information and contributing to clinical decisions. The findings emphasise that carers are not only support persons but also possess vital contextual knowledge that can shape the design of services to better meet patient needs. Importantly, the study underscores the value of formal care planning processes that involve both patients and carers and the need for primary care teams to support carers through education, emotional support and resource provision (66,67).

The literature also affirms that collaborative partnerships enhance communication, trust and shared accountability across care teams. As identified in *Australia's Primary Health Care 10 Year Plan 2022–2032*, partnerships that include consumers and carers in service development are essential for addressing fragmentation and improving equity in access and outcomes (68). Furthermore, inclusive and culturally responsive engagement approaches can ensure that design and quality improvement efforts reflect the preferences of diverse population groups, particularly those at higher risk of poor health outcomes in later life. National Aboriginal Community Controlled Health Organisations (NACCHOs) exemplify this approach through community-led governance and culturally safe care, highlighting the importance of embedding local voices and self-determination in service planning and delivery (51).

Interprofessional collaborative practice strengthens the integration of care by promoting shared decision-making, clearly defined roles and mutual accountability among primary and secondary care providers. Mitchell et al. (2020) identified that successful implementation of interprofessional collaborative practice in integrated primary–secondary care models require aligned leadership, sustained communication structures and joint care planning. These mechanisms help embed collaboration across organisational boundaries and ensure that patient care is coordinated, continuous and responsive to complex health needs (69).

Patient engagement in service design and quality improvement within primary care is increasingly recognised as essential to enhancing safety. Patients bring a unique perspective, identifying safety incidents and risks that may be overlooked by clinicians or administrative systems (70). In primary care, patient-reported incidents often relate to administrative processes, access and delays, alongside diagnostic and assessment errors. These incidents are not only associated with physical harm but also with emotional harm, including distress and anxiety, highlighting the importance of patient-centred safety strategies (70).

Simple patient feedback mechanisms such as short surveys, can provide actionable insights for service-level improvements. Incorporating these tools into routine practice enables targeted interventions that improve safety performance and patient experience. Furthermore, identifying patients at higher risk, such as frequent attenders with lower safety ratings, supports proactive and personalised safety planning. By embedding patient engagement into service design and quality improvement processes, primary care teams can strengthen safety, responsiveness and trust (70,71).

The literature confirms that partnering with consumers and carers at the service level contributes to more integrated and person-centred care systems. In primary care, such partnerships form a foundational component in responding to the complex needs of ageing populations, facilitating health system navigation and guiding continuous quality improvement processes (1,66,68).

Health service culture

Establishing a health service culture that values and systematically supports consumer and carers as partners is necessary to embed service-level participation as a sustained and measurable practice. The Australian NSQHS emphasise the importance of creating enabling environments in which consumers and carers actively participate in governance, policy, planning and quality improvement activities (58). As part of the *Partnering with Consumers Standard*, health services are required to develop, document and regularly review strategies that promote consumer engagement in safety and quality systems (1).

Research highlights that health services with inclusive and transparent leadership, adequate resource allocation for engagement and systems to evaluate the impact of consumer involvement are more likely to sustain genuine co-design practices (9,68). Within primary care, this culture may manifest through mechanisms such as patient advisory groups, participation in quality improvement collaboratives, use of structured patient feedback systems and involvement in practice accreditation processes (30,54). Notably, the presence of leadership that models partnership-based behaviours and champions the consumer voice contributes to normalising engagement across all levels of practice (9).

The *Primary Health Care 10 Year Plan 2022–2032* reinforces the need for cultural change within health services to support consumer-centred models of care and drive equity and service improvement through participation (68). Such a shift is particularly pertinent in primary care settings, where ongoing relationship-based care offers an ideal platform for embedding patient perspectives into continuous service development and evaluation.

System level: participation in governance and policy

System-level participation refers to the involvement of older adults and carers in shaping the design, governance and policy directions of healthcare systems, particularly through mechanisms established by governments, regulators and peak bodies. This level of engagement is vital for creating equitable, responsive systems that reflect the lived experience of older people and their diverse needs. It shifts participation from service delivery to structural influence, helping to reorient systems toward prevention, rights-based care and consumer-led quality improvement (44).

Governments and statutory bodies have increasingly recognised the importance of embedding consumer voices in strategic governance. The Australian Government's reform of the aged care sector, including the proposed new Aged Care Act and associated rules, aims to enshrine principles of transparency, dignity and co-design (72). A critical analysis by Carney et al. (2024) of the Australian Government introduction of a supported decision-making framework through the recent Aged Care Act found the process to have been deficient and argues that such reforms must move beyond tokenistic inclusion to deliver meaningful accountability and uphold human rights (73).

Frameworks such as the Aged Care Diversity Framework (74) and resources by COTA Australia (2023)(44) advocate for inclusive engagement practices that prioritise cultural safety, gender equity and accessibility for all communities, including Aboriginal and Torres Strait Islander peoples, LGBTIQ+ individuals and those from culturally and linguistically diverse backgrounds.

Personalised care

Consumer participation at the system level is key to shaping policies that uphold person-centred care. Recent consultations led by the Consumers Health Forum (54,75) demonstrated that the involvement of older adults has led to the inclusion of diverse perspectives in the development of healthy ageing policies, aged care reform directions and broader health strategies. For example, targeted consumer engagement has influenced the National Dementia Action Plan and the National Preventive Health Strategy to better reflect lived experiences and expectations around autonomy, respect and tailored support (75,76).

Additionally, the "Guidance for the New Regulatory Model for NATSIFAC Providers" emphasises the co-design of culturally safe services and the inclusion of Aboriginal and Torres Strait Islander elders in policy and regulatory development (77). This reinforces a rights-based, person-first orientation within system-level frameworks.

Health literacy

Health literacy enables individuals to access, interpret and act on health information, directly influencing outcomes and care engagement. Fitzpatrick (2023) emphasises that digital communications can play a transformative role in health literacy by bridging information gaps, simplifying complex language and supporting shared decision-making between practitioners and patients (78).

The National Digital Health Strategy 2023–2028 reinforces this approach, prioritising the integration of digital tools to enable more informed and active participation in health and care. Within this context, national platforms such as My Health Record (*see Chapter 5*) illustrate how digital systems can strengthen consumer and carer engagement by facilitating information access and continuity of care. System-level efforts are increasingly directed at reorienting services toward prevention and self-management by embedding health literacy into every digital touchpoint (79).

Through secure information-sharing features, My Health Record also enables nominated carers to assist in care coordination, reducing fragmentation and duplication. In this way, digital tools operationalise the broader goal of health partnerships, extending *team-based care* to include patients and carers as active contributors to decision-making and health management (80).

While digital tools offer significant promise, access remains uneven. Fitzpatrick (2023) warns that without careful design and system-level intervention, digital innovations risk excluding those with low literacy, older adults unfamiliar with technology and people from CALD backgrounds (78).

Clarity, simplicity and cultural relevance are essential features of health communication at the system level. Health information must be designed to accommodate diverse literacy levels, languages and preferences. The ACSQHC highlights the importance of plain language, visual aids and consistent terminology across digital and print formats (1).

Shared decision-making

System-level implementation of shared decision-making is evident in the co-development of national standards. For example, the inclusion of older Australians in shaping the Aged Care Quality Standards and the National Safety and Quality Health Service (NSQHS) Partnering with Consumers Standard has advanced a rights-based approach to care that centres on dignity, autonomy and person-centred planning (58,81). These standards now require services to actively partner with consumers in governance, planning and evaluation processes, moving beyond tokenistic consultation to meaningful co-design.

Policy structures have further institutionalised consumer input through representative bodies such as the Aged Care Council of Elders, which provides advice to government on quality, safety and equity in aged care reforms and the Independent Health and Aged Care Pricing Authority, which incorporates consumer perspectives into complex funding and pricing decisions (73). These bodies serve not only as advisory groups but as mechanisms of participatory governance, ensuring that resource allocation, care models and performance measures reflect lived experience.

In addition, national frameworks such as the Australian Charter of Healthcare Rights and the Charter of Aged Care Rights affirm the legal and ethical imperative of involving individuals in decisions about their care. System-level policy now recognises that shared decision-making is central to safety, quality and satisfaction, particularly for older people and carers who navigate multiple services across primary, acute and community care (4,58).

Digital infrastructure also plays a growing role in enabling shared decision-making. Tools like My Health Record, patient portals and decision aids are being supported by government policy to facilitate transparent information exchange and shared goal-setting (79,80).

Partnerships

Partnerships between consumers, policymakers and service providers have evolved from episodic consultation to embedded governance. This evolution reflects a systemic commitment to shared leadership, where consumers, particularly older adults and carers, participate as decision-makers in the governance and development of health and aged care systems. The Australian Commission on Safety and Quality in Health Care mandates that all accredited services demonstrate evidence of consumer partnerships in governance and policy development (58). This includes representation on boards, quality and safety committees and co-design panels that shape accreditation standards and service delivery models.

The Council on the Ageing (COTA) Australia (2023) (44) emphasises that partnerships must not only include consumer input but also amplify consumer leadership. A COTA national consultation found that older people value opportunities to co-lead system reviews, shape strategic reforms and deliver sector education from a lived experience perspective. These partnerships provide a foundation for aligning national reforms with the complex and intersectional realities of ageing, including cultural diversity, disability and geographic variation (44).

The Aged Care Council of Elders and other national bodies exemplify formalised partnership models in which older Australians contribute to strategic oversight, ensuring that policies reflect the values of dignity, autonomy and equity (73). These arrangements position older people not as stakeholders to be consulted, but as structural contributors to aged care governance.

Effective health system-level partnerships to support healthy ageing require coordination across primary, community and acute care sectors, especially for older adults with complex and multi-sectoral needs. As highlighted by Lepage et al. (2022), healthcare managers act as institutional entrepreneurs by establishing new collaborative mechanisms such as co-located teams, shared care coordinators and formalised information-sharing agreements. These partnerships strengthen system coherence and create more seamless experiences for patients and carers.

For consumers, inter-organisational partnerships can offer access to a broader care team spanning health, social and community services. Wankah et al. (2022) demonstrate how such partnerships are underpinned by system-level policies that mandate and enable collaboration through regulatory reforms, funding mechanisms and strategic directives that foster integrated care. New roles, such as liaison nurses and embedded social workers, can be established through targeted investment driven by health policy priorities. Policy frameworks can promote co-produced care plans, joint training and shared governance, which improve service coordination and support person-centred, timely care for older adults. This alignment between policy and practice enhances trust, reduces fragmentation and ensures that partnerships deliver tangible value to patients and carers navigating complex systems (82).

Patient engagement plays a pivotal role in governance and policy for safe healthcare delivery. Patient-reported data provide complementary intelligence to existing safety monitoring systems, offering early warnings about potential systemic risks (70). Analysis of patient feedback across multiple services can identify patterns in safety incidents, informing evidence-based policy decisions and resource allocation. Integrating patient perspectives into governance structures fosters a culture of shared responsibility for safety, with patients contributing to the development of safety frameworks, accreditation standards and policy reforms. System-wide adoption of patient engagement mechanisms supports continuous learning, enhances transparency and ensures that safety initiatives are grounded in the lived experience of healthcare users (70,71).

Health service culture

System-level policies strongly influence the culture of healthcare organisations by setting clear expectations for consumer partnership and participation. The Australian Charter of Healthcare Rights affirms individuals' rights to partnership, respect and information and this is increasingly being operationalised through national and state-level policy frameworks (58). These frameworks position consumer engagement not as peripheral but as central to quality and safety standards across health and aged care.

In Victoria, Safer Care Victoria plays a pivotal role in shaping health service culture by supporting healthcare organisations to partner meaningfully with consumers in the design, governance and evaluation of care. Safer Care Victoria's *Partnering in Healthcare* framework provides a structured approach to embedding consumer voices at all levels of care delivery and improvement. It positions partnership as a core enabler of cultural change, equity and safety across the health system (9).

Embedding a rights-based approach into governance requires more than aspirational statements; it demands structures that support transparency, enforceability and redress mechanisms (73). The Aged Care Act 2024 reflects this shift through principles of transparency, accountability and dignity, to ensure that consumer participation becomes foundational, not discretionary (73).

Culture, as Brown and Turner (2025) argue, must be recognised as a strategic priority in system reform. It influences how change is enacted, how values such as person-centred care are realised and how effectively services engage with consumers and carers. When system-level policies embed expectations for co-design and lived experience leadership, they reinforce cultures of inclusion, respect and responsiveness (83).

Health services that cultivate such cultures actively support consumer voices in planning, delivery and governance. This cultural alignment fosters trust and contributes to safer, more equitable care for older adults and their carers (44). By aligning organisational culture with policy mandates and human rights standards, systems can better navigate complexity while remaining anchored in partnership (83).

Patient advocacy

The "Putting Patients First" framework developed by Brickley et al. (2021) offers a practical model for integrating patient-centred care into general practice. This framework, co-designed with patient advocates and general practitioners, emphasises the importance of collaboration, system consideration and optimising the general practice environment. By adopting this model, healthcare providers can enhance the patient experience, ensuring that care is not only clinically effective but also aligned with patients' values and preferences (84). Implementing such frameworks at all levels of healthcare delivery can lead to more holistic, person-centred care that truly reflects the needs and desires of patients.

Patient advocates play a pivotal role in advancing healthcare quality and safety across all levels of the system by amplifying the patient voice and bridging gaps between healthcare providers, policymakers and communities. The patient experience forms a core dimension of healthcare quality that extends beyond clinical outcomes to include emotional and psychosocial well-being (85). Engaging patient advocates as expert community members facilitates meaningful participation in service design and quality improvement, ensuring care is tailored and responsive to lived experiences. At the system and governance levels, organisations such as the Australian Patient Advocacy Alliance (APAA) aim to use collaborative advocacy efforts to influence health policy to better reflect the needs of people with chronic and complex conditions (86). Incorporating patient experience data and insights from advocates into governance structures fosters transparency, accountability and a culture of continuous improvement to enhance safety, equity and effectiveness across the continuum of care. This multidimensional approach ensures that healthcare systems not only listen to patients but partner with them actively, driving sustainable improvements from bedside care through to national health strategies (71,84,85).

References

1. Australian Commission on Safety and Quality in Health Care. Partnering with Consumers Standard [Internet]. [cited 2025 Jul 28]. Available from: https://www.safetyandquality.gov.au/standards/nsqhs-standards/partnering-consumers-standard
2. Layton N, Lalor A, Slatyer S, Lee DCA, Bryant C, Watson M, et al. Who cares for the carer? Codesigning a carer health and wellbeing clinic for older care partners of older people in Australia. Health Expect Int J Public Particip Health Care Health Policy. 2023 Dec;26(6):2644–54.
3. Orthia L, McCallum J, Hosking D, Maccora J, Krasovitsky. Co-designing Aged Care: Views of 4,562 Older Australians. Manuka, Australian Capital Territory: National Seniors Australia; 2021.
4. Australian Commission on Safety and Quality in Health Care. Australian Charter of Healthcare Rights [Internet]. 2020 [cited 2025 Jul 28]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/australian-charter-healthcare-rights
5. Mylek M, Schirmer J. 2024 Carer Wellbeing Survey [Internet]. 2024 Oct [cited 2025 Jul 28]. Available from: https://www.carersaustralia.com.au/research/2024-carer-wellbeing-survey/
6. Farmer J, Bigby C, Davis H, Carlisle K, Kenny A, Huysmans R. The state of health services partnering with consumers: evidence from an online survey of Australian health services. BMC Health Serv Res. 2018 Aug 10;18(1):628.
7. Agency for Clinical Innovation. A Guide to Build Co-design Capability [Internet]. 2019. Available from: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0013/502240/ACI-Guide-build-codesign-capability.pdf

8. Chauhan A, Walpola RL, Seale H, Walton M, Wilsen C, Smith A, et al. How do health services engage culturally and linguistically diverse consumers? An analysis of consumer engagement frameworks in Australia - Chauhan - 2021 - Health Expectations - Wiley Online Library [Internet]. [cited 2025 Jul 29]. Available from: https://onlinelibrary.wiley.com/doi/full/10.1111/hex.13315?msockid=06f67bd4e5e46dab0e9b6e5ee4316cbc
9. Horvat L. Partnering in healthcare for better care and outcomes [Internet]. 2019. Available from: https://www.safercare.vic.gov.au/publications/partnering-in-healthcare
10. Merner B, Schonfeld L, Virgona A, Lowe D, Walsh L, Wardrope C, et al. Consumers' and health providers' views and perceptions of partnering to improve health services design, delivery and evaluation: a co-produced qualitative evidence synthesis. Cochrane Database Syst Rev. 2023 Mar 14;3(3):CD013274.
11. United States Centre of Disease Control. Health Literacy. 2024 [cited 2025 Jul 28]. Challenges Affecting Health Literacy of Older Adults. Available from: https://www.cdc.gov/health-literacy/php/older-adults/understanding-challenges.html
12. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health. 2012 Jan 25;12:80.
13. Bombard Y, Baker GR, Orlando E, Fancott C, Bhatia P, Casalino S, et al. Engaging patients to improve quality of care: a systematic review. Implement Sci IS. 2018 Jul 26;13(1):98.
14. Smith GD, Ho KHM, Poon S, Chan SWC. Beyond the tip of the iceberg: Health literacy in older people. J Clin Nurs. 2022;31(5–6):E3–5.
15. Salomé S, Du Bousquet L, Monfort E. Co-designing conversational agents with older people: A scoping review of methods, challenges, and a way forward. Comput Hum Behav Rep. 2025 Mar 1;17:100606.
16. Marshall N, Butler M, Lambert V, Timon CM, Joyce D, Warters A. Health literacy interventions and health literacy-related outcomes for older adults: a systematic review. BMC Health Serv Res. 2025 Feb 26;25(1):319.
17. Lewis CL, Pignone MP. Promoting Informed Decision-Making in a Primary Care Practice by Implementing Decision Aids. N C Med J. 2009;70(2):136–9.
18. Krist AH, Tong ST, Aycock RA, Longo DR. Engaging patients in decision-making and behavior change to promote prevention. Stud Health Technol Inform. 2017;240:284–302.
19. Drug and Therapeutics. An introduction to patient decision aids. BMJ. 2013 Jul 23;347:f4147.
20. Bulletin D and T. An introduction to patient decision aids. 2013 Jul 23 [cited 2025 Jul 28]; Available from: https://www.bmj.com/content/347/bmj.f4147
21. The patient-as-partner approach in health care: a conceptual framework for a necessary transition - PubMed [Internet]. [cited 2025 Jul 29]. Available from: https://pubmed.ncbi.nlm.nih.gov/25607943/
22. Interventions to improve health literacy among Aboriginal and Torres Strait Islander Peoples: a systematic review | BMC Public Health | Full Text [Internet]. [cited 2025 Jul 29]. Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-10278-x
23. Foronda C, Baptiste DL, Reinholdt MM, Ousman K. Cultural Humility: A Concept Analysis. J Transcult Nurs. 2016 May 1;27(3):210–7.
24. Curtis E, Jones R, Tipene-Leach D, Walker C, Loring B, Paine SJ, et al. Why cultural safety rather than cultural competency is required to achieve health equity: a literature review and recommended definition. Int J Equity Health. 2019 Nov 14;18(1):174.
25. Horvat L, Horey D, Romios P, Kis-Rigo J. Cultural competence education for health professionals - PubMed. Cochrane Database Syst Rev. 2014(5):CD009405.
26. Vallesi S, Wood L, Dimer L, Zada M. "In Their Own Voice"-Incorporating Underlying Social Determinants into Aboriginal Health Promotion Programs. Int J Environ Res Public Health. 2018 Jul 18;15(7):1514.
27. Hoque F. Shared Decision-Making in Patient Care: Advantages, Barriers and Potential Solutions. J Brown Hosp Med. 3(4):13–5.
28. Elwyn G, Frosch D, Thomson R, Joseph-Williams N, Lloyd A, Kinnersley P, et al. Shared Decision Making: A Model for Clinical Practice. J Gen Intern Med. 2012 Oct 1;27(10):1361–7.
29. Stacey D, Hill S, McCaffery K, Boland L, Lewis KB, Horvat L. Shared Decision Making Interventions: Theoretical and Empirical Evidence with Implications for Health Literacy. Stud Health Technol Inform. 2017;240:263–83.
30. The Royal Australian College of General Practice. Shared decision making [Internet]. [cited 2025 Jul 29]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-

guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/screening-case-finding-and-prevention-principles/shared-decision-making

31. Agency for Clinical Innovation, New South Wales Government. Shared decision making. [cited 2025 Jul 29]. Shared decision making | Consumer Enablement Guide. Available from: https://aci.health.nsw.gov.au/projects/consumer-enablement/how-to-support/shared-decision-making
32. Carers Australia. Who is a carer? [Internet]. 2020 [cited 2025 Jul 1]. Available from: https://www.carersaustralia.com.au/about-carers/who-is-a-carer/, https://www.carersaustralia.com.au/about-carers/who-is-a-carer/
33. Helping Hand Organisation. Consumer-Carer-Engagement-Framework. [Internet]. 2012. Available from: https://www.helpinghand.org.au/wp-content/uploads/2019/01/Consumer-Carer-Engagement-Framework.pdf
34. Parliment of Australia. A national carer strategy and practical recognition [Internet]. 2011 [cited 2025 Jul 29]. Available from: https://www.aph.gov.au/Parliamentary_Business/Committees/House/Social_Policy_and_Legal_Affairs/UnpaidCarers/Recognising_valuing_and_supporting_unpaid_carers/Chapter_3_-_A_national_carer_strategy_and_practical_recognition
35. Department of Health. Victoria. Consumer and carer engagement [Internet]. State Government of Victoria, Australia; [cited 2025 Jul 29]. Available from: https://www.health.vic.gov.au/working-with-consumers-and-carers/consumer-and-carer-engagement
36. Department of Social Services [Internet]. [cited 2025 Jul 29]. National Carer Strategy. Available from: https://www.dss.gov.au/supporting-carers/national-carer-strategy
37. Government of Western Australia. Working with Consumers and Carers Toolkit [Internet]. 2023. Available from: https://www.health.wa.gov.au/articles/u_z/working-with-consumers-and-carers-toolkit
38. Chauhan A, Walpola RL, Manias E, Seale H, Walton M, Wilson C, et al. How do health services engage culturally and linguistically diverse consumers? An analysis of consumer engagement frameworks in Australia. Health Expect. 2021;24(5):1747–62.
39. Agency for Clinical Innovation, New South Wales Government. Culturally responsive practice. Agency for Clinical Innovation (ACI); 2024 [cited 2025 Jul 29]. Culturally responsive practice. Available from: https://aci.health.nsw.gov.au/projects/consumer-enablement/how-to-support/culturally-responsive-practice
40. Napier D. Culture matters: using a cultural contexts of health approach to enhance policy-making. 2017.
41. The National Mental Health Commission. Sit beside me, not above me [Internet]. Available from: https://www.mentalhealthcommission.gov.au/sites/default/files/2024-04/sit-beside-me-not-above-me_0.pdf
42. Napier D, Ancarno C, Butler B, Calabrese J, Chater A, Chatterjee H. Culture and health. Lancet Public Health [Internet]. 2014 [cited 2025 Jul 29];Volume 384(9954). Available from: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2814%2961603-2/fulltext
43. Health Consumers Queensland. Guides - [Internet]. 2018 [cited 2025 Jul 31]. Available from: https://www.hcq.org.au/guides/
44. Council on the Ageing Australia. Consumer Engagement in Aged Care [Internet]. 2023 [cited 2025 Jul 31]. Available from: https://cota.org.au/report/consumer-engagement-in-aged-care/
45. Advance Care Planning. Advance care planning explained [Internet]. 2025 [cited 2025 Jul 28]. Available from: https://www.advancecareplanning.org.au/understand-advance-care-planning/advance-care-planning-explained
46. End of Life Directions for Aged Care. ELDAC Our Care Model [Internet]. [cited 2025 Jul 31]. Available from: https://www.eldac.com.au/Our-Care-Model
47. Consumer engagement in aged care - Literature review | [Internet]. 2020 [cited 2025 Jul 31]. Report No.: Aged Care Quality and Safety Commission. Available from: https://www.agedcarequality.gov.au/resources/consumer-engagement-aged-care-literature-review
48. Research in Practice [Internet]. [cited 2025 Jul 31]. Co-production and strengths-based practice: Leaders' Briefing (2020). Available from: https://www.researchinpractice.org.uk/adults/publications/2020/july/co-production-and-strengths-based-practice-leaders-briefing-2020/
49. Ng AH, Reeder S, Jones A, Cahill A, Langridge D, Baker S, et al. Consumer and community involvement: implementation research for impact (CCIRI) – implementing evidence-based patient and public involvement across health and medical research in Australia – a mixed methods protocol. Health Res Policy Syst. 2025 Feb 24;23(1):25.

50. Redman-MacLaren M, Turner Anmatyerre/Jaru NN, Taylor J, Laycock A, Vine K, Thompson Gurindji Q, et al. Respect Is Central: A Critical Review of Implementation Frameworks for Continuous Quality Improvement in Aboriginal and Torres Strait Islander Primary Health Care Services. Front Public Health. 2021;9:630611.
51. NACCHO. Aboriginal Community Controlled Health Organisations [Internet]. 2024 [cited 2025 Jul 31]. Available from: https://www.naccho.org.au/aboriginal-community-controlled-health/
52. Askew DA, Brady K, Mukandi B, Singh D, Sinha T, Brough M, et al. Closing the gap between rhetoric and practice in strengths-based approaches to Indigenous public health: a qualitative study. Aust N Z J Public Health. 2020 Apr;44(2):102–5.
53. Oetzel J, Scott N, Hudson M, Masters-Awatere B, Rarere M, Foote J, et al. Implementation framework for chronic disease intervention effectiveness in Māori and other indigenous communities. Glob Health. 2017 Sep 5;13(1):69.
54. Consumers Health Forum of Australia [Internet]. [cited 2025 Jul 31]. The Consumer Sentiment Survey - The Voice of Australian Health Consumers 2022. Available from: https://www.chf.org.au/our-work/reports/the-consumer-sentiment-survey-the-voice-of-australian-health-consumers-2022
55. Mengistu TS, Khatri R, Erku D, Assefa Y. Successes and challenges of primary health care in Australia: A scoping review and comparative analysis. J Glob Health. 13:04043.
56. Thomas J, Barraket J, Wilson C, Cook K, Louie Y, Holcombe-James I, et al. Measuring Australia's digital divide: the Australian digital inclusion index 2018. 2018.
57. Bush R, Boyle F, Ostini R, Ozolins I, Brabant M, Jimenez Soto E, et al. Advancing health literacy through primary health care systems. 2017 Jul 10 [cited 2025 Aug 1]; Available from: http://hdl.handle.net/1885/119189
58. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Primary and Community Healthcare Standards [Internet]. [cited 2025 Aug 1]. Available from: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/national-safety-and-quality-primary-and-community-healthcare-standards
59. Rudd R. HLE2: The Health Literacy Environment of Hospitals and Health Centers. 2019 Jan 1 [cited 2025 Aug 1]; Available from: https://www.academia.edu/115082995/HLE2_The_Health_Literacy_Environment_of_Hospitals_and_Health_Centers
60. United States Centre of Disease Control. Health Literacy. 2025 [cited 2025 Aug 1]. Attributes of a Health Literate Organization. Available from: https://www.cdc.gov/health-literacy/php/develop-plan/health-literate-organization.html
61. Joseph-Williams N, Lloyd A, Edwards A, Stobbart L, Tomson D, Macphail S, et al. Implementing shared decision making in the NHS: lessons from the MAGIC programme. 2017 Apr 18 [cited 2025 Aug 4]; Available from: https://www.bmj.com/content/357/bmj.j1744
62. Innovation A for C. Agency for Clinical Innovation. Agency for Clinical Innovation (ACI); 2025 [cited 2025 Aug 4]. Shared decision-making: Finding Your Way. Available from: https://aci.health.nsw.gov.au/about/clinician-connect/network-updates/2025/march/shared-decision-making
63. Fuehrer S, Weil A, Osterberg LG, Zulman DM, Meunier MR, Schwartz R. Building Authentic Connection in the Patient-Physician Relationship. J Prim Care Community Health. 2024 Jan 28;15:21501319231225996.
64. Department of Health and Human Services VIC. Public participation framework [Internet]. 2018. Available from: https://www.vgls.vic.gov.au/client/en_AU/search/asset/1296592/0
65. Department of Health and Human Services. Stakeholder engagement toolkit. Melbourne: Victorian Government; 2018 Feb.
66. Davidson AR, Zigori BD, Ball L, Morgan M, Gala D, Reidlinger DP. Family carers' experiences and perceived roles in interprofessional collaborative practice in primary care: A constructivist grounded theory study. Health Expect Int J Public Particip Health Care Health Policy. 2023 Dec;26(6):2302–11.
67. Davidson AR, Kelly J, Ball L, Morgan M, Reidlinger DP. What do patients experience? Interprofessional collaborative practice for chronic conditions in primary care: an integrative review. BMC Prim Care. 2022 Jan 14;23(1):8.
68. Australian Government Department of Health and Aged Care. Australia's Primary Health Care 10 Year Plan 2022–2032 [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2025 Jun 19]. Available from: https://www.health.gov.au/resources/publications/australias-primary-health-care-10-year-plan-2022-2032?language=en

69. Mitchell GK, Young CE, Janamian T, Beaver KM, Johnson JLK, Hannan-Jones C, et al. Factors affecting the embedding of integrated primary-secondary care into a health district. Aust J Prim Health. 2020 Jun;26(3):216–21.
70. Hernan AL, Giles SJ, Carson-Stevens A, Morgan M, Lewis P, Hind J, et al. Nature and type of patient-reported safety incidents in primary care: cross-sectional survey of patients from Australia and England. 2021 Apr 1 [cited 2025 Aug 10]; Available from: https://bmjopen.bmj.com/content/11/4/e042551
71. The Health Foundation. Involving patients in improving safety [Internet]. [cited 2025 Aug 10]. Available from: https://www.health.org.uk/reports-and-analysis/reports/involving-patients-in-improving-safety
72. Australian Government Department of Health, Disability and Ageing. The new regulatory model – Guidance for NATSIFAC providers [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Aug 4]. Available from: https://www.health.gov.au/resources/publications/the-new-regulatory-model-guidance-for-natsifac-providers?language=en
73. Carney Ao T, Then SN, Sinclair C. A New Aged Care Act: Progress in Implementing A Supported Decision-Making Approach in Australia's Federation? [Internet]. 2024. Available from: https://www.ssrn.com/abstract=4911190
74. Australian Government Department of Health D and A. Aged Care Diversity Framework [Internet]. Australian Government Department of Health, Disability and Ageing; 2019 [cited 2025 Aug 4]. Available from: https://www.health.gov.au/resources/publications/aged-care-diversity-framework?language=en
75. Consumer Engagement in Aged Care [Internet]. COTA Australia. [cited 2025 Aug 4]. Available from: https://cota.org.au/report/consumer-engagement-in-aged-care/
76. Government Department of Health, Disability and Ageing Australian. National Preventive Health Strategy 2021–2030 [Internet]. Australian Government Department of Health, Disability and Ageing; 2021 [cited 2025 Aug 4]. Available from: https://www.health.gov.au/resources/publications/national-preventive-health-strategy-2021-2030?language=en
77. Australian Government Department of Health D and A. The new regulatory model – Guidance for NATSIFAC providers [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Aug 4]. Available from: https://www.health.gov.au/resources/publications/the-new-regulatory-model-guidance-for-natsifac-providers?language=en
78. Fitzpatrick PJ. Improving health literacy using the power of digital communications to achieve better health outcomes for patients and practitioners. Front Digit Health. 2023 Nov 17;5:1264780.
79. Australian Digital Health Agency. National Digital Health Strategy. Available from: https://www.digitalhealth.gov.au/sites/default/files/documents/national-digital-health-strategy-2023-2028.pdf
80. Walsh L, Hemsley B, Allan M, Dahm MR, Balandin S, Georgiou A, et al. Assessing the information quality and usability of My Health Record within a health literacy framework: What's changed since 2016? Health Inf Manag J Health Inf Manag Assoc Aust. 2021;50(1–2):13–25.
81. Aged Care Quality and Safety Commission [Internet]. [cited 2025 Aug 4]. Quality Standards. Available from: https://www.agedcarequality.gov.au/providers/quality-standards
82. Wankah P. Enhancing inter-organisational partnerships in integrated care models for older adults: a multiple case study. J Health Organ Manag. 2022 Apr 22;36(6):781–95.
83. Brown I, Adviser P, Turner L, Officer P. Culture should be a strategic priority amid the changing landscape of the healthcare system. 2025 May 8 [cited 2025 Aug 4]; Available from: https://www.bmj.com/content/389/bmj.r928
84. Brickley B, Williams LT, Morgan M, Ross A, Trigger K, Ball L. Putting patients first: development of a patient advocate and general practitioner-informed model of patient-centred care. BMC Health Serv Res. 2021 Mar 20;21(1):261.
85. Oben P. Understanding the Patient Experience: A Conceptual Framework. J Patient Exp. 2020 Dec;7(6):906–10.
86. Australian Patient Advocacy Alliance. [cited 2025 Aug 10]. Available from: https://patientadvocacyalliance.org.au/

Chapter 7: Life course approach and models of care for healthy ageing

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Background: Life course approach and models of care for healthy ageing

This chapter discusses the literature on models of healthcare that are relevant to establishing a comprehensive approach in primary care to preventive and proactive healthcare, supporting the optimal health of individuals (healthy ageing) across the life course of ageing.

Given the focus of this evidence review on healthy ageing throughout the life stage of adulthood, the approaches to care have been drawn from literature addressing or applicable to prevention, treatment, management, and care coordination for healthy ageing across the adult life span, from early to mid-adulthood, later adulthood, to advanced older age. A life course approach describes this. Whilst a life course approach commonly describes accessible, preventive and personalised healthcare from conception through to the end of life (1), for this review, the focus is on the life stages of adulthood, from early ageing through to advanced older age. This includes end-of-life care models for when that is the required care.

Primary care holds a central position in promoting healthy ageing due to its accessibility and role in preventive care. Early adulthood and middle age are pivotal periods for implementing interventions that can delay or prevent the onset of age-related conditions (2). As outlined in *Chapter 4: Interventions*, effective strategies in these life stages include promoting physical activity, addressing multiple risk behaviours, and supporting lifestyle modification programs. These approaches are often strengthened using behaviour change techniques, digital health tools, and community-based supports.

Integrated care is well established as a systematic approach to ensuring comprehensive care, care coordination and continuity of care for individual patients for patient cohorts and across services and settings. An Integrated Model of Care aims to improve patient outcomes, efficiency, and the satisfaction of both health professionals and patients (3). It brings together multiple specific models of care tailored to particular diseases, populations and care settings. It can bring together a range of specific condition models of care to encompass care across the life course: prevention, diagnosis, treatment, rehabilitation and palliative care and is seen as improving access, quality and continuity of care, particularly for people with multiple morbidities and complex care needs.

Contemporary models of care increasingly recognise that sustainable improvements depend on active partnerships with consumers and carers, integrating lived experience into governance, service design, and evaluation (4). Co-design approaches and patient-reported measures (PROMs and PREMs) (5) offer essential insights into outcomes that matter most, ensuring that models of care are responsive, equitable, and person-centred.

The literature is discussed in two sections. The first section considers the types of models of care and two conceptual frameworks relevant to this review: the first being the concept of integrated care between primary care and other relevant health services, as well as other service sectors, which focuses on the prevention and promotion of health at different stages of ageing. The second is an overarching conceptual framework for a life course approach to healthy ageing in primary care, aiming to provide preventive and proactive, holistic, comprehensive, and integrated care to all adults across the various stages of adult ageing. Building a life course approach to healthy ageing in primary care would comprise a range of specific models of care specific to the population profile and health needs of the primary care service's patient population and connected local community.

The second section of this paper discusses a selection of specific care models that can be considered when designing and implementing a life course approach to care in primary care settings.

To inform this synthesis, a comprehensive review of the literature was undertaken using databases including PubMed, CINAHL, Scopus, and the Cochrane Library. The search focused on preventive and integrated primary health care models and their effectiveness in promoting healthy ageing across early adulthood, middle age, older age, and end of life. Additional targeted searches were conducted using the AI-powered academic engine *Semantic Scholar*, which employs natural language processing to refine and prioritise relevant results. Across five focused searches, 945 papers were identified, 624 screened, 566 deemed eligible, and 258 included in this review.

Models of care in healthcare

A model of care in healthcare is a comprehensive framework that outlines how health services are delivered to individuals or specific population groups as they progress through stages of a condition or health event (7).

A model serves as a guide to care provided, detailing the best practices, organisational structures, processes and principles that shape care delivery in various settings and contexts.

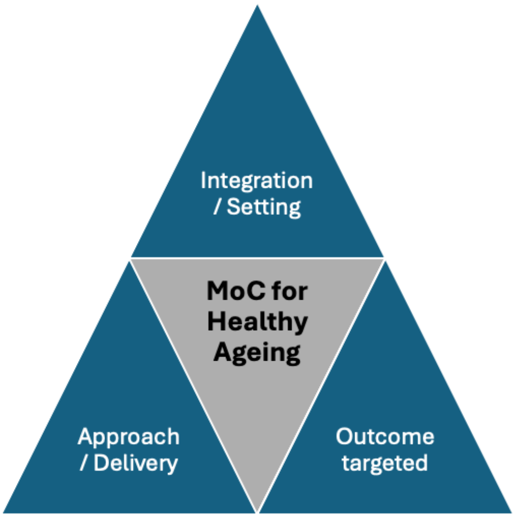
A model of care is adaptable to different health care contexts and can be designed for specific clinical specialties, patient populations or service delivery platforms (e.g. primary care, palliative care, digital health). Effective models of care are typically flexible, locally adapted and emphasise strong integration between service providers to ensure continuity and quality of care.

Models of care should be based on a theoretical foundation and be built on a conceptual or evidence-based framework that guides care delivery, such as patient-centred approaches or life-course-based approaches (7–9).

Three key components can be identified as central to models of care that promote healthy ageing across the adult life course:

a) Delivery-oriented organisational approach or structure: This specifies how care teams are organised, including task delegation, governance and responsibility for patient care (7,8,10), as well as models such as Nurse-Led Models or Virtual Care Models that utilise technology as new delivery methods.
b) Outcomes-focused practical methods and activities/interventions: In models of care, these detail the active methods and processes for delivering care, such as care plans, follow-up procedures and integration of services (7,10,11) to focus on specific health states (chronic disease management; frailty, etc.).
c) Integration within setting or context: Models of care can be designed specifically for different settings or contexts, such as Hospital in the Home models (12), or Interdisciplinary care teams to manage chronic conditions (13,14).

Figure 7.1 Key components for models of care for healthy ageing



Successful models require systematic planning, development, implementation and ongoing evaluation to ensure sustainability and effectiveness (8,14).

Integrated models of care in primary health care

Preventive and integrated primary health care models are increasingly recognised as essential for promoting healthy ageing across the adult life course. Although evidence is strongest among older adults, a growing body of research demonstrates their value in earlier stages of adulthood. (15,16).

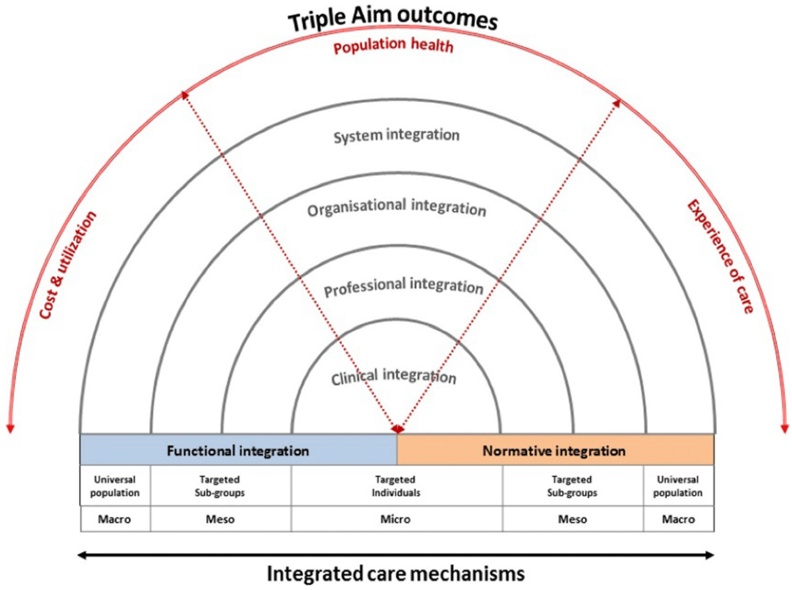
Integrated models of care that promote and support healthy ageing in primary care involve coordinated, person-centred care across multiple health and service settings. These models link primary care with acute care, residential aged care, mental health services, and community pharmacy.

In addition to clinical evidence and service planning priorities, model development should integrate structured co-design with consumers and carers, using methods such as experience-based co-design and analysis of PROM/PREM data to shape priorities and evaluate success (3).

Primary care is the central platform for integration of care to meet a person's health needs. Valentijn et al. proposed a conceptual framework for integrated care in primary care that emphasised the person-centred and population-based purpose of integrated care (17,18). The framework was developed in recognition that integrated care is increasingly seen as necessary to address the needs of people with multiple health conditions (multiple morbidities) requiring a complex set of healthcare responses.

The framework was based on the premise that the characteristics of primary care – particularly first point of contact, continuous, comprehensive and coordinated care for individuals support better health and deliver greater equity in health than health systems that are hierarchical and specialised (19,20). Notably, the framework is intended to facilitate integration of care across the three dimensions of integrated care: the micro level (clinical integration); at the meso level (professional and organisational integration) and at the macro (system integration) level (18) Figure 7.2.

Figure 7.2 Conceptual framework of Integrated Care based on the integrative functions of primary care



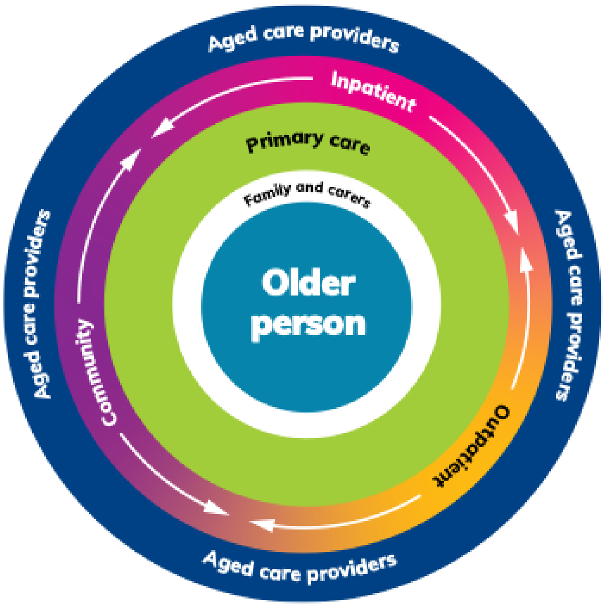
The framework proposed in this study brings together primary care capacity to integrate the biomedical, psychological and social dimensions of health and well-being, through both a person-focused and population-based approach to care, together with the system-level dimensions of integrated care. The authors describe this as follows:

- At the micro level, clinical integration emphasises a person-focused perspective, ensuring that service users receive continuous care. Health professionals must take proper account of the needs of individuals, ensuring that the services provided are matched (both horizontally and vertically) to their needs.
- At the meso- and macro-levels, integrated care is enabled when care between levels is coordinated and supported by system arrangements and by health professional roles and responsibilities and focussed on the person and their health needs.
- Functional and normative integration encompasses all levels of health services, through the micro-, meso- and macro-levels and delivers and enables connectivity within a system for individual health care and for connected, integrated health care services for all individuals (18).

These conceptual underpinnings and principles of integrated care are expanded on in Amelung et al (2021) (21) highlighting that integrated care prioritises people-centred approaches, fosters genuine partnerships between patients and providers, and responds to the social determinants of health by engaging community resources to promote health and prevent avoidable disease.

An integrated model of care for healthy ageing in primary healthcare, based on these principles, would encompass several specific models of care that provide tailored approaches to prevention, diagnosis, treatment, rehabilitation, and palliative care for diverse target populations. These would be combined with system-level approaches to integration to provide and support relevant connections between types and levels of health services, as well as social services as appropriate, for specific models or care approaches. This is illustrated in the following figure developed by the NSW Health Agency for Clinical Innovation Aged Health Network.

Figure 7.3. Aged health service settings model



Health care for older people requires multiple interactions between them, their carers and families and the health system, across all levels of health care and in all relevant settings: inpatient, outpatient and community. Appropriate care coordination and transitions between service settings reduce the risks of siloed decisions on treatment and care; uncoordinated, overlooked or omissions of relevant information and duplicated assessments and interventions. Primary health care is central to and an essential facilitator of continuity of care for the older person across different health and aged health services and settings (22).

An integrated model of care for healthy ageing in primary care would comprise of practice-based selected models such as those focused on maintaining the health of a healthy adult entering mid-life as well as on those with established risk factors for poorer health in older age, with models of care tailored to maintaining optimal health of older people with frailty, chronic health conditions, cognitive impairment or palliative care needs. These would include the concomitant system-level services and sector integration arrangements required for these models of care (22).

Contemporary and continually evolving digital technology applications are essential for the complex requirements of integrated care across the adult life stages of ageing in primary care. Digital enablers such as electronic communication systems, shared care plans, and telehealth facilitate collaboration between primary care and other health and community services. These tools help address the complexities of managing multimorbidity and chronic conditions in older adults by improving access, supporting patient engagement, and reducing system burden (23–25).

The implementation of an integrated approach to health care requires a systematic approach to ensuring comprehensive care, care coordination, and continuity of care for individual patients, patient cohorts, and across services and settings. An Integrated Model of Care aims to improve patient outcomes, efficiency, and the satisfaction of both health professionals and patients (3). It can bring together a range of specific condition models of care to encompass care across the life course: prevention, diagnosis, treatment, rehabilitation and palliative care and is seen as improving access, quality and continuity of care, particularly for people with multiple morbidities and complex care needs.

Implementation governance should include consumer and carer representatives with decision-making authority, ensuring that lived experience perspectives inform service rollout, adaptation and continuous improvement (26).

Evaluation frameworks should incorporate patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) (5) to capture the outcomes that matter to consumers, track improvements over time, and identify equity gaps.

The World Health Organisation Europe published ‘Integrated Care Models: an overview’ in 2016 (27) to promote conceptual clarity and provide information on existing integrated care models. The WHO Europe definition of Integrated care proposes that:

“Integrated health services delivery is defined as an approach to strengthen people-centred health systems through the promotion of the comprehensive delivery of quality services across the life-course, designed according to the multidimensional needs of the population and the individual and delivered by a coordinated multidisciplinary team of providers working across settings and levels of care. It should be effectively managed to ensure optimal outcomes and the appropriate use of resources based on the best available evidence, with feedback loops to continuously improve performance and to tackle upstream causes of ill health and to promote well-being through intersectoral and multisectoral actions” (21).

The WHO overview report on Integrated Models of Care concludes that integrated care models need to be applied within a context, with the design of such models based on population needs, aligned with health system functions and operationalised with a strong management strategy (21).

In a recent comprehensive overview of integrated care, the emergence of support for integrated care as the optimal approach to health care has been described as arising from efforts over recent decades to reorient the historical single episode, reactive provision of primarily acute health care to individuals towards coordination of care for the rising numbers and proportions of older people living longer with chronic health conditions (the Chronic Care Model) (28) and to increase capacity to promote better health and provide preventive health care in primary health care (the Primary Health Care model) (21,29). These models, however, have mainly retained an episodic and largely specific setting approach to health care, despite growing evidence that better outcomes are achieved through the integration of health care across health services and settings, as well as with other preventive and community-based services. Neither the Chronic Care Model nor the Primary Health Care model had been effective in reducing duplication and inefficiencies in the use of resources. Individuals needing health care were still presented with fragmentation of the health care they required (21). A rise in clinical navigation services had also occurred in response to the need to reduce these gaps and to improve efficiency and coordination of care for individuals.

Integration of evidence-based programs in primary health care for older people, such as those outlined in the WHO Integrated Care for Older People (ICOPE) model (30,31), has been shown to improve older adults' physical and mental (intrinsic) capacities, including locomotor, psychological and cognitive functions that enable a person to function and engage with their environment. Intrinsic capacity is influenced by factors such as the presence of diseases, injuries, and age-related changes, as well as the environment in which older people live. ICOPE programs have been shown to empower older adults to actively participate in their own care, leading to improved health outcomes and increased adherence to self-care practices (32).

Integrated care models may aim to bridge gaps between primary, hospital, and social care systems. In PRISMA (Canada), care was coordinated across agencies using case management and shared assessments (33). In Australia, HealthOne NSW brought together general practice, community health and aged care services through co-location and data sharing (34). These models reduce duplication, enhance continuity and support ageing in place.

Another integrated care model relevant to a model of care for healthy ageing is the geriatric co-management model in primary care, which involves collaboration with geriatric specialists and has been effective in managing complex chronic care needs. This model helps prevent hospital readmissions and delays the need for institutional care, thereby supporting healthy ageing in the community (35).

In Australia, the RACGP's Aged Care Clinical Guide (the Silver Book) (36) provides evidence-based guidance and resources for the care of common clinical conditions in ageing for people in both community settings and residential aged care settings. GPs provide care to almost all residents in aged care facilities. The Silver Book provides guidance on both general and organisational approaches to care across health care settings and systems (community and residential care). The Silver Book considers common clinical conditions, particularly multimorbidity, palliative and end-of-life care, deprescribing, medication management and polypharmacy, dementia and behavioural and psychological symptoms of dementia, osteoporosis, frailty and falls, pain, mental health, dermatology, and incontinence. While not a model of care in itself, the Silver Book underpins key elements of primary care-led models by promoting consistent, evidence-based approaches across settings, facilitating coordination between GPs, nursing staff, allied health professionals, and aged care providers. In Canada a similar resource was developed, the Care of the Elderly Health Guide (37).

Other Australian approaches to integrated care for older people include the Framework for Integrated Care for Older People with Complex Health Needs, published by the NSW Agency for Clinical Innovation in 2014 and updated in 2021 (38) and the NSW Health Integrated Care strategy, which includes tools and resources to support primary, integrated and community health care for people living with or at risk of long-term health conditions or who have complex needs (39).

A review of integrated healthcare in rural Australia for older people with preventable chronic conditions (15) considered integrated health care models using the European Sustainable Integrated Chronic Care Model for Multimorbidity (SELFIE) framework (40) as a synthesising tool for the review. The SELFIE framework is a response to the policy challenge posed by the increasing prevalence of multi-morbidity in populations. SELFIE developed a framework for integrated care models emerging in Europe and applied a systems approach to the components of these, considering both the core elements and the micro-, meso- and macro-levels of the health system as described by the WHO. This framework is discussed later in this chapter. Fifteen integrated healthcare models were identified in the NSW review, which found that care coordination and multidisciplinary teams bridging gaps between health and social services for patients were common to these models. Despite funding difficulties and limited technology use, several models have shown positive patient and healthcare outcomes.

An earlier review by the National Ageing Research Institute (NARI) into the integrated care, health and housing needs of older Australians that was undertaken for the Royal Commission into Aged Care Quality and Safety, considered that different models of integrated person-centred care need to be considered across a continuum of needs in older age, with each model appropriate for different levels and types of need. The review found that clinical models of care for older people in Australia were primarily based in primary care and aimed for integration with secondary health and social care. This review found that care coordinators were better placed to lead such models than general practitioners. These models are commonly focused on people with complex medical needs and on people with advanced frailty and/or dementia. The review identified the stepped nature of care needs, from older people with low needs and a high capacity for self-management to those with complex needs and limited self-management capacity.

The NARI review emphasised the importance of integrated care as a community-focused approach, that is, addressing the needs of a local community rather than being limited to design for individual clients. The review cited Aboriginal Community Controlled Services and culturally specific service providers as models of integrated care that are community-focused, serving communities rather than individuals alone. Co-design with diverse communities, guided by cultural safety principles, ensures models of care are tailored to local contexts and address structural barriers to access.

A life course approach to healthy ageing for adults

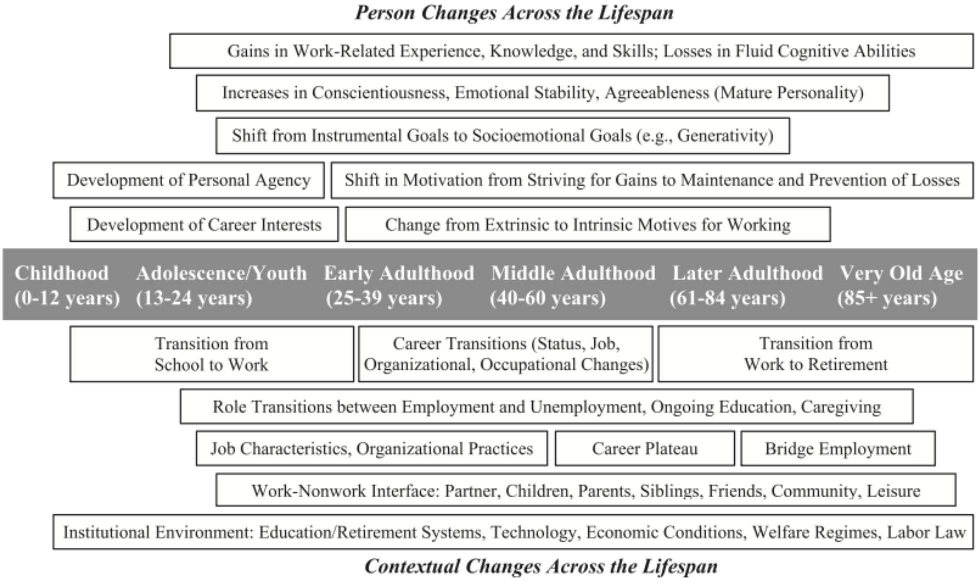
The terms "lifespan" and "life course" refer to different aspects of human development and ageing (41). Lifespan refers to the duration of an individual's life, from birth to death, and is often associated with biological or chronological age. Lifespan is often divided into distinct age groups (see Figure 7.4) for descriptive purposes. Life course, on the other hand, is a broader concept that examines the sequence of social roles, statuses and experiences individuals have throughout their lives, considering social, historical and cultural contexts and how they affect health and ageing.

The lifespan perspective, consistent with its origins in psychology, focuses mainly on the individual whereas the life course perspective places a stronger emphasis on the broader context in which the development of individuals and groups is embedded (41).

Table 7.1. Lifespan and life course perspectives

Category	Lifespan	Life Course
Focus	Primarily concerned with the biological and chronological aspects of aging.	Examines the individual's journey through life, considering social, historical and cultural influences.
Scope	The period between birth and death, encompassing physical growth, maturation and decline.	Includes social roles (e.g., student, worker, parent, retiree), transitions between roles and the impact of social structures on individual development.
Example	Studying the maximum lifespan of humans	Studying how historical events (like parental environment, early childhood) affect people's health.
Key Concepts	Longevity	Includes concepts like life stages (e.g., childhood, adolescence, adulthood), life transitions (e.g., marriage, job change), and life trajectories.

Figure 7.4. Person and contextual characteristics relevant to work and careers and normative age-related changes in these characteristics (41)



When looking at models of care relevant to healthy ageing, an overarching approach to or model of care could, as a minimum, be organised around lifespan phases (early adulthood until very old age) to emphasise evidence-informed preventive and therapeutic care. Alternatively, a life course approach to healthy ageing could be designed to provide evidence informed health care appropriate for the multiple and varied dimensions of health needs through the adult life-course as clinically and socially indicated.

Promotion and support of healthy ageing should begin as early as possible and target all age groups, aiming to prevent illness before it occurs, promote optimal health, and reduce the burden of disease after onset. Evidence from the WHO shows the potential impact of such measures: at least 80 per cent of heart disease, stroke and diabetes, and 40 per cent of cancers, are preventable. Many chronic diseases share common causes, including behavioural risk factors, biomedical factors, and broader social determinants that influence health across the lifespan (42).

These findings provide a strong rationale for life course-based models of care, which are grounded in the theoretical life-course framework that organises health and social care around the evolving needs, experiences and contexts of individuals throughout their lives, rather than focusing only on isolated episodes or current conditions. These models emphasise continuous, person-centred and integrated care that adapts to life transitions, personal histories and social environments, which makes them relevant to an integrated model of care for healthy ageing across the adult life-course.

Preventive health care

There is expert consensus on the value of adopting a life course approach to preventive health care, including a particular focus on preventable chronic diseases (43–45). Preventive health care involves acting early and taking advantage of opportunities to prevent the onset of chronic diseases while simultaneously reducing or eliminating behavioural risk factors and other social and environmental determinants that contribute to chronic diseases. The scope of action and range of preventive interventions is broad. Prevention can be targeted at individuals, population cohorts, communities, and whole populations.

Prevention can be defined in levels according to a 'stages of disease' continuum. Four levels of prevention have been well recognised in literature (46) with a fifth level, quaternary prevention, developed more recently to address health care harms. A further level of quaternary prevention has been developed more recently to address health care harms (47).

These categories are not exclusive of each other and a particular preventive intervention may be classified differently by different stakeholders.

The levels of prevention are:

- Primordial prevention: that is, preventing the emergence of predisposing social and environmental conditions that can lead to the causation of disease. This includes population-based interventions aimed at preventing the development of risk factors that lead to preventable illnesses and chronic diseases. Examples of primordial prevention include interventions to decrease the number of children who take up smoking, such as the regulation of age eligibility for the purchase of cigarettes and plain packaging of tobacco and public health campaigns to inform public awareness of health risks and protective health behaviours-such as sun safety and skin cancer. Urban design that prioritises safe and inviting environments to encourage active lifestyles of residents in communities and local areas is another.
- Primary prevention: the next stage in the intervention chain is to reduce the incidence (i.e., the development of new cases) of chronic diseases by eliminating or decreasing specific risk factors and other determinants, while promoting factors that protect health. Examples of primary prevention include vaccination programs and cardiovascular risk identification and management. The RACGP Red Book on preventive health care for individuals supports including immunisations (48).
- Secondary prevention involves reducing the progression of chronic diseases through early detection (typically by screening at an asymptomatic stage) and early intervention. An example of secondary prevention is the dietary management and promotion of physical activity for individuals at risk of developing diabetes, aimed at reducing or delaying the onset of the disease and national screening programs for some cancers. The RACGP Red Book on preventive health care supports screening and case finding delivered by primary care and national screening programs.
- Tertiary prevention: this involves improving function and minimising the impact of established disease. It also includes preventing or delaying complications through effective management and rehabilitation. An example of tertiary prevention is cardiac rehabilitation for people who have established cardiovascular disease and have suffered a heart attack. Tertiary prevention in primary care is supported by condition specific clinical guidelines such as the RACGP-Diabetes Australia Handbook on Management of type 2 diabetes (49) and the RACGP Handbook of Non-Drug Interventions (HANDI) (50) which provides guidelines for non-drug interventions and therapies for people with common health conditions.

- Quaternary prevention is particularly relevant to primary care for healthy ageing and to integrated care between primary, secondary and tertiary health care and primary care and aged care (47). Quaternary prevention focuses on protecting patients from unnecessary health care, such as polypharmacy, over-diagnosis and over-treatment (51–53). These can occur in the context of fragmented and siloed interventions for multiple and complex chronic health conditions. Quaternary prevention and overmedicalization has been identified by the World Organisation of Family Doctors (WONCA) as a particular priority in primary health care of older adults (54). A particular tool for quaternary prevention of polypharmacy that has been developed is the Drug Burden Index (DBI) which estimates the risk of functional impairment from medications with anticholinergic and sedative effects in older people with the goal of becoming a clinical risk assessment tool (55).

These categories are not mutually exclusive, and a particular preventive intervention may be classified differently by various stakeholders. However, they are useful for framing a lifespan approach to healthy ageing in the provision of primary health care for adults in early, mid, and late life.

Prevention in the context of promoting and supporting healthy ageing should start with public and population health measures for the entire population, that is, focusing on primordial and primary prevention (56,57).

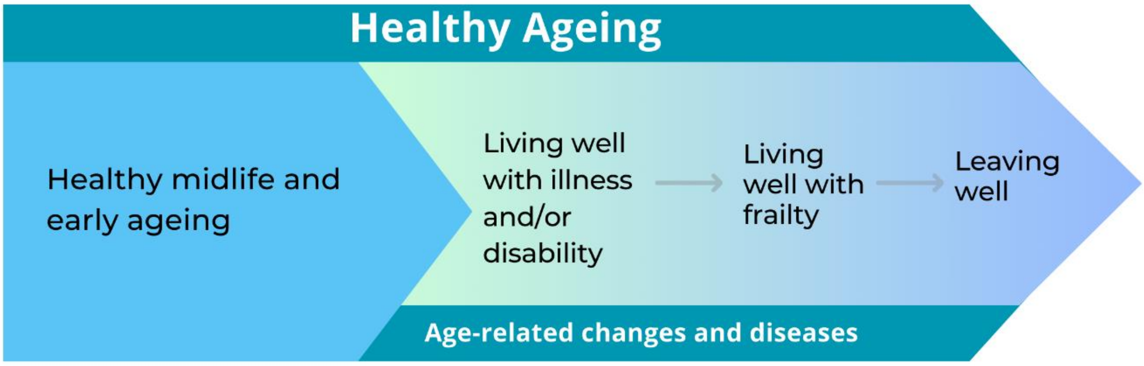
Preventive health care to support healthy ageing in the provision of health care to adults (a lifespan stage approach) emphasises primary, secondary and tertiary prevention (56,58–60), that is:

- Immunisations and promotion of health literacy and understanding of maintaining health and wellbeing through the adult life course
- identifying modifiable risk factors in adults in early ageing, ensuring early detection and early intervention in potential disease development, and
- provision of health care aimed at optimising functional ability and minimising the impact of established disease.

A model of care for healthy ageing focussed on the life span stage of adulthood, from early adulthood through middle adulthood to older age and very old age, would emphasise prevention and early intervention in the risk factors for and indicators of those health conditions commonly associated with the early stages of ageing (refer Chapter 4 re common conditions with ageing and common age-related conditions and disease) through to quaternary prevention in advanced older age.

A conceptual approach to this is illustrated in Figure 7.5 which outlines the Living Well approach to primary and integrated healthcare for older adults developed by the National Healthcare Group in Singapore (61). The foundation of this model is primary health care given its role in health care as the first point of contact and a continuous source of care for individuals. Implementing this model requires a shift from a disease-focused approach to one that prioritises wellness, quality of life, and person-centred care. The aim is to support individuals to live well while managing illness, chronic conditions, frailty, and other aspects of advanced ageing, including end-of-life care. Successful implementation also depends on the active involvement of families, carers, and communities in the care process.

Figure 7.5. *Healthy Ageing and Living Well (adapted from National Healthcare Group, Singapore)*



Components of a life course approach to healthy ageing for adults

This chapter discusses the conceptual framework and care components of a life course integrated care model in primary health care for adults in early, middle and older age as well as those requiring end-of-life care. Applying the principles of both integrated care models and life course models of care, this includes:

- screening and early interventions in younger adulthood through to mid-ageing and the onset of common conditions occurring with ageing;
- interventions and continuity of care through middle ageing and older age, with the onset of common age-related conditions and diseases, and
- integrated care of mental health and other complex health conditions
- palliative care and end-of-life care.

A life course model of care for healthy ageing adopts a holistic, long-term perspective on health, acknowledging that ageing and its related conditions are influenced by a lifetime of biological, behavioural and social factors. Instead of responding to illness late in life, this model highlights the importance of screening, early intervention, prevention and support throughout all stages of life, from early development to advanced old age.

The life course model highlights the importance of preventive strategies and health-promoting behaviours throughout life. Early-life experiences, socioeconomic status and lifestyle choices all influence health trajectories, making it essential to address these factors across the lifespan (62–64). Interventions targeting modifiable risk factors such as physical inactivity, poor nutrition and social isolation can reduce the risk of chronic diseases and cognitive decline (64–66).

The life course model emphasises multidomain interventions - such as physical activity, cognitive training, nutrition, and social engagement to maintain and enhance functional ability and well-being, rather than just treating illness (64,67–69). This model values outcomes like quality of life, autonomy and social participation, aligning care with what matters most to older adults (68,69).

Families and community organisations play a crucial role in supporting healthy ageing by providing social support, facilitating group learning and encouraging behaviour change (70). Community-based programs and group sessions help older adults age in place, maintain independence and foster social connections (70,71).

Socioeconomic factors, such as childhood socioeconomic position and education level, significantly influence healthy ageing (72). Higher socioeconomic status and better education are associated with a greater probability of healthy survival and ageing (73). Whilst these non-modifiable factors could inform screening approaches and risk predictions, modifiable factors across the life course, such as diet and exercise, can be targeted to alter the risk of chronic diseases and improve overall health outcomes (74,75).

Integrated life-course care models bring together health professionals, social workers or connectors, and community resources to provide personalised, holistic care. These models enhance self-management, social support, and health outcomes by addressing the diverse needs of older adults in a coordinated manner (67,69,71,76).

Success in the life-course model is assessed by improvements in quality of life, functional ability, and social participation, rather than solely by the absence of disease (77–79). This holistic approach ensures that care is person-centred and responsive to the changing needs and preferences of older adults.

Hence, a primary care-based life-course model for healthy ageing requires a paradigm shift to integrated, wellness-focused care that actively involves individuals, families, communities and a range of health services to support quality of life and functional ability throughout the ageing process (63,64,66,67,69–71,76).

Effective implementation of life course models in primary care requires coordination among various health professionals across a range of health services and with other sectors, along with supportive infrastructure, funding, and essential resources. While life course models of care for healthy ageing offer a comprehensive conceptual and design framework, challenges remain in their implementation (80). These include the development of policies, systems and services infrastructure that support integrated health care between diverse health services (81).

While primary health care is central to promoting healthy aging, challenges such as limited resources, workforce limitations and shortages, and the need for systemic changes of the predominant care delivery models persist (82). Addressing these challenges requires concerted efforts to enhance the capacity and efficiency of primary health care services, ensuring they can meet the growing demands of an aging population (83).

A life-course approach in primary care, as exemplified by Indonesia's policy for non-communicable diseases (NCDs), emphasises a comprehensive strategy that spans various stages of life. This approach necessitates multi-sectoral collaboration and long-term planning to effectively prevent and manage NCDs, highlighting the importance of integrating health, social, economic, and environmental factors (84).

Implementing life course models of care in primary care requires addressing several structural and systemic challenges. These include strengthening interdisciplinary collaboration and communication, as well as improving the currently limited connections between diverse health services involved in the care of the same individual (86). Building greater capacity for preventive and proactive primary health care is critical to reducing preventable reliance on hospital-based curative care and to promoting healthy ageing. Achieving this transition will require substantial policy and system reforms to better support the needs of a growing ageing population (85).

Additionally, achieving the ambition of a life course approach to healthy ageing, which aims to proactively promote and protect health, will benefit from studies that aim to better understand the dynamic relationships between different ageing trajectories and their determinants (87,88).

The following Table 7.2 summarises evidence on the effectiveness of preventive and integrated primary health care models in improving healthy ageing across different adult life stages.

Table 7.2 Life stages relevant to healthy ageing across the adult life course

Life Stage	**Key findings & interventions**
Early Adulthood	Evidence is limited; most models focus on older adults with Australian examples focused on childhood and early adult prevention. Early prevention and risk assessment are recommended (85–87).
Middle Age	Preventive care and risk factor management, such as for cardiovascular disease, in primary care can reduce future disease burden and promote healthy ageing. Digital tools and non-medical providers enhance capacity but systemic barriers persist (89–91).
Older Age	Strong evidence that integrated multidisciplinary care (including physical, dietary and cognitive interventions) improves quality of life; reduces frailty, falls and hospitalisations and supports independence and quality of life (2,68,92–97).
End Of Life	Integrated care models facilitate coordinated, person-centred care. Unnecessary interventions are reduced and quality of life is improved. Care in residential settings, including integrated oral health care and in mental health services for older adults show improved quality of life and care coordination (92,94,98–100).

Australian evidence demonstrates the strongest support for integrated and preventive primary health care models in older age, with positive effects on chronic disease management, quality of life, and care coordination. There is emerging but limited evidence for early adulthood and middle age, suggesting the potential for further research into the implementation of integrated care throughout the adult life course (95,101).

Models and approaches to care for lifespan stages and specific conditions

In this second section, the terms ‘model of care’ and ‘approach to care’ are used. In the context of this review, a life course approach in primary care for healthy ageing is discussed as an overarching framework for care that encompasses a range of potential models or approaches to care for specific conditions and patient and population cohorts.

The term ‘model of care’ refers to a structured framework for delivering health services to a specific population cohort with a particular condition. It is described as defining the way health services are delivered, outlining best practice care and services for a condition, an individual, a population, or a patient cohort (102). It is described as patient-centric, being flexible for local implementation, supporting integrated care and efficient use of resources and having a robust, standardised set of outcome measures and evaluation purposes. Models of care are also described as being informed by policy, evidence and resources (103).

An approach to care reflects a more open, inclusive and responsive way of thinking about the provision of care. It takes into account values, attitudes, and cultural understandings (104). The term ‘approach to care’ prioritises people over systems and adaptability over uniformity, whereas the term ‘model of care' emphasises the latter of these. An approach to care is intended to guide the behaviour, interactions, and decision-making of health professionals and to be applicable across a wide range of settings and conditions.

In particular, models of care define 'who does what, where and how', in the delivery of care; an approach to care does not define the logistics of the provision of care.

The discussion in this chapter section will use each term as it is defined in the literature from which it is drawn. It is important to note that an approach to care can be applied to several models of care – that is, a person-centred approach can be used in a chronic disease management model of care; an aged care model and a mental health care model.

The different applications of a model of care and an approach to care are illustrated in the literature as follows.

Table 7.3. Examples of Approaches to Care and Models of Care

Health care	**Approach to Care (philosophy/attitude)**	**Model of Care (structured framework)**	**References**
Preventive care in primary care	Health promotion – empowering healthy behaviours through education and prevention.	Patient-Centred Medical Home (PCMH) – coordinated, continuous, team-based primary care.	(105)
Chronic disease management	Self-management support – encouraging autonomy, education and goal-setting.	Chronic Care Model (CCM) – proactive, team-based care with decision support and planned visits.	(106,107)
Rehabilitation	Restorative / goal-oriented – focused on regaining function and independence.	Multidisciplinary Rehabilitation Model – coordinated care from various allied health disciplines e.g., physiotherapy, occupational therapy, speech therapy.	(108,109)
Culturally diverse populations	Culturally safe care – respecting cultural identity, eliminating power imbalances.	Aboriginal Community Controlled Health Services (ACCHS) – holistic, locally governed service delivery.	(110) (111)
Aged care	Person-centred care – Tailoring care to individual life history, goals and preferences.	Comprehensive Geriatric Assessment (CGA) – Multidimensional assessment guiding coordinated care.	(112,113)
End-of-life care	Dignity-conserving / compassionate care – supporting emotional and spiritual needs.	Palliative Care Model – interdisciplinary approach to end-of-life symptom management and support.	(114,115)

Healthy lifestyle and preventive care – life stage approach

Early and middle age are pivotal periods for introducing and implementing interventions that can delay or prevent the onset of age-related conditions. General practice has a pivotal role in promoting healthy lifestyles and preventive care for adults in the earliest stages of ageing. Typical interventions include promoting physical activity, addressing multiple risk behaviours, and implementing lifestyle modification programs. These interventions are often enhanced using behaviour change techniques, technology and community-based approaches.

The effectiveness of interventions can vary across different cultural and contextual settings. The literature has identified a need for further investigation of effective interventions. In particular, the cost-effectiveness of interventions is influenced by recruitment rates and the fidelity of implementation. Interventions with high uptake rates are more likely to be cost-effective (116,117).

National and state health agencies have established various healthy ageing initiatives that can be integrated into general practice to support older adults in maintaining their health, function, and independence. These include:

Preventive health assessments

Screening and early intervention, creating opportunity The Medicare Benefits Schedule (MBS) supports a range of health assessments that enable GPs to identify risks and intervene early to promote healthy ageing (118). These include:

- 45–49-Year-Old Health Check (MBS item 701, 703, 705, 707): Offered once to adults aged 45–49 at risk of developing chronic disease, focusing on lifestyle risk factors, mental health, and metabolic indicators.
- Heart Health Check (MBS item 699, 177): A cardiovascular disease risk assessment for individuals aged 45 years and older (30+ for Aboriginal and Torres Strait Islander people), supporting early identification and management of CVD risk (Department of Health and Aged Care, 2023).
- Type 2 Diabetes Risk Evaluation (AUSDRISK tool): An MBS-supported risk assessment tool used to evaluate a patient's risk of developing type 2 diabetes, particularly relevant for people aged 40–49 with high risk.
- 75+ Health Assessment (MBS item 701, 703, 705, 707): Annual structured assessment for people aged 75 and over to evaluate physical, mental and social health risks, including falls, frailty, cognitive decline, and social isolation.

The integration of practice nurses in these assessments facilitates comprehensive and proactive lifestyle support (119).

Lifestyle counselling in routine practice

Routine consultations present opportunities for brief lifestyle counselling using motivational interviewing techniques. GPs and practice nurses can address smoking, alcohol intake, physical activity and nutrition. The integration of digital tools, such as My Health Record and patient-facing health apps, enhances monitoring and goal-setting. The RACGP provides smoking, nutrition, alcohol and physical activity (SNAP) evidence-based guidelines for GPs and practice staff to work with patients on these lifestyle risk factors (120). The SNAP guidelines also address issues related to overweight and obesity.

The Guidelines include the 5As approach to guide behavioural interventions in primary care. This framework supports practitioners to: Ask about current behaviours, Advise on the benefits of change, Assess readiness, Assist with appropriate supports, and Arrange follow-up to sustain progress.

Risk identification and behavioural interventions

State-funded programs such as Queensland's 'My Health for Life' initiative offer structured health coaching to support behaviour change in older adults at risk of chronic disease (Health and Wellbeing Queensland, 2023). GPs can refer eligible patients, aligning clinical care with community-based health promotion efforts (121). Screening tools such as AUSDRISK support the identification of at-risk individuals during consultations.

The American Heart Association (AHA) has provided guidance on health behaviour change programs in primary care for cardiovascular disease prevention and risk factor management among middle-aged and older adults. The AHA statement provides key strategies for implementation, including assisting patients in adopting health promotion goals and providing follow-up support, aligned with the Five As Behaviour Change approach, developed in the USA and now widely used and adapted to address other health risk factors for adults (122) (123).

The 5As are widely used in preventive health care to:

- encourage lifestyle modifications to prevent chronic diseases such as diabetes, cardiovascular disease (124), and cancer.
- structure brief interventions during clinical encounters, making them more systematic and patient-centred (125).
- promote shared decision-making between patients and healthcare providers.
- provide a repeatable framework that can be adapted to different clinical settings and populations.

Some examples in literature of the applications of the 5As approach are (126):

- smoking cessation: clinicians ask about tobacco use, advise quitting, assess readiness, assist with a quit plan (e.g., nicotine replacement), and arrange follow-up.
- obesity management: providers assess dietary and physical activity habits, advise weight loss, assess motivation, assist with goal setting and arrange dietitian referrals or check-ins.
- alcohol use: a brief 5As-based intervention can reduce harmful drinking behaviours in primary care.

Chronic Disease Management plans

Chronic Disease Management (CDM) items under the MBS have provided for GPs to develop General Practitioner Management Plans (GPMPs) and Team Care Arrangements (TCAs). These plans facilitate structured lifestyle interventions and subsidised access to allied health professionals, including dietitians, exercise physiologists and physiotherapists (119). These arrangements can support optimal health and continuity of care. These are now consolidated into Chronic Condition Management Plans that simplify referrals to allied health providers (127).

Some Australian evidence has shown that ongoing support and follow-up have been shown to be crucial for the maintenance of lifestyle changes among patients. The involvement of practice nurses is essential for sustaining the implementation of these programs and there is a need for better referral services and feedback mechanisms between allied health providers and general practitioners to ensure that patients receive continuous encouragement and support (128,129). Mobile health (mHealth) behavioural change support interventions can also be delivered through primary care to provide continuing support.

Community engagement approaches to the promotion of healthy ageing

Community-centred approaches that support healthy ageing are multifaceted strategies rooted in and led by the community, integrating various local supports to enhance the well-being of older adults within the community. Some examples of these are closely connected to primary care, providing integrated health and social support for healthy ageing.

The Healthy Ageing Promotion Program for You (HAPPY) in Singapore is supported by the Health Promotion Board of the Singaporean Ministry for Health to support healthy ageing within individual communities and with primary care networks. The program is led by health coaches and trained volunteers, focusing on dual-task exercise, cognition, and social engagement. National screening and integration pathways inform referrals of program participants with evident health issues to a general practitioner or geriatric service. The program has demonstrated the effectiveness of community-based, peer-led interventions in achieving improvements in health and well-being (130).

Aboriginal Community Controlled Health Organisations (ACCHOs) embody community-led approaches to healthy ageing. Their role is multifaceted, encompassing health and social care and is grounded in the principles of self-determination, cultural safety and holistic health care (131). Examples of ACCHO Healthy Ageing Initiatives include Yarnin' groups and men's and women's groups for social connection and health education; transport services to improve access to appointments; nutrition and physical activity programs tailored to older community members; and on Country programs that support ageing in place and connection to land (132).

The NUKA System of Care is an innovative healthcare system based in Anchorage, Alaska, developed and managed by the Southcentral Foundation (SCF) to serve Alaska Native and American Indian people (133). The model provides medical, dental, behavioural, traditional and health care support services to Alaska Native and American Indian people. It has gained international recognition for its relationship-based, customer-owned model of care, which aligns strongly with the principles of healthy ageing defined by the World Health Organisation (WHO) that emphasise integrated, person-centred care that supports the ability of older adults to do what they value. The NUKA System of Care demonstrates how a relationship-based, culturally grounded, integrated healthcare model can support healthy ageing by empowering individuals, strengthening community ownership and ensuring comprehensive, respectful care. The focus on relationships extends beyond health care delivery. To ensure whole-system transformation, each key work system was redesigned – including workforce development, compliance, human resources, and finance – to embed an organisation-wide focus on relationship-building and shared decision-making (134). The model is reported to have delivered a 44% decrease in emergency presentations, a 63% decrease in hospital admissions and a 90% result in employee satisfaction (133).

Multidisciplinary team models of care for healthy ageing

Multidisciplinary team care is the most frequently used model of health care to strengthen the capacity of primary care to address the complex needs of ageing populations. In countries that are members of the Organisation for Economic Co-operation and Development (OECD), including Australia, as well as in China, a systematic review of literature found that expansion of the multidisciplinary team care model was the most frequently described component of primary care transformation initiatives (135). These were commonly supported by adapted payment mechanisms with increased access to primary care.

Multidisciplinary team (MDT) models involve collaboration among medical practitioners, nurses, specialists and allied health professionals to provide comprehensive care. They are increasingly implemented in primary health care to address the rising prevalence of multimorbidity, frailty and functional decline in an ageing population. MDT models enable person-centred, coordinated, and often preventive approaches by combining the expertise of diverse health professionals (136).

Recent research, including systematic reviews, randomised controlled trials and cohort studies, has evaluated the effectiveness of MDT models in improving clinical, functional and quality-of-life outcomes for older adults. Evidence suggests MDT that care, can lead to improvements in functional status, medication management and patient satisfaction, with some studies reporting reductions in hospitalisations and healthcare costs (68,137–143). However, the overall impact on broader health outcomes, such as mortality, quality of life, and long-term independence, remains inconsistent, with several high-quality studies reporting neutral or limited effects (144–148).

This review synthesises the current evidence base to clarify the strengths, limitations and future directions for MDT care in primary care for ageing populations.

There are four common contributing factors to effective multidisciplinary team care:

- Team composition: effective MDTs typically included GPs, nurses, pharmacists, social workers and allied health professionals, with clear roles and regular communication (141,149–152).
- Care integration: integration with community and social services, use of shared electronic health records and proactive case-finding are associated with better outcomes (138,153–155).
- Patient engagement: involving patients and caregivers in care planning and decision-making improves satisfaction and adherence (51,137,150).
- Contextual factors: rural vs. urban settings, funding models and workforce sustainability influence MDT effectiveness (95,156,157).

Evidence of effectiveness

Although there is substantial evidence that multidisciplinary team care in primary care for ageing populations can improve functional status, medication management, deprescribing, patient satisfaction, and reduce hospitalisations, studies show limited or no measured impact on mortality, long-term independence, or overall quality of life (51,144,145,147,148,158–160).

Implementation factors, such as team composition, care integration, patient engagement and contextual adaptation, are critical to success (51,149–152). Barriers including poor communication, unclear roles and funding constraints can undermine effectiveness (157,161,162).

Despite these limitations, MDT care remains a promising approach for addressing the complex needs of older adults in primary care, particularly when interventions are tailored, well-integrated and patient-centred.

In Australia, multidisciplinary health care has been funded through GP Management Plans and Team Care Arrangements, which enable patients to access various health professionals for coordinated health promotion or preventive care via referral from a general practitioner. These care plans, however, do not facilitate multidisciplinary team care within a single health setting. At present, coordinated care is primarily delivered through GP chronic condition management plans, multidisciplinary case conferences, GP mental health treatment plans, and related case conferences (163).

The Health Care Homes trial, undertaken in Australia between 2017 and 2021, supported team-based care through shared information and care planning, and incorporated community pharmacists into multidisciplinary care services. The Health Care Homes model featured voluntary enrolment of patients to a general practice (their health care home) with a nominated GP as their preferred clinician; risk assessment and stratification tools and resources; funding arrangements based on client enrolment and risk assessment; training and support for the development of the health care homes model in each practice with electronic shared care planning tools providing electronic medical records. Implementation outcomes in practices within the trial varied and were considered highly dependent on the personal commitment of individual health professionals within each practice. Outcomes of the trial included improved care planning and improved access to multidisciplinary care. However, expectations of reduced healthcare costs and lower costs to patients were not met, and there was little evidence of improved health outcomes (164).

Examples of models of multidisciplinary team care

The following are brief outlines of several general practice or single-organisation-based multidisciplinary team care models identified in both international and Australian literature.

Chronic Care Model (CCM)

The Chronic Care Model (CCM) is a widely implemented framework that supports high-quality management of chronic health conditions. It was developed to provide proactive, planned care with community resources and self-management support (165). Chronic Care MDTs commonly comprise general practitioners, nurses, allied health professionals, care coordinators and social workers. In Australia, elements of the CCM underpinned the Health Care Homes trial, which targeted patients with complex chronic conditions (166).

Comprehensive Geriatric Assessment in Primary Care

In the UK, Comprehensive Geriatric Assessment is provided in community settings through integrated multidisciplinary primary care teams. The team typically includes a GP, geriatrician, nurse, social worker, pharmacist, physiotherapist, and occupational therapist. This model of care has been shown to improve functional outcomes, reduce hospital utilisation, and deliver person-centred care (167).

OPEN-ARCH (Far North Queensland)

OPEN ARCH is an integrated, community-based model designed to keep older people with complex, chronic needs living well at home by bringing together primary care, specialist clinicians, and community supports in a single team. At its core is a GP-centred pathway supported by a dedicated care coordinator who conducts comprehensive assessments, develops individualised care plans and navigates referrals. The multidisciplinary team (MDT) usually includes GPs, geriatricians or aged-care physicians (often by outreach or telehealth), nurse practitioners, community nurses, physiotherapists/OTs, social workers, pharmacists and local community service providers. The MDT meets regularly — either face-to-face or virtually — to review high-risk patients, prioritise interventions (such as medication reviews, home modifications, and allied health input), and plan timely follow-up.

In Far North Queensland, this approach is adapted for geography and cultural needs: outreach visits, telehealth to link remote communities to specialists, and partnerships with Aboriginal Community Controlled Health Organisations to ensure cultural safety and local buy-in. Shared care plans and clear communication with hospitals aim to reduce avoidable emergency department visits and admissions, speed up discharge support, and improve continuity of care. Success factors include strong care coordination, reliable communication systems, local stakeholder engagement and funding mechanisms that support time-intensive case management.

Qualitative evaluations demonstrate better experiences for patients and carers, suggesting that enablement models of integration can foster independence and support positive change for older adults with complex needs. Understanding these lived experiences is vital to the comprehensive evaluation and ongoing refinement of integrated service models (168).

Geriatric Evaluation and Management (GEM)

The Geriatric Evaluation and Management (GEM) model of care includes explicitly specialist geriatrician expertise in the MDT, together with general practitioners, nurses and allied health professionals, including physiotherapists, occupational therapists and/or social workers. This model of care is being increasingly adapted for use in primary and community care. Geriatric evaluation and management at home care is provided by some Australian health services. Northern Health in Melbourne, Victoria, offers the GEM@Home service, a hospital-in-the-home model delivered by a multidisciplinary team comprising geriatricians, nurses, physiotherapists, occupational therapists, social workers, and pharmacists. The service has been shown to improve functional capacity, enhance medication management, reduce the risk of falls, and prevent or shorten hospital admissions (169).

Hospital in the home programs

These programs are widespread and typically involve multidisciplinary teams. In Australia, the Transitional Aged Care Program, part of the Australian Government Aged Care initiative, offers time-limited, multidisciplinary team-based care and support in the home, focusing on functional reablement for older individuals transitioning from hospital to home care. Teams usually include nurses, physiotherapists, occupational therapists, social workers, and GPs (170).

Patient-Centred Medical Home (PCMH)

The PCMH model integrates primary care health professionals, including general practitioners, nurses, allied health workers and care managers, to deliver continuous, comprehensive care to patients connected to a primary care practice, by enrolment or similar mechanism. This model emphasises team-based, accessible services and shared decision-making. The Patient-Centred Medical Home is particularly suited to managing complex chronic conditions in older adults (171). The model integrates care across primary care, specialist care, mental health and social and community services. Introduced in the USA, the model is described by the United States Agency for Healthcare Research and Quality (AHRQ) as focused on patient-centred care coordination and is comprised of five components (105):

- **Comprehensive care**: in which the PCMH provides for most of an individual's physical and mental health care needs, including prevention and wellness, acute care and chronic care. Care is provided through a multidisciplinary and, in larger services, may include health professionals located in different settings. Smaller practices may incorporate virtual team members to deliver multidisciplinary, team-based care across all aspects of comprehensive care.
- **Patient-centred care:** care that is relationship-based and focused on the whole person and their health needs in the context of their culture, values and preferences. The PCMH recognises that patients and families are core members of the care team and actively supports patient learning about management and organisation of their own care at a level the patient chooses.
- **Coordinated care:** in which the PCMH coordinates care across all elements of the broader health care system, including specialty care, hospitals, home health care, and community services and supports. In the Australian context, this approach has limited potential beyond individual initiatives and projects that aim to coordinate care across separate parts of the health services arrangements.
- **Accessible services:** through minimised waiting times for urgent needs, additional time as appropriate with patients, out-of-hours telephone or electronic access to a member of the care team, and alternative methods of communication such as email and telephone care.

- **Quality and safety:** using evidence-based medicine and clinical decision-support tools to guide shared decision making with patients and families; with appropriate performance measurement and improvement, measurement and monitoring of patient experiences and patient satisfaction and practising population health management.

This model is commonly supported by a combination of health insurance payments, both public and private, that include fee-for-service payments, time and insured person-based payments and payments based on health outcomes (performance payments), with funding arrangements aiming to promote comprehensive, coordinated and cost-effective health care.

The NSW Agency for Clinical Innovation describes the Patient Centred Medical Home model along the same principles as the AHRQ above and includes (172):

- dedicated staff to help patients navigate health care services and create care plans;
- a focus on strong, trusting relationships with physicians and the care team, with open communication about decisions and health status;
- care that is culturally sensitive and compassionate.

The Australian Health Care Homes (HCH) Trial, previously mentioned, was based on tailored funding arrangements for participating general practices to implement the patient-centred medical home service. Time- and enrolled person-based funding (bundled payments linked to the complexity of the individual enrolled patient's health needs) was designed to enable practices to improve population health, enhance patient experience, reduce healthcare costs and support health professionals. The National Trial featured voluntary patient enrolment, coordinated care planning and team-based care with shared care plans for both health professionals and patients (173). The model of care emphasised comprehensive care, patient-centredness, coordinated care and accessible services.

An evidence review by the Sax Institute (174) during the trial found a surprising lack of research into how models of patient-centred medical homes have been implemented, with the majority of the literature focusing on the components of these models of care and their outcomes. That review identified systemic barriers and enablers for implementation of patient-centred medical home models of care that comprised:

- Policy settings and funding incentives to support the model;
- Strategies to support transformation and change management, including leadership, culture, staff experience and resources to provide care planning and continuity of care;
- Care coordination beyond the practice, including education programs, practice facilitation and coaching; learning communities or collaboratives and learning resources such as 'toolkits' for new and enhanced workforce roles, including medical practice assistants, community health workers; embedded community pharmacists and linkages or partnerships enabling information sharing and care coordination with community providers, specialist and hospital services and
- Health information technology, including more effective use of health information technology, population health management tools, risk stratification tools, and data and performance measurement and feedback.

The authors concluded that implementation of the patient-centred medical home model requires:

- a strong foundation for successful redesign;
- commitment to sustained implementation over time;
- visionary leadership and a supportive culture.

In particular, the review determined that there is no one single change strategy for the implementation of patient-centred medical homes and that, as the evaluation report of the Australian National Trial found, “developmental pathways to success vary by practice” and that implementation of the PCMH model needs to be guided by local contexts and circumstances (175).

Nurse-led models of care

Nurse-led models of care in primary health care are increasingly recognised as effective in managing the complex health needs of older adults in primary care settings. These models are commonly led by nurses who are Nurse Practitioners, Advanced Practice Nurses, or Clinical Nurse Specialists, who provide assessment, diagnosis, treatment and care coordination for patients with chronic conditions and functional limitations (176,177).

Nurse-led models of care can encompass comprehensive geriatric assessments (CGA), health promotion, self-management education, multidisciplinary collaboration including comprehensive geriatric assessments (CGA) and care coordination. These models of care in primary health care address the spectrum of health issues for older adults by integrating health promotion, disease prevention and comprehensive care management.

These components are critical for improving health outcomes, reducing healthcare utilisation, and enhancing the quality of life for older adults.

Table 7.4. Components and activities of Nurse-led Models of Care

Components	Activity examples
Comprehensive geriatric assessments	Multidisciplinary and specialist identification of physical, psychological, cognitive and social needs of older adults.
Care coordination and management	Integration and coordination of services for seamless care delivery.
Health promotion and disease prevention	Interventions to empower older adults to maintain their health and independence.
Self-management education and support	Education to enable older adults to manage their health effectively.
Multidisciplinary collaboration	Collaboration with other healthcare professionals for holistic care.
Focus on function and quality of life	Emphasis on maintaining function and improving quality of life.

Comprehensive geriatric assessments as part of nurse-led models of care are effective in delaying the placement of aged residential care and reducing mortality rates among frail older people (178). They are important in identifying key components of care for community-dwelling frail older people, emphasising the need for expert consensus on the feasibility and importance of these assessments (179).

Nurse-led care coordination has been demonstrated to improve health outcomes and quality of life for older adults (180,181). Nurse-led models of care place a strong emphasis on maintaining and improving function, as well as enhancing nutrition and quality of life, for community-dwelling older adults (182). Health promotion and disease prevention through nurse-led interventions is effective in reducing frailty progression, improving physical functioning and enhancing mental health outcomes (182,183).

Self-management education is a key component of nurse-led models, enabling older adults to take an active role in managing their health. Self-management education is effective in reducing healthcare utilisation, improving health outcomes and quality of life (178,184). An early example of this approach is demonstrated by the *Greater Randwick Integrated Health Services Plan* (185), which proposes co-designed service models and coordinated workforce planning to support wellness rather than illness.

It represents a foundational workforce-integrated model of care, and while it predates more recent national reforms, it draws on two key templates: the Canterbury Model (186) and Integrated Care for Older People (187).

Another approach receiving some attention in the literature is salutogenic-based interventions led by nurses and their effect on improving health outcomes for older adults (188). Salutogenic theory was initially developed as a population-focused theory of health, focusing on the factors that enable some individuals to remain healthy despite challenges and adversity(189). This is discussed further in this chapter in respect of integrated care approaches for people living with frailty.

Nurse-led multidisciplinary interventions are effective in reducing emergency presentations, hospital length of stay, complications and anxiety and depression levels (184,190).

Team-based primary care with Nurse Practitioners (NPs)

These are team-based models that incorporate nurse practitioners (NPs) or advanced practice nurses to improve capacity and continuity in primary care. Nurse practitioners provide assessments, prescribe medications and manage chronic illnesses and coordinate the care of older adults (191,192). A Cochrane review found that NP care was comparable to physician-led care in terms of clinical outcomes and satisfaction (193).

Silver Chain Group is one of Australia's largest not-for-profit health and aged care providers (194). The Group provides a range of integrated, multidisciplinary, community-based health services, including hospital substitution, aged care and palliative care. The service emphasis is on reducing hospitalisations, supporting older adults to live independently at home, and providing holistic, person-centred care in the community (195). Multidisciplinary teams usually comprise nurse practitioners and registered nurses, providing clinical and wound care, as well as medication management. General practitioners are either integrated or collaborate with the team, and allied health professionals include physiotherapists, occupational therapists, social workers, dietitians, and speech pathologists, with a care coordinator and care aides or support workers. The Silver Chain range of programs includes hospital in the home care; palliative care; restorative and reablement programs, chronic disease management with a single point of contact provided for each individual client and their family. The Silver Chain community-based MDT care model has been found to reduce hospital admissions and emergency department presentations; improve functional independence; produce high levels of client satisfaction and preference for in-home care, and provide a cost-effective alternative to institutional care (196).

Integrated primary care and social services for healthy ageing

Integrated primary care and social services for healthy ageing involve a comprehensive approach that combines health and social care to address the complex needs of older adults. This integration aims to improve patient outcomes by providing coordinated, person-centred care that enhances functional ability and well-being. The key components of integrated care models include preventive health care, care coordination, and the alignment of health and social services (197). These components are designed to address the multifaceted needs of older adults, particularly those with multimorbidity and frailty, and to improve their quality of life.

The health care of older people who have multiple chronic conditions; and-or are medically complex; and-or are frail; is beyond the capacity of traditional, episodic care delivery models. As well, health and social care arrangements are historical, siloed, dispersed across various locations and sectors, each with their own models of care and communication and information systems.

Older people with complex and chronic conditions have been shown to benefit from coordinated or integrated health and social care that is person-centred, more comprehensive, coordinated and accessible in the communities in which they live. There is also evidence of benefit to health service demand for this cohort of people. A Canadian study in 2013 of the evidence drawn from a long-term national research program on integration of aged care to maintain patient autonomy (PRISMA). The PRISMA program investigated the implementation and outcomes over time of community-based comprehensive geriatric assessment and care services across Canada (198). The 2013 analysis of multiple academic reports on the program found that integration of care benefitted the health and wellbeing of older adults and produced health system benefits that included reduced avoidable demand on emergency services and specialist care. The study established two themes or components to the service model that are critical to its effectiveness: design and adaptation of the model to its local context and 'dynamism and adaptability' achieved by building into the model an intrinsic ability to adapt over time to contextual circumstances, including research program constraints (198).

In New Zealand, the Te Whiringa Ora model of integrated care comprises a community-based, multidisciplinary team with a case management approach to care that places the client and their family at the centre of their health plan and brokers health and social supports from partner providers. Te Whiringa Ora has demonstrated improved access to care and a reduction in hospital admissions and length of stay (199).

Key components of these integrated care approaches are:

- Integrated care models emphasise preventive healthcare provided close to home, which helps reduce hospital admissions and promote healthy ageing (200,201).
- Effective care coordination involves aligning specialist and generalist care (168), which is crucial for managing the complex needs of older adults (187). This includes comprehensive assessments and shared care plans among providers (201,202).
- Integration requires a seamless continuum of care that includes both health and social services. This alignment supports the functional ability of older adults and maximises resource and information sharing efficiencies (98,200).
- The focus on "ageing in place" highlights the importance of community-based care settings, which are essential for maintaining the independence and well-being of older adults (98,203).

Impact on patient outcomes

Integrated care has been shown to reduce hospital admission rates and the length of hospital stays, which are critical indicators of improved health outcomes for older adults (204).

By focusing on optimising physical and mental capacities, integrated care models enable older adults to maintain their functional ability and participate in society for longer (200,202).

There is also evidence that integrated care models improve patient satisfaction by providing more coordinated and person-centred care (204,205).

Supporting integrated care

Establishing integrated care for older people between primary care and social services requires several mechanisms to ensure coordination, continuity, and person-centred care. These are considered to be:

- Structural mechanisms: particularly shared governance and policy frameworks; pooled or tailored funding arrangements; multidisciplinary teams that are co-located or virtually integrated to support collaborative care planning.
- Operational mechanisms including designated care coordination roles; shared information systems and electronic health records; common assessment tools and a single point of access.
- Cultural and relational mechanisms: person-centred philosophy and practice; a trust-based, collaborative culture; inclusive of community and consumer leadership and engagement.

Social prescribing in primary care to support healthy ageing

Social prescribing is defined as "a means for trusted individuals in clinical and community settings to identify that a person has non-medical, health-related social needs and to subsequently connect them to non-clinical supports and services within the community by co-producing a social prescription - a non-medical prescription, to improve health and wellbeing and to strengthen community connections (206). Link workers co-create a non-medical prescription with individuals to improve their health and well-being.

Engagement in social prescribing is facilitated through referrals from a primary care physician, link worker, or self-referral.

Social prescribing for ageing adults in Canada has shown in a Social Return on Investment (SROI) analysis a return of $4.43 per $1 invested through: reduced risk of falling; reduced loneliness; reduction in ambulance calls; ED visits, hospital admissions, length of stay; healthcare cost; dementia incidence; mortality incidence; coronary heart disease and stroke incidence (207).

While integrated care and social services models offer numerous benefits, they also present challenges to their implementation. These include structural and interdisciplinary tensions, organisational self-interest, and challenges in record sharing (203). Additionally, financial and organisational barriers can hinder the widespread adoption of integrated care models (208). Overcoming these challenges requires concerted efforts at the policy, system and clinical levels to ensure that integrated care can be effectively implemented and sustained (200,208).

Reviews and evaluations indicate that integration improves quality of life, reduces hospitalisation and enhances service coordination (209,210). However, the integration of tertiary and secondary system levels of health care (macro- and meso-level integration) remains underdeveloped (211).

Evaluation of international models of integrated care suggests that the most effective community-based integrated models include structural arrangements that connect primary health care services with secondary care services (e.g. specialist care) and inpatient care, particularly multidisciplinary sub-acute care where that is established. In Australia, multidisciplinary sub-acute care encompasses geriatric assessment and management (Geriatric Evaluation and Management), rehabilitation, psychogeriatric care and palliative care. Sub-acute care is variously implemented across Australia and may include hospital-based care and care in residential settings (212,213).

The WHO's Integrated Care for Older People (ICOPE) framework provides evidence-based guidelines for managing declines in intrinsic capacity at the community level (60). Complementing this, the World Bank's FIRE framework outlines policy levers—financing, innovation, regulation and evaluation - for PHC-centred integrated care (214). These frameworks advocate prevention, person-centredness and systemic alignment.

Examples of models of integrated health and social care

Several international models have implemented integrated care across multiple levels of health care for older people. These include:

Canterbury (NZ)

A system-wide model with pooled funding and cross-sector collaboration has shown reductions in hospital stays and emergency admissions (186).

Gesundes Kinzigtal (Germany)

A population-health model integrating care across sectors with shared incentives and EHRs, leading to cost savings and better outcomes (215).

Jean Bishop Integrated Care Centre (UK)

Delivers proactive frailty care through multidisciplinary teams, reducing hospital use (discussed further below).

The Canadian Program of Research to Integrate Services for the Maintenance of Autonomy (PRISMA)

This model provides integrated care for older adults by establishing an overarching framework to co-ordinate existing health and social services using shared and consistent policies, processes, information and communication and other resources and tools. This model has shown significant benefits in client empowerment and improved satisfaction with care and health service utilisation and outcome benefits (198).

The Te Whiringa Ora model of integrated care

In a rural area in New Zealand with a largely indigenous population with high levels of socioeconomic disadvantage (216). The service is a community-based, multidisciplinary team model centred on care coordination with the client and their family. The model is described as providing a 'web of care' for and with patients and their families and provides coordinated care between general practices, hospital, community and cultural services. Coordination of care is facilitated by culturally appropriate care coordinators and telephone contact and tele-health monitoring in the home to support self-management of chronic conditions by individual clients and their families. The Te Whiringa Ora model of integrated care places the client and their family at the centre of their health plan. Te Whiringa Ora has demonstrated improved access to care and a reduction in hospital admissions and length of stay. Four distinct system and service delivery challenges to implementation of the model have been identified: perceived duplication of existing services, patient engagement, practice engagement and planning challenges (216).

An Australian approach: Indigo 4Ms Framework

A rural-specific integrated care approach, the Indigo 4Ms Tool, has been developed for small rural health services across Australia (217). Based on the 4Ms framework developed by the Institute of Healthcare Improvement (218), USA, which proposes four domains of an age-friendly health system: "what Matters", Medication, Mentation (mental wellbeing) and Mobility, the Indigo 4Ms project focused on facilitating integrated health and social care. It is intended to prevent, slow, or reverse common age-related difficulties, such as hearing, vision, mobility, and memory. The Indigo 4Ms framework includes a resource tool for older adults to support the collaborative development of personalised health and wellbeing plans with their health care team, alongside a complementary tool designed for primary health care workers to guide conversations and plan development. Both tools have been implemented in rural communities and health services and are currently under evaluation (219).

Integrated multidisciplinary and system-level care for complex health needs

The integration of health care for older adults with chronic and complex conditions is a critical area of focus internationally and in Australia. Effective models aim to improve patient outcomes and reduce healthcare utilisation and enhance the patient experience and that of health professionals. This discussion considers several models that have been identified as effective in achieving these goals.

The SELFIE framework (220) is a response to the policy challenge posed by the increasing prevalence of multi-morbidity in populations. SELFIE developed a framework for integrated care models emerging in Europe and applied a systems approach to the components of these, considering both the core elements and the micro-, meso- and macro-levels of the health system as described by WHO. This framework was discussed earlier in this chapter.

Geriatric consultative models that include geriatric specialists offer an underutilised tool to maintain functional health and to prevent avoidable hospital admissions for older adults. These models commonly include geriatricians and general practitioners; they may include nurse practitioners and can include pharmacists, allied health professionals and social workers. They are described as cost-effective chronic care management systems that help prevent readmissions and hospitalisations while delaying the need for residential care placement (139,221).

Examples of Integrated multidisciplinary and system-level

The following are examples of integrated multidisciplinary and system-level care for older adults with complex health needs.

OPEN ARCH: An Australian integrated care model

The Older Persons Enablement and Rehabilitation for Complex Health Care Needs (OPEN ARCH) model of care provides specialist geriatric intervention in primary care for older adults with complex needs in Far North Queensland (201). Designed to improve access to comprehensive care in the community for older people who would usually require hospital admission, OPEN ARCH is based on a partnership between the regional hospital and health service and the North Queensland Primary Health Network. The model of care includes multidisciplinary comprehensive geriatric assessment with social care coordination for older adults at risk of functional decline and hospitalisation. The aim of the model is to enable older adults to stay in their homes with support addressing their complex, chronic, or multimorbid health conditions (222).

General practitioners refer older persons with a high risk of functional decline or hospitalisation to a specialist geriatric clinic for a geriatrician assessment and a care plan coordinated by an Enablement Officer, a clinical care coordinator (nursing or allied health professional). The models align specialist geriatric care with primary care, facilitating shared medical records and case conferencing with the specialist, GP and Enablement Officer. (222,223).

Outcomes of this model of care have been assessed through a randomised controlled trial and by qualitative studies. Outcomes include a stabilising of trends in emergency department presentations and hospital admissions by this cohort of patients (224); qualitative patient and carer outcomes that include achievement of positive change, improving and maintaining independence and 'getting by', and favourable cost-effectiveness measures particularly in reduced inpatient stays and improved functional independence (168).

Geriatric Resources for Assessment and Care of Elders (GRACE)

The Geriatric Resources for Assessment and Care of Elders (GRACE) model (225) aims to enhance the quality of primary care for low-income older adults through a multidisciplinary team comprising a nurse practitioner and a social worker. The model was developed in Indiana to provide primary care services, along with support for older adults living in the community. It is described as *"an intensive patient-centred medical home (PCMH) model for people with complex needs"*. This model of care comprises in-home geriatric assessment by the MDT team; development of an individual care plan based on geriatric care protocols and patient goals with geriatrician medical input and oversight; collaboration with the primary care physician to review and implement the care plan; regular interdisciplinary team conferences including a pharmacist and mental health liaison. The model emphasises proactive, ongoing care management and coordination, using an electronic medical record system to track patient outcomes and ensure proactive follow-up.

The model explicitly includes older adults diagnosed with dementia or depression.

GRACE has been assessed through a randomised controlled trial and additional studies, including practical clinical trials and implementation research in diverse healthcare settings. These studies consistently demonstrate GRACE's effectiveness, feasibility, and potential for cost savings, particularly for high-risk older adults such as veterans (226).

Canterbury Integrated Care Model

The widely known Canterbury Integrated Care Model was established in New Zealand's South Island by the Canterbury District Health Board (DHB) to develop new models of integrated health care and new forms of health purchasing to support these models (186). The development of the Canterbury model was prompted by a range of health system pressures in the region including high rates of hospital admissions of older people for health conditions that could be managed in the community; fragmented and uncoordinated health care services with delayed access to health care; duplication of services; siloed services and lack of shared health information and effective communication to support patient care. Medical and social support services were not connected, and there were significant gaps in care for people transitioning between different services (primary care and aged care) or between hospital and home (227).

The Canterbury model developed an overarching framework with a single budget for all services, enabling innovation, collaboration and resource integration (228). A shared electronic record aggregates data from all services – including general practice, hospital, pharmacy, laboratory and diagnostic imaging, supporting continuity of care and real-time communication. An online software platform, Health Pathways, was developed to support standardised assessment and referral processes, supporting consistent practices and streamlining service access.

Acute demand management was implemented through the establishment of a community-based rapid response service, providing multidisciplinary team care with a range of professionals including nursing, allied health, specialists and other support. This component of the Canterbury model played a significant role in mitigating the impact of the 2011 earthquakes in the region, helping to maintain acute care capacity and reduce pressure on emergency departments and inpatient admissions despite major infrastructure losses (227).

The model's benefits included reduced hospital utilisation, with lower admission and readmission rates compared to the national average, shorter average lengths of stay, and fewer emergency presentations (229). Hospital stays for patients over 75 were shortened, and the proportion of this age group admitted to residential care also decreased (227).

A particular aspect of the Canterbury Integrated Care Model was the incremental development of its components, influenced by the need to respond to changing circumstances, particularly following the 2011 earthquakes (229). Strong leadership and culture have been identified as central to the development and effectiveness of the model, as well as significant investment in skills development and implementation science (230).

The Integrated Multimorbidity Care Model: EU Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (JA-CHRODIS)

JA-CHRODIS is a comprehensive, person-centred, integrated model of care, designed to transition from fragmented, disease-specific care to integrated, holistic management, and to support healthy ageing by addressing the multiple and complex needs of older adults. The model is adaptable to local area health contexts and resource constraints. It emphasises multidisciplinary team care, individualised care plans, regular comprehensive assessments and the involvement of social and community resources to address both medical and non-medical needs. It is focused on the whole person and on maintaining function, independence and quality of life. (231–233).

The model comprises five core domains:

- delivery of care;
- decision support;
- self-management support;
- information systems and technology;
- social and community resources.

The JA-CHRODIS model aims to reduce care fragmentation by encouraging collaboration between primary care and hospital and community care for older adults with multiple conditions It also emphasises the support of self-management and active patient participation in care decisions.

Table 7.5. EU Integrated Multimorbidity model of care - JA-CHRODIS

Domain	**Processes and resources supporting Healthy Ageing**
Delivery of Care	Individualised care plans, case managers
Decision Support	Multidisciplinary team input, regular assessments
Self-Management Support	Patient education, empowerment

Information Systems/Tech	Shared records, care coordination
Social/Community Resources	Links to social support, community programs

Pilot studies in several European regions have demonstrated improved quality of care, enhanced patient satisfaction, and improved professional skills in managing multimorbidity (231,233). The model is adaptable to different health systems and is being used to guide policy and practice across Europe (234).

Integrated care for older adults living with frailty

Integrated care models for people at risk of and living with frailty provide coordinated, patient-centred care that integrates health and social services to improve outcomes and quality of life. The most effective models incorporate multidisciplinary team care, comprehensive assessments and proactive management strategies (235).

Older adults with frailty often face complex care needs due to multimorbidity, polypharmacy, physical dysfunction, and social/psychological factors. This complexity frequently leads to fragmented care, increasing the risk of poor treatment adherence and adverse drug reactions (202).

A systematic review of models of care for frailty for the European Joint Action on Frailty Prevention (ADVANTAGE JA), published in 2019 (235), found few models of integrated care specifically designed to prevent and manage frailty. The review considered that comprehensive assessment and multidisciplinary interventions addressing modifiable physical, psychological, cognitive and social factors were essential. The available evidence supported a more holistic and salutogenic response to frailty, combining a chronic care approach with education, enablement, and rehabilitation to optimise function, particularly in the event of sudden deterioration in health or transitions between care settings.

The salutogenic approach to health care

A salutogenic theory of health care has been proposed over recent decades as a positive, resource (strengths) based problem-solving model of health which focuses on health-promoting factors as well as risk factors to improve health and well-being (236). Developed as a population-focused theory of health, salutogenesis focuses on understanding why some individuals remain healthy despite stress and adversity. It has also been applied to improve end-of-life care (189).

Central to the salutogenic approach is the concept of a sense of coherence (SOC)(237), defined as an individual’s capacity to maintain resilience and effectively cope with stress. A sense of coherence is a stress-preventive and moderating factor, supporting health (238). A scoping review of salutogenic approaches by Cardiff Institute of Society, Health and Ethics found evidence that high self-esteem and positive self-concept are health protective and contribute to positive outcomes, and that a wide range of other factors are also protective, such as social skills, problem-solving abilities and coping skills are also influential (239). The ADVANTAGE JA review identified a range of studies that indicated the benefit of a holistic approach combining chronic care with education, enablement and rehabilitation.

More recently, a review employing horizon scanning methods identified and evaluated emerging models of care for older people with frailty to determine their applicability within the Norwegian health services context (240). One such model, the Walcheren Integrated Care Model (WICM), is often highlighted for its innovative approach and structured integration of services, although evidence indicates important limitations in terms of cost-effectiveness and measurable health outcomes (see below).

Examples of integrated care for ageing population

Walcheren Integrated Care Model

The Walcheren Integrated Care Model (WICM)(241) is a Dutch model designed to improve care for frail, community-dwelling older adults by integrating health and social services through proactive screening, case management and multidisciplinary collaboration. Its key features are:

- proactive frailty screening using the Groningen Frailty Indicator (242);
- comprehensive needs assessment (EASYcare instrument);
- case management by geriatric nurse practitioners and specialists;
- general practitioners (GPs) as coordinators and single entry point;
- multidisciplinary meetings, protocols and web-based patient files;
- collaboration across primary, secondary, and tertiary care.

Outcomes reported show a small positive effect on quality of life, particularly in maintaining social attachments, with general quality of life preserved compared to a decline in usual care. However, no significant improvement was shown in experienced health, mental health, social functioning or functional abilities (243).

Whilst the Walcheren Integrated Care Model offers a structured, multidisciplinary approach that can help preserve quality of life for frail elderly people, particularly in social and emotional domains, it has not been shown to improve health outcomes or functional abilities and is not cost-effective compared to standard care (244).

The Community Actions and Resources Empowering Seniors (CARES) model

CARES is a collaborative model based in primary care, designed to address frailty in its early stages and decrease healthcare costs through reduced hospital admissions (245). Implemented in a Canadian area, the model is based on evidence that frailty can be delayed and potentially prevented. The model also aims to improve the quality of life for older adults by promoting a sense of empowerment and control over their risk for frailty through health coaching to support healthy ageing. Primary care assessment of frailty risk is undertaken in adults aged 65 to 84 years. A Frailty Index is generated through a subsequent electronic comprehensive geriatric health assessment (246). The Frailty Index informs an individual care plan, and adherence to the care plan by the older adult is supported by a health coach for up to six months. The frailty index and comprehensive geriatric assessment are repeated after six months to assess the benefit. Initial results of the CARES proof of concept pilot evaluation showed a statistically significant decrease in the Frailty Index (FI-CGA) score of participating older adults with an average reduction of 0.032 from the baseline Comprehensive Geriatric Assessment (CGA) to the 6-month post-CGA assessment, suggesting that the intervention may slow the progression of frailty and enhance the self-management ability of older adults (245). Implementation of the electronic Frailty Index Comprehensive Geriatric Assessment (FI-CGA) into primary care electronic medical records enhances the ability of healthcare providers to make informed and comprehensive healthcare decisions (247).

Programs of All-Inclusive Care for the Elderly (PACE)

The Programs of All-Inclusive Care for the Elderly (PACE) in some states in the United States combine funding from the national Medicare and Medicaid programs to deliver comprehensive, community-based care for disadvantaged and frail older adults, enabling them to remain at home (248). PACE participants are typically eligible for both Medicare and Medicaid funding for health and aged care. Program financing is capped, allowing providers to deliver a flexible and tailored package of services that are not restricted to those reimbursable under traditional fee-for-service arrangements.

PACE integrates medical and social services through interdisciplinary, team-based care designed to meet the full spectrum of participants' needs. This coordinated model provides primary, acute, and long-term care within a single system, reducing reliance on institutional care and supporting ageing in place. Its most effective components include person-centred care planning, close collaboration among multidisciplinary teams, and the integration of health and social supports to optimise outcomes for frail older adults.

PACE relies on interdisciplinary teams (IDTs), including physicians, nurses, social workers, therapists, and other professionals, to coordinate care. High team performance is strongly linked to better functional outcomes and improved management of conditions such as urinary incontinence, although not directly to survival rates (249).

PACE operates through collaborative care models, particularly those integrating behavioural health, which further improve outcomes for participants with psychiatric or cognitive disorders (250). It offers a comprehensive range of services: primary, acute, long-term, behavioural health, rehabilitation, personal care, and social support, all within a single organisational framework (251).

The integration of services and settings enables smooth transitions between different types of care and environments, decreasing hospitalisations and promoting community living (252). Services are customised to meet individual needs and preferences, fostering autonomy and community residence (253).

During the COVID-19 pandemic, PACE programs rapidly shifted from centre-based to home-based care, increasing in-home services, telehealth and social support, demonstrating adaptability and resilience (254).

Jean Bishop Integrated Care Centre (UK)

Established in 2018 in Hull, UK, the Jean Bishop Integrated Care Centre provides proactive, multidisciplinary care for older people living with frailty. The service is widely regarded as a leading example of collaborative care, integrating NHS services, social care, voluntary organisations, and emergency services to help frail and elderly residents remain healthy, independent, and living at home or in their preferred care setting (255). Care is delivered by a multidisciplinary team comprising geriatricians, nurse practitioners, general practitioners with extended roles in frailty care, pharmacists, occupational therapists, physiotherapists, social workers, clinical support workers, carers' support staff, and volunteers. Each participant is initially visited at home by a team member before attending a single, comprehensive appointment at the Centre, lasting approximately three to five hours. During this session, a full geriatric assessment is conducted, encompassing physical health, psychological wellbeing and mental health, medication review, social needs, functional status, and therapy requirements. Following assessment, a personalised care plan is developed, including discussions on advanced care planning (256).

A community-based, non-randomised controlled trial was undertaken to assess the effectiveness of the service, measuring the outcomes of the integrated care service plus usual care versus usual care alone for participants aged 65 years and older with an electronic Frailty Index score of ≥0.36. The primary outcome measure of wellbeing was assessed using an Integrated Palliative Care Outcome Scale (IPOS) a valid and reliable self-reported measure used to assess symptoms and other concerns (overall wellbeing) among those with advanced illness and at risk of frailty (257). The intervention group included 199 older adults, with 54 control participants. Outcome measures, adjusted for age, gender and living status, showed improvements in overall wellbeing that were sustained through to three months. The trial authors acknowledged that the participant sample was limited to participants with severe frailty and concluded that the effectiveness of the service on the outcomes of frailty, such as dependency, hospitalisation and mortality, needed further study (256).

An Australian model: OPEN ARCH

The OPEN ARCH (Older Persons ENablement And Rehabilitation for Complex Health conditions) model highlighted above provides specialist geriatric intervention in primary care settings for community-dwelling older adults with complex needs (168). OPEN ARCH operates through vertical integration at the primary-secondary interface, with primary care serving as the central integrating function (201). As discussed previously, a study of OPEN ARCH identified positive patient and carer experiences arising from the service as well as indications that enablement models of integration can improve independence for older people with complex needs (258).

Integrated palliative care

Integrated palliative care for older community-dwelling adults generally involves coordinated, multidisciplinary approaches that address physical, psychological, social, and practical needs. Evidence indicates that such integrated models can reduce symptom distress, unnecessary hospitalisations, and enhance satisfaction with care, although their effects on some outcomes are mixed.

The evidence of outcomes of integrated approaches to palliative care commonly features the following benefits:

- symptom management: integrated care reduces symptom distress and improves quality of life, especially for those with chronic non-cancer conditions and heart failure (259–261);
- healthcare utilisation**:** these models lower unnecessary hospitalisations and emergency visits, and increase the likelihood of dying at home (262,263);
- patient and caregiver experience**:** enhanced satisfaction with care, better psychosocial support, and improved caregiver outcomes are reported (158,260,264);
- cost-effectiveness**:** integrated approaches can be cost-saving compared to usual care (260).

There is evidence of a limited impact on symptom burden in dementia or on mortality rates (261,263). The quality of evidence varies from low to moderate, and further research is necessary for widespread implementation (158,265).

Table 7.6 Examples of integrated primary and secondary palliative care

Key Components	How Integration is Achieved	Evidence of Effectiveness	References
Multidisciplinary team (MDT), person-centred assessment, symptom	MDTs work with GPs and community nurses, shared care plans, regular meetings, coordinated communication	Reduced symptom distress, cost-effective, improved satisfaction	(158,260,266)

management, psychosocial support, care planning			
Comprehensive geriatric and palliative assessment, home visits, 24/7 call service, follow-up	Geriatric team collaborates with home nursing, primary care, and provides ongoing support and coordination	Fewer unnecessary hospitalisations, ER visits, more home deaths	(262,266)
Monthly nurse / social worker calls, caregiver support, advance care planning, symptom management	Nurse / social worker team coordinates with caregivers and primary care, uses protocols for ongoing support	Reduced ED / hospital visits, no significant symptom improvement	(263)
Needs / frailty assessment, symptom and psychosocial support, advance care planning	Palliative care team works with primary care, uses standardised tools, regular follow-up	Improved quality of life, reduced anxiety / depression, no mortality increase	(259,261)

Australian initiatives

Integrated Palliative Care for Frail Older People Living in the Community, Queensland

This model of integrated palliative care addressed the growing challenge of caring for Australia's ageing population, particularly frail older adults with multiple chronic conditions who are at high risk of hospitalisation and death (266). Recognising that palliative care can improve the quality of life for people with life-limiting illnesses, the study explored how an integrated model of care—linking primary care (general practitioners) with specialist services—could better meet the needs of frail older people living at home.

The research was built on evidence from a systematic review, which identified multidisciplinary case conferences as the most effective and practical method of integrating primary and secondary care. A two-phase mixed-methods design was used. In Phase 1, focus groups involving GPs, geriatricians, palliative care specialists, nurses, and allied health professionals explored the experiences of caring for frail older adults and their views on the proposed model. These insights informed a refined approach tailored to this population. Phase 2 piloted the model with patients, carers, and healthcare providers, assessing feasibility, acceptability and potential impact. Quantitative data (hospital admissions, days in hospital, emergency visits) and qualitative interviews were collected at baseline, one month, and three months. Results suggested improved mental well-being for patients, better physical and mental well-being for carers, and reductions in hospital use.

Findings demonstrated that the integrated model improved mental well-being for patients and enhanced physical and mental well-being for carers. Hospitalisations were reduced, indicating potential cost efficiencies for the health system. Participants generally welcomed the model, though barriers such as time pressures, funding constraints, and entrenched intra-professional boundaries posed challenges to implementation. Involving health professionals in the design of the model, highlighting its benefits, and allowing negotiation of roles within case conferences may help overcome these barriers and support sustainable integration (266).

Key features of the model included: use of a frailty and palliative needs screening tool, a shift in terminology from "palliative care" to "supportive care," active involvement of patients and carers in case conferences, and flexible delivery to accommodate local practice contexts. Health professionals noted that patient and carer participation added value but also created tension between frank professional discussion and patient-centred dialogue, highlighting the need for careful structuring of case conferences (266).

The research showed that integrated case conferences were acceptable to patients, carers, and most health professionals. The approach increased access to services, improved coordination of care, and enhanced outcomes for patients and carers. Evidence suggests that while the model was originally designed for palliative care, a broader application to complex frail older adults may be beneficial. Notably, the model demonstrated potential to reduce health service utilisation, yielding cost efficiencies and improving system effectiveness in meeting increasing demand. However, without dedicated funding, widespread implementation may not be feasible (266).

For primary care and government health departments, this study provides valuable insights: integrating primary and specialist care through structured case conferences can improve patient outcomes, enhance carer well-being, and generate health system efficiencies. Careful attention to workforce engagement, role negotiation, and local adaptation is critical to successful implementation and sustainability.

Improving Palliative, Aged and Chronic Care through Clinical Research and Translation (IMPACCT)

The IMPACCT program (267) is a collaborative international quality improvement program that studies the prospective use of medications and non-pharmacological interventions commonly used in palliative care and cancer symptom management. It focuses on improving the quality of life for individuals with chronic illnesses and their families through early and comprehensive palliative care, addressing physical, psychological, social and spiritual needs. The program has provided education and information for GPs and practice nurses, emphasising the early introduction of palliative care in the course of a serious illness (268).

Integrated mental health care for older community-dwelling adults

Integrated mental health care models for older community-dwelling adults aim to address the fragmented nature of traditional healthcare delivery by coordinating physical and mental health services, social support and community resources (208). The evidence base for these approaches has expanded significantly, with multiple systematic reviews and randomised controlled trials demonstrating their effectiveness in improving outcomes for older adults with depression, anxiety, and other mental health conditions (158).

Evidence-based integrated mental health care models for older community-dwelling adults include the Integrated Care Model (ICM), Collaborative Care, Seniors' Community Hub (SCH), Embrace model, and Community-Based Integrated Service (CBIS) model, with each of them demonstrating effectiveness in improving depression, functional status, and quality of life outcomes.

The Integrated Care Model (ICM)

The Integrated Care Model implemented in Taiwan represents a comprehensive approach to geriatric mental health care. The ICM includes five key components: assessment and management of health problems, improvements in spiritual and mental wellbeing, assistance with activities of daily living and mobility, provision of social welfare resources, and prevention of elder abuse (269). This model demonstrated significant improvements in depression scores, psychological symptoms, suicide ideation measures, and life satisfaction over 18 weeks compared to usual care (269).

Seniors' Community Hub (SCH)

The Seniors' Community Hub model, piloted in Canada, delivers person-centred, evidence-informed, coordinated, and integrated care services to older community-dwelling adults living with frailty (270). The SCH intervention consists of team-based multi-domain assessment with person-centred care planning and follow-up, involving family physicians, health professionals, patients and caregivers (270). While the pilot study with 88 patients showed no statistically significant differences in quality-of-life measures at 12 months, the model demonstrated feasibility for implementation.

Embrace Model

The Embrace model, implemented in the Netherlands, is based on the Chronic Care Model and population health management approach (271). This integrated care model offers continuous and coordinated care by addressing the needs and preferences of patients (271). Qualitative research involving 23 older adults showed that Embrace enhanced participants' ability to maintain control despite dependency, with participants feeling safe and secure compared to standard care systems (271).

Community-Based Integrated Service (CBIS) Model

The CBIS model developed in South Korea includes eight healthcare services and five social care services for older adults living alone (272). Each service encompasses screening, assessment, service provision, evaluation, and termination phases. Testing with 22 older adults over two weeks demonstrated high satisfaction ratings (9 out of 10), indicating the model's potential to promote independence and enhance quality of life through "aging in place" (272).

Collaborative Care Models

Multiple studies have identified collaborative care as a practical approach, particularly for depression management in older adults (273). These models typically involve multidisciplinary teams with care coordinators, treatment interaction, continuity of care, individualised care planning, tailored holistic assessment and self-management support. An Australian implementation of collaborative care model was successfully demonstrated combining management of depression alongside management of physical chronic conditions using practice nurses as care-managers: the TrueBlue study participants showed significantly improved depression and treatment intensification, sustained over 12 months of intervention and reduced 10-year cardiovascular disease risk (274). Collaborative care using practice nurses appears to be an effective primary care intervention. The core components of these models consistently include a multidisciplinary team with a care coordinator, though implementation varies across settings (273).

Effective outcomes in these models include:

- Mental health outcomes: integrated care models consistently demonstrate improvements in mental health outcomes. The ICM showed significant improvements in depression scores, psychological symptoms, and suicide ideation measures (269). Community-based multidisciplinary integrated care demonstrated improvements in functional status and participant satisfaction with care over 12-36 months (158).
- Healthcare utilisation: several models show positive impacts on healthcare utilisation. Integrated care approaches have been associated with reduced emergency department

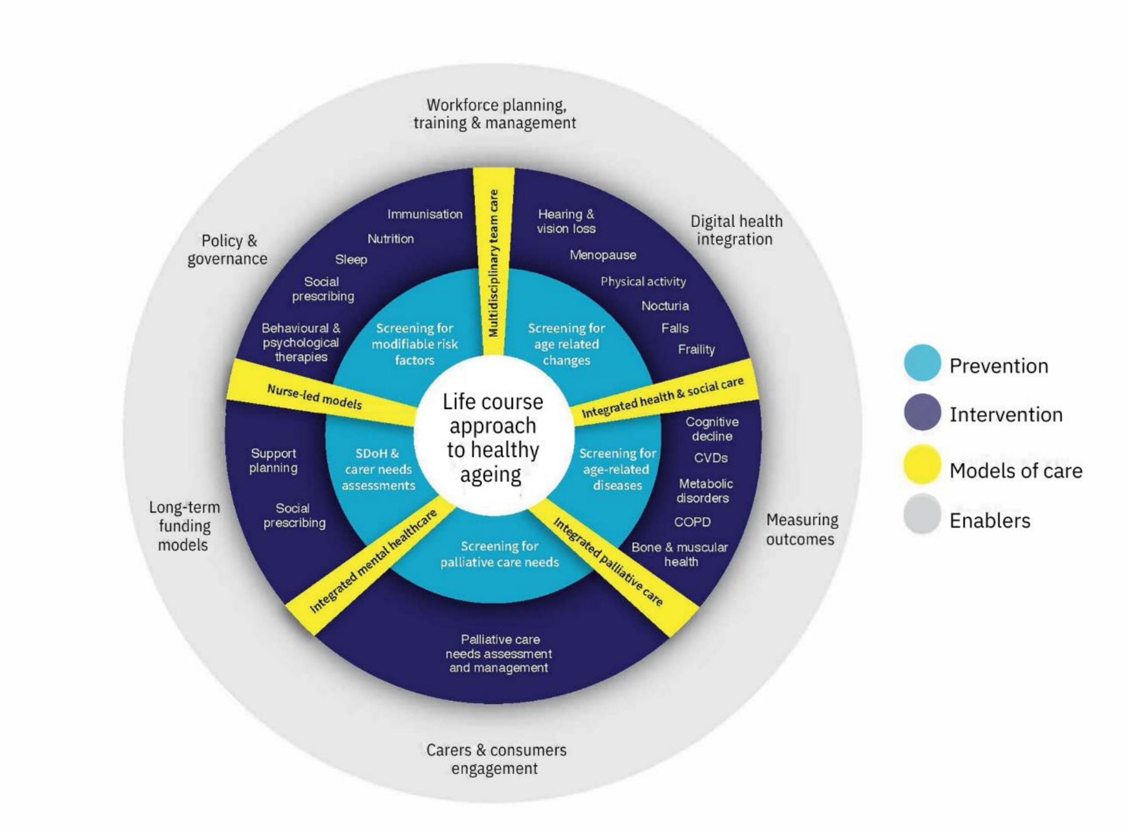
presentations, stabilised quality of life, and decreased hospitalisation rates (275). The multidisciplinary psychiatric home treatment model showed significant improvements in psychiatric symptoms, fewer hospital and nursing home admissions, and lower care costs (276).

- Quality of life and functional status: Multiple studies report improvements in quality of life and functional status. The ICM demonstrated significant improvements in life satisfaction (269), while community-based MDT integrated care showed improvements in functional status with standardised mean differences of 0.21 (158).

The life course approach to healthy ageing for adults: a conceptual framework

The healthy ageing conceptual model (Figure 7.6) outlines a life course approach to healthy ageing, integrating prevention, early identification, targeted interventions and coordinated models of care. It illustrates how primary care, community services and multidisciplinary teams work together to maintain functional ability and support people in living well across adulthood into advanced older age and end of life care. The framework highlights key enablers, including workforce planning, training and management, digital health integration, consumers and carers, funding and governance which are required to support consistent and sustainable provision of evidence-informed approaches that are focussed on optimising health and wellbeing in midlife, early stages of ageing and advanced older age.

Figure 7.6. *Healthy Ageing Model: A conceptual guide linking prevention, intervention, integrated care and system enablers.*



Note: This model presents the fundamental screenings, interventions and enabling factors that support healthy ageing throughout adult life stages. .
It serves as a conceptual guide and does not capture all possible clinical or community-based interventions.
Abbreviations: SDoH (Social Determinants of Health), CVDs (Cardiovascular Diseases), and COPD (Chronic Obstructive Pulmonary Disease)

Issues for consideration

A life-course approach in primary care to promote healthy ageing through the adult lifespan recognises that interventions at all stages of adulthood - from early prevention to complex care at the end of life - can influence functional ability, quality of life and deliver measurable benefits to the health system.

To implement this approach, primary care needs to be equipped to address the full spectrum of prevention, chronic and complex conditions care and end of life care. This needs to encompass primary prevention to avert disease onset; secondary prevention for early detection and intervention; tertiary prevention to reduce complications and disability and quaternary prevention to avoid unnecessary or harmful interventions, particularly in frail older adults. This continuum extends to palliative and end-of-life care, where the focus shifts toward quality of life, dignity and patient-centred decision-making. However, current primary care systems in Australia and internationally are commonly fragmented, under-resourced and oriented toward episodic, illness-driven encounters rather than integrated, proactive and person-centred care.

Implementing a life-course approach in primary care requires targeted funding arrangements, workforce development and system-level innovations. Adequate investment is essential to expand preventive care capacity, strengthen multidisciplinary teams, support long-term patient engagement, and integrate social and community resources. Without these changes, opportunities to prevent disease progression, maintain function and support healthy ageing will be missed for many older adults, with substantial personal, social, health system and economic costs.

Implementation drivers and potential innovations that deserve further exploration include:

1. Incentives and support for primary care patient incentives to engage in preventive health information and behaviour.
2. Comprehensive health assessments to provide a life course checklist of preventive activities. Currently available health assessments are discussed in Chapter 3 and include the 45+ health assessment; heart health item numbers for people in early to middle ageing and annual health assessments from 75 years of age for people in older age in the general population.
3. Patient held records – the power of a person held record for condition and cohort specific health management and person-centred care has been recognised in child health records and pregnancy records. Development of a preventive health care record for healthy ageing could be considered.
4. Development of tailored pay-for-performance funding arrangements and incentive models to encourage increased efforts of primary care providers to engage in systematic prevention should be considered. Examples of such funding arrangements have been identified in the models of care discussed in this chapter. Australian pay-for-performance trials have included Practice Incentive Payments (PIP) payments for immunisation targets (277). Australian bundled payments have included asthma and diabetes payments for annual cycles of care.
5. What is the evidence for a blended funding model for a life course approach to healthy ageing in primary care in Australia? What would be required to tailor a blended funding model to ensure equity of access to life course care for healthy ageing for all older adults regardless of their general practice provider: from corporate primary health care services through to disadvantaged community based primary health care providers?

References

1. Our work: life course [Internet]. [cited 2025 Aug 4]. Available from: https://www.who.int/our-work/life-course
2. Masini A, Cherasco N, Conti A, Pighini I, Barone-Adesi F, Panella M. Preventive Pathways for Healthy Ageing: A Systematic Literature Review. Geriatrics. 2025 Feb 18;10(1):31.
3. Minkman MMN, Zonneveld N, Hulsebos K, van der Spoel M, Ettema R. The renewed Development Model for Integrated Care: a systematic review and model update. BMC Health Services Research. 2025 Mar 26;25(1):434.
4. Deveny E. Listening for meaning consumer voice in a system built on value.
5. Australian Commission on Safety and Quality in Health Care. Patient experience [Internet]. [cited 2025 Aug 13]. Available from: https://www.safetyandquality.gov.au/our-work/indicators-measurement-and-reporting/patient-experience
6. Semantic Scholar | AI-Powered Research Tool [Internet]. [cited 2025 Aug 4]. Available from: https://www.semanticscholar.org/
7. Clarke J, Davis K, Douglas J, Peters MDJ. Defining nurse-led models of care: Contemporary approaches to nursing. International Nursing Review. 2025 Mar;72(1):e13076.
8. Davidson P, Halcomb E, Hickman L, Phillips J, Graham B. Beyond the rhetoric: what do we mean by a 'model of care'? Aust J Adv Nurs [Internet]. 2006 May 1 [cited 2025 Aug 4];23(3). Available from: https://www.ajan.com.au/index.php/AJAN/article/view/1935
9. Daaleman TP, Elder GH. Family Medicine and the Life Course Paradigm. The Journal of the American Board of Family Medicine. 2007 Jan 1;20(1):85–92.
10. Boult C, Green AF, Boult LB, Pacala JT, Snyder C, Leff B. Successful Models of Comprehensive Care for Older Adults with Chronic Conditions: Evidence for the Institute of Medicine's "Retooling for an Aging America" Report: [see editorial comments by Dr. David B. Reuben, pp. 2348–2349]. J American Geriatrics Society. 2009 Dec;57(12):2328–37.
11. Duarte ST, Moniz A, Costa D, Donato H, Heleno B, Aguiar P, et al. Low back pain management in primary healthcare: findings from a scoping review on models of care. BMJ Open. 2024 May;14(5):e079276.
12. Bransgrove NJ, Porter JE, Peck B, Bishop J. Mapping Hospital in the Home Models of Care: A Systematic Review. Journal of Advanced Nursing. 2025 May;81(5):2345–53.
13. Roberts N, Carrigan A, Clay-Williams R, Hibbert PD, Mahmoud Z, Pomare C, et al. Innovative models of healthcare delivery: an umbrella review of reviews. BMJ Open. 2023 Feb;13(2):e066270.
14. Ng YF. A Model of Care for a Regional Health System. Int J Integr Care. 2017 Jul 11;17(3):99.
15. Hamiduzzaman M, McLennan V, Gaffney H, Miles S, Crook S, Grove L, et al. Fostering integrated healthcare in rural Australia: A review of service models for older Australians with preventable chronic conditions. Health Policy. 2025 Mar;105304.
16. Masini A, Cherasco N, Conti A, Pighini I, Barone-Adesi F, Panella M. Preventive Pathways for Healthy Ageing: A Systematic Literature Review. Geriatrics. 2025 Feb 18;10(1):31.
17. Beard JR, Officer A, De Carvalho IA, Sadana R, Pot AM, Michel JP, et al. The World report on ageing and health: a policy framework for healthy ageing. The Lancet. 2016 May;387(10033):2145–54.
18. Valentijn PP, Schepman SM, Opheij W, Bruijnzeels MA. Understanding integrated care: a comprehensive conceptual framework based on the integrative functions of primary care. Int J Integr Care [Internet]. 2013 Mar 22 [cited 2025 Aug 4];13(1). Available from: http://www.ijic.org/article/10.5334/ijic.886/
19. Starfield B, Shi L, Macinko J. Contribution of Primary Care to Health Systems and Health. Milbank Quarterly. 2005 Sep;83(3):457–502.
20. Starfield B, Shi L. Policy relevant determinants of health: an international perspective. Health Policy. 2002 Jun;60(3):201–18.
21. Amelung V, Stein V, Suter E, Goodwin N, Nolte E, Balicer R, editors. Handbook Integrated Care [Internet]. Cham: Springer International Publishing; 2021 [cited 2025 Aug 4]. Available from: https://link.springer.com/10.1007/978-3-030-69262-9
22. NSW Agency for Clinical Innovation. Aged health services in NSW [Internet]. Sydney: Agency for Clinical Innovation; 2021. Report No.: ISBN 978-1-76081-188-4. Available from: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0004/630616/ACI-Aged-health-services-NSW.pdf
23. Jimenez G, Matchar D, Koh CHG, Van Der Kleij R, Chavannes NH, Car J. The Role of Health Technologies in Multicomponent Primary Care Interventions: Systematic Review. J Med Internet Res. 2021 Jan 11;23(1):e20195.

24. Sturgiss E, Desborough J, Hall Dykgraaf S, Matenge S, Dut G, Davis S, et al. Digital health to support primary care provision during a global pandemic. Aust Health Rev. 2022 Mar 18;46(3):269–72.
25. van Olmen J. The Promise of Digital Self-Management: A Reflection about the Effects of Patient-Targeted e-Health Tools on Self-Management and Wellbeing. Int J Environ Res Public Health. 2022 Jan 26;19(3):1360.
26. Australian Commission on Safety and Quality in Health Care. Standard 2: Partnering with Consumers [Internet]. 2025. Available from: https://www.safetyandquality.gov.au/sites/default/files/migrated/Standard-2-Tip-Sheet-3-Training-for-partnerships-with-consumers.pdf
27. Europe WHORO for. Integrated care models: an overview: working document. 2016 [cited 2025 Aug 4]; Available from: https://iris.who.int/handle/10665/375502
28. Defining the PCMH [Internet]. [cited 2025 Aug 4]. Available from: https://www.ahrq.gov/ncepcr/research/care-coordination/pcmh/define.html
29. UHC service planning & models of care [Internet]. [cited 2025 Aug 4]. Available from: https://www.who.int/teams/integrated-health-services/clinical-services-and-systems/service-organizations-and-integration
30. Healthy ageing and functional ability [Internet]. [cited 2025 Aug 4]. Available from: https://www.who.int/news-room/questions-and-answers/item/healthy-ageing-and-functional-ability
31. Integrated care for older people: guidelines on community-level interventions to manage declines in intrinsic capacity [Internet]. [cited 2025 Aug 4]. Available from: https://www.who.int/publications/i/item/9789241550109
32. Portfolio: Evidence-based Programs for a Person-centered, Integrated Care for Older People at the Primary Health-care Level [Internet]. Pan American Health Organization; 2022 [cited 2025 Jul 15]. Available from: https://iris.paho.org/handle/10665.2/56526
33. Hebert R, Raiche M, Dubois MF, Gueye NR, Dubuc N, Tousignant M, et al. Impact of PRISMA, a Coordination-Type Integrated Service Delivery System for Frail Older People in Quebec (Canada): A Quasi-experimental Study. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences. 2010 Jan 1;65B(1):107–18.
34. HealthOne NSW [Internet]. [cited 2025 Aug 5]. Available from: https://www.health.nsw.gov.au:443/healthone/Pages/default.aspx
35. Lenartowicz M. Geriatric Consultative Models in Primary Care. In: Wasserman M, Riopelle J, editors. Primary Care for Older Adults [Internet]. Cham: Springer International Publishing; 2018 [cited 2025 Aug 4]. p. 5–12. Available from: http://link.springer.com/10.1007/978-3-319-61329-1_2
36. RACGP - RACGP aged care clinical guide (Silver Book) [Internet]. [cited 2025 Aug 4]. Available from: https://www.racgp.org.au/silverbook
37. Triscott JAC, Dobbs B, Charles L, Huang J, Moores D, Tian PGJ. The Care-of-the-Elderly Health Guide. J Prim Care Community Health. 2021 Jan;12:21501327211044058.
38. Aged health services in NSW. 2021;
39. Agency for Clinical Innovation. Navigating the Healthcare Neighbourhood. Agency for Clinical Innovation (ACI); 2021 [cited 2025 Aug 4]. NSW Health Integrated Care. Available from: https://aci.health.nsw.gov.au/nhn/health-professionals/tools-and-resources/nsw-health-integrated-care
40. Leijten FRM, Struckmann V, Van Ginneken E, Czypionka T, Kraus M, Reiss M, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy. 2018 Jan;122(1):12–22.
41. Zacher H, Froidevaux A. Life Stage, Lifespan, and Life Course Perspectives on Vocational Behavior and Development: A Theoretical Framework, Review, and Research Agenda. Journal of Vocational Behavior. 2021 Apr 21;126.
42. Non communicable diseases [Internet]. [cited 2025 Aug 4]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
43. Baird J, Jacob C, Barker M, Fall C, Hanson M, Harvey N, et al. Developmental Origins of Health and Disease: A Lifecourse Approach to the Prevention of Non-Communicable Diseases. Healthcare. 2017 Mar 8;5(1):14.
44. Framework to implement a life course approach in practice [Internet]. [cited 2025 Aug 4]. Available from: https://www.who.int/publications/i/item/9789240112575
45. Yingwattanakul P, Moschis GP. Life Course Perspectives on the Onset and Continuity of Preventive Healthcare Behaviors. J Primary Prevent. 2017 Oct;38(5):537–50.
46. Willcox S. VU Research Repository | Victoria University | Melbourne Australia. Melbourne: Australian Health Policy Collaboration; 2014 [cited 2025 Aug 4]. Chronic diseases in Australia: the case for changing

course: Background and policy paper. Available from: https://www.vu.edu.au/mitchell-institute/policy-solutions/chronic-diseases-in-australia-the-case-for-changing-course
47. Martins C, Godycki-Cwirko M, Heleno B, Brodersen J. Quaternary prevention: reviewing the concept: Quaternary prevention aims to protect patients from medical harm. European Journal of General Practice. 2018 Jan 1;24(1):106–11.
48. RACGP - About the Red Book [Internet]. [cited 2025 Aug 13]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/about-the-red-book
49. RACGP. Management of type 2 diabetes: A handbook for general practice [Internet]. 2025. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/management-of-type-2-diabetes/introduction
50. RACGP - Patient Resources [Internet]. [cited 2025 Aug 13]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/handi/patient-resources
51. Radcliffe E, Servin R, Cox N, Lim S, Tan QY, Howard C, et al. What makes a multidisciplinary medication review and deprescribing intervention for older people work well in primary care? A realist review and synthesis. BMC Geriatr. 2023 Sep 25;23(1):591.
52. Ibrahim K, Cox NJ, Stevenson JM, Lim S, Fraser SDS, Roberts HC. A systematic review of the evidence for deprescribing interventions among older people living with frailty. BMC Geriatr. 2021 Dec;21(1):258.
53. Chua S, Todd A, Reeve E, Smith SM, Fox J, Elsisi Z, et al. Deprescribing interventions in older adults: An overview of systematic reviews. Arab-Zozani M, editor. PLoS ONE. 2024 Jun 17;19(6):e0305215.
54. World Organization of Family Doctors (WONCA) [Internet]. [cited 2025 Aug 12]. Available from: https://www.globalfamilydoctor.com/groups/SpecialInterestGroups/QuaternaryPrevention.aspx
55. Hilmer SN. Calculating and using the drug burden index score in research and practice. Expert Review of Clinical Pharmacology. 2018 Nov 2;11(11):1053–5.
56. Budreviciute A, Damiati S, Sabir DK, Onder K, Schuller-Goetzburg P, Plakys G, et al. Management and Prevention Strategies for Non-communicable Diseases (NCDs) and Their Risk Factors. Front Public Health. 2020 Nov 26;8:574111.
57. World Health Organization. World report on ageing and health [Internet]. Geneva: World Health Organization; 2015 [cited 2025 May 29]. Available from: https://iris.who.int/handle/10665/186463
58. Christensen K, Doblhammer G, Rau R, Vaupel JW. Ageing populations: the challenges ahead. The Lancet. 2009 Oct;374(9696):1196–208.
59. Palapar L, Blom JW, Wilkinson-Meyers L, Lumley T, Kerse N. Preventive interventions to improve older people's health outcomes: systematic review and meta-analysis. Br J Gen Pract. 2024 Apr;74(741):e208–18.
60. World Health Organization. Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care, 2nd ed [Internet]. 2024 [cited 2025 Aug 4]. Available from: https://www.who.int/publications/i/item/9789240103726
61. Lim W, Wong S, Leong I, Choo P, Pang W. Forging a Frailty-Ready Healthcare System to Meet Population Ageing. IJERPH. 2017 Nov 24;14(12):1448.
62. Corley PJ, Pattie BsA, Batty DsD, Cox PS, Deary PI. Life-Course Pathways to Exceptional Longevity: Evidence From the Lothian Birth Cohort of 1921. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences [Internet]. 2024 Jun 28;79. Available from: https://consensus.app/papers/lifecourse-pathways-to-exceptional-longevity-evidence-deary-batty/9e4744e5021d5682b4e349362352f254/
63. Finkel D, Nilsen C, Sindi S, Kåreholt I. Impact of childhood and adult socioeconomic position on change in functional aging. Health psychology : official journal of the Division of Health Psychology, American Psychological Association [Internet]. 2024 Jan 8; Available from: https://consensus.app/papers/impact-of-childhood-and-adult-socioeconomic-position-on-sindi-finkel/b604f4f4bfed5f95aa0cf7f2d9502c03/
64. Meng X, Su J, Gao T, Dongfei, Zhao Y, Fang S, et al. Multidomain interventions based on a life-course model to prevent dementia in at-risk Chinese older adults: A randomized controlled trial. International journal of nursing studies. 2024 Jan 1;152:104701.
65. Rinaldi C, Zeppegno P, Grossini E, Panella M, Opizzi A, Gramaglia C, et al. Effectiveness of a combined lifestyle intervention for older people in long-term care: A randomized controlled trial. Archives of gerontology and geriatrics. 2024 Jan 1;120:105340.
66. Zhang H, Hao X, Qin Y, Yang Y, Zhao X, Wu S, et al. Social participation classification and activities in association with health outcomes among older adults: Results from a scoping review. Journal of advanced nursing. 2025;81(2):661–78.

67. Guo R, Zhang J, Yang F, Wu Y. Efficacy of an Intelligent and Integrated Older Adult Care Model on Quality of Life Among Home-Dwelling Older Adults: Randomized Controlled Trial. Journal of Medical Internet Research [Internet]. 2024 Oct 24;27. Available from: https://consensus.app/papers/efficacy-of-an-intelligent-and-integrated-older-adult-care-zhang-guo/b6266b103e25596c9d6922a48acf793c/
68. Lee W, Peng LN, Lin C, Chen RC, Lin SZ, Loh C, et al. Effects of incorporating multidomain interventions into integrated primary care on quality of life: a randomised controlled trial. The Lancet Healthy longevity [Internet]. 2021 Oct 1;2 11. Available from: https://www.thelancet.com/journals/lanhl/article/PIIS2666-7568(21)00248-8/fulltext
69. Rikkert MGMO, Peeters GMEE (Geeske). The multicausality of declines in wellbeing and cognition in older adults with multimorbidity. The Lancet Healthy Longevity. 2021 Nov;2(11):e681–2.
70. Nguyen T, Tang B, Harrison K, Stadler S, Walter L, Hoepke K, et al. Age Self Care, a program to improve aging in place through group learning and incremental behavior change: Preliminary data. Journal of the American Geriatrics Society. 2024 Nov 28;73:920–9.
71. Seah B, Kowitlawakul Y, Chokkanathan S, Fong JJY, Espnes GA, Ang E, et al. Salutogenic Healthy Ageing Programme Embracement (SHAPE) for senior-only households: A study protocol. Journal of Advanced Nursing. 2018 Apr;74(4):946–56.
72. Sege RD, Aslam MV, Peterson C, Bethell C, Burstein D, Niolon PH, et al. Positive Childhood Experiences and Adult Health and Opportunity Outcomes in 4 US States. JAMA Netw Open. 2025 Jul 29;8(7):e2524435.
73. Mikkola TM, Kautiainen H, Von Bonsdorff MB, Wasenius NS, Salonen MK, Haapanen MJ, et al. Healthy ageing from birth to age 84 years in the Helsinki Birth Cohort Study, Finland: a longitudinal study. The Lancet Healthy Longevity. 2023 Sep;4(9):e499–507.
74. Hacker K. The Burden of Chronic Disease. Mayo Clinic Proceedings: Innovations, Quality & Outcomes. 2024 Feb;8(1):112–9.
75. Oster H, Chaves I. Effects of Healthy Lifestyles on Chronic Diseases: Diet, Sleep and Exercise. Nutrients. 2023 Oct 31;15(21):4627.
76. Lee W, Peng LN, Lin C, Chen RC, Lin SZ, Loh C, et al. Effects of incorporating multidomain interventions into integrated primary care on quality of life: a randomised controlled trial. The Lancet Healthy longevity [Internet]. 2021 Oct 1;2 11. Available from: https://www.thelancet.com/journals/lanhl/article/PIIS2666-7568(21)00248-8/fulltext
77. Hirschfeld S, Goodman E, Barkin S, Faustman E, Halfon N, Riley AW. Health Measurement Model—Bringing a Life Course Perspective to Health Measurement: The PRISM Model. Front Pediatr. 2021 Jun 10;9:605932.
78. Krahn GL, Robinson A, Murray AJ, Havercamp SM, Havercamp S, Andridge R, et al. It’s time to reconsider how we define health: Perspective from disability and chronic condition. Disability and Health Journal. 2021 Oct;14(4):101129.
79. Liu M, Chang Y, Zhao S, Guo W, Ji X, Liu Y, et al. The effect of the interaction between intrinsic capacity and social support on the trajectories of activities of daily living in older adults. Geriatric Nursing. 2024 Nov;60:231–40.
80. The future of primary care | NHS Confederation [Internet]. [cited 2025 Aug 4]. Available from: https://www.nhsconfed.org/publications/future-primary-care
81. Commission corporateName:Productivity. Innovations in care for chronic health conditions - Productivity Reform Case Study [Internet]. 2021 [cited 2025 Aug 4]. Available from: https://www.pc.gov.au/research/completed/chronic-care-innovations
82. Thomas SL, Wakerman J, Humphreys JS. Ensuring equity of access to primary health care in rural and remote Australia - what core services should be locally available? Int J Equity Health. 2015 Dec;14(1):111.
83. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. Int J Equity Health. 2013;12(1):18.
84. Sutarsa IN, Nopiyani NMS. Integrated primary care using a life course approach for prevention and control of non-communicable diseases: Indonesia’s perspective. PHPMA. 2023 Jul 1;11(1):1–4.
85. Lum CM. Active Ageing and Healthy Ageing. In: Fong BYF, Wong WCW, editors. Gaps and Actions in Health Improvement from Hong Kong and Beyond [Internet]. Singapore: Springer Nature Singapore; 2023 [cited 2025 Aug 4]. p. 315–31. Available from: https://link.springer.com/10.1007/978-981-99-4491-0_21
86. Prescription for prevention: a new model of primary care [Internet]. Re:State. [cited 2025 Aug 4]. Available from: https://re-state.co.uk/publications/prescription-for-prevention-a-new-model-of-primary-care/
87. Papa R, Scherer S. Routes to healthy ageing: the role of lifecourse patterns. Ageing and Society. 2025 Feb;45(2):386–413.
88. Kuh D, Karunananthan S, Bergman H, Cooper R. A life-course approach to healthy ageing: maintaining physical capability. Proc Nutr Soc. 2014 May;73(2):237–48.

89. Harris M. 10 years of preventive health in Australia. Part 3 - engaging primary health care. Public health research & practice [Internet]. 2025 May 1;35. Available from: https://consensus.app/papers/10-years-of-preventive-health-in-australia-part-3-%E2%80%93-engaging/1f0038e8821c50bcb067320c155a99a4/
90. Laddu D, Jun, Kaar J, Ozemek C, Durant R, Campbell T, et al. Health Behavior Change Programs in Primary Care and Community Practices for Cardiovascular Disease Prevention and Risk Factor Management Among Midlife and Older Adults: A Scientific Statement From the American Heart Association. Circulation [Internet]. 2021 Nov 4;144. Available from: https://consensus.app/papers/health-behavior-change-programs-in-primary-care-and-ma-laddu/0ea6a04ef53c52ef975340fc2498d217/
91. Meng L, Huang ST, Chen H, Hashmi A, Hsiao F, Chen L. Health care utilization and potentially preventable adverse outcomes of high-need, high-cost middle-aged and older adults: Needs for integrated care models with life-course approach. Archives of gerontology and geriatrics. 2023 Feb 1;109:104956.
92. Anne Hendry, Eliane Vanhecke, Ana Maria Carriazo, Luz López-Samaniego, Juan Manuel Espinosa, Duygu Sezgin, et al. Integrated Care Models for Managing and Preventing Frailty: A Systematic Review for the European Joint Action on Frailty Prevention (ADVANTAGE JA). 2019;19:5–10.
93. Cesari M, Canevelli M, Thiyagarajan JA, Choi SE, Grushevska P, Kumar S, et al. Identification of research gaps to improve care for healthy ageing: a scoping review. Family Medicine and Community Health [Internet]. 2024 Oct 1;12. Available from: https://consensus.app/papers/identification-of-research-gaps-to-improve-care-for-grushevska-cesari/cd2bf86f4738517c93d4b70cc2a8ea2f/
94. Gutiérrez-Barreto SE, Sosa-Tinoco E, Rojas-Calixto O, Deniss-Navarro Z, Avila-Avila A, Gutierrez JP. Evaluating the design of the Integrated Care for Older People: a theory of change approach. Front Med. 2023 Jul 12;10:1166196.
95. Hamiduzzaman M, McLennan V, Gaffney H, Miles S, Crook S, Grove L, et al. Fostering integrated healthcare in rural Australia: A review of service models for older Australians with preventable chronic conditions. Health Policy. 2025 Mar;105304.
96. Mann JD Sue; McDermott, Robyn. Integrated care for community dwelling older Australians. Journal of Integrated Care. 2019;27(2):173–87.
97. Rudnicka E, Napierała P, Podfigurna A, Męczekalski B, Smolarczyk R, Grymowicz M. The World Health Organization (WHO) approach to healthy ageing. Maturitas. 2020 May 26;139:6–11.
98. Cesari M, Sumi Y, Han Z, Perracini M, Jang H, Briggs A, et al. Implementing care for healthy ageing. BMJ Global Health [Internet]. 2022 Feb 1;7. Available from: https://consensus.app/papers/implementing-care-for-healthy-ageing-perracini-briggs/24ba7bfec0ef548da7b667cf0b7e64cd/
99. Dumble J, Sadler P, Cottrell T, Planinic A, Perin S, Harrison C, et al. Too late for early intervention? The Healthy Ageing Service's mental health response. Australas Psychiatry. 2023 Dec;31(6):830–4.
100. Martin R, Calache H, George A. Integrating Oral and General Health Care in Australia: Utilising Aged Care to demonstrate essential elements of this global issue. Int J Integr Care. 2021 Feb 26;20(3):215.
101. Zhang Y, Stokes J, Anselmi L, Bower P, Xu J. Can integrated care interventions strengthen primary care and improve outcomes for patients with chronic diseases? A systematic review and meta-analysis. Health Res Policy Sys. 2025 Jan 6;23(1):5.
102. Understanding the process to develop a Model of Care An ACI Framework. In: A practical guide on how to develop a Model of Care at the Agency for Clinical Innovation. AGENCY FOR CLINICAL INNOVATION;
103. Daly J, Speedy S, Jackson D. Contexts of Nursing. 4th ed. London: Elsevier Health Sciences APAC; 2014. 917 p.
104. National Safety and Quality Health Service Standards (second edition) | Australian Commission on Safety and Quality in Health Care [Internet]. [cited 2025 Aug 5]. Available from: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/national-safety-and-quality-health-service-standards-second-edition
105. Agency for Healthcare Research and Quality. Defining the PCMH [Internet]. [cited 2025 Aug 5]. Available from: https://www.ahrq.gov/ncepcr/research/care-coordination/pcmh/define.html
106. Bodenheimer T. Improving Primary Care for Patients With Chronic Illness. JAMA. 2002 Oct 9;288(14):1775.
107. Wagner EH, Austin BT, Korff MV. Organizing Care for Patients with Chronic Illness. The Milbank Quarterly. 1996;74(4):511.
108. Short Term Restorative Care Program | Aged Care Quality and Safety Commission [Internet]. [cited 2025 Aug 5]. Available from: https://www.agedcarequality.gov.au/resource-library/short-term-restorative-care-program
109. Turner-Stokes L. Evidence for the effectiveness of multi-disciplinary rehabilitation following acquired brain injury: a synthesis of two systematic approaches. J Rehabil Med. 2008;40(9):691–701.

110. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 Aug 5]. Health and wellbeing of First Nations people. Available from: https://www.aihw.gov.au/reports/australias-health/indigenous-health-and-wellbeing
111. Ramsden IM. Cultural Safety and Nursing Education in Aotearoa and Te Waipounamu [Internet]. Victoria University; PMID: 8298296. Available from: https://www.croakey.org/wp-content/uploads/2017/08/RAMSDEN-I-Cultural-Safety_Full.pdf
112. Ellis G, Whitehead MA, O'Neill D, Langhorne P, Robinson D. Comprehensive geriatric assessment for older adults admitted to hospital. In: The Cochrane Collaboration, editor. Cochrane Database of Systematic Reviews [Internet]. Chichester, UK: John Wiley & Sons, Ltd; 2011 [cited 2025 Aug 5]. p. CD006211.pub2. Available from: https://doi.wiley.com/10.1002/14651858.CD006211.pub2
113. Person-centred care | Australian Commission on Safety and Quality in Health Care [Internet]. [cited 2025 Aug 5]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/person-centred-care
114. Chochinov HM. Dignity-Conserving Care—A New Model for Palliative Care: Helping the Patient Feel Valued. JAMA. 2002 May 1;287(17):2253.
115. Palliative care [Internet]. [cited 2025 Aug 5]. Available from: https://www.who.int/news-room/fact-sheets/detail/palliative-care
116. Aznar-Lou I, Zabaleta-Del-Olmo E, Casajuana-Closas M, Sánchez-Viñas A, Parody-Rúa E, Bolíbar B, et al. Cost-effectiveness analysis of a multiple health behaviour change intervention in people aged between 45 and 75 years: a cluster randomized controlled trial in primary care (EIRA study). Int J Behav Nutr Phys Act. 2021 Jul 2;18(1):88.
117. Stevens W, Hillsdon M, Thorogood M, McArdle D. Cost-effectiveness of a primary care based physical activity intervention in 45-74 year old men and women: a randomised controlled trial. Br J Sports Med. 1998 Sep;32(3):236–41.
118. Australian Government Department of Health. Medicare Benefits Schedule Time-Tiered Health Assessment - Older Person's Health Assessment provided for people aged 75 years and older [Internet]. [cited 2025 Aug 7]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=note&q=AN.0.39&qt=noteID
119. RACGP. RACGP - What's new in the 10th Ed Red Book [Internet]. [cited 2025 Jul 2]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/preventive-activities-in-general-practice/what-s-new-in-the-10th-ed-red-book
120. RACGP - Smoking, nutrition, alcohol, physical activity (SNAP) [Internet]. [cited 2025 Aug 7]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/snap
121. Queensland Health. Create healthier habits with a free Health Coach. [cited 2025 Aug 7]. My Health for Life. Available from: https://www.myhealthforlife.com.au/
122. General USPHSO of the S, Health NC for CDP and HP (US) O on S and. Interventions for Smoking Cessation and Treatments for Nicotine Dependence. In: Smoking Cessation: A Report of the Surgeon General [Internet] [Internet]. US Department of Health and Human Services; 2020 [cited 2025 Aug 7]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK555596/
123. Agency for Healthcare Research and Quality. Five Major Steps to Intervention (The "5 A's") [Internet]. [cited 2025 Aug 7]. Available from: https://www.ahrq.gov/prevention/guidelines/tobacco/5steps.html
124. Patnode CD, Redmond N, Iacocca MO, Henninger M. Behavioral Counseling Interventions to Promote a Healthy Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Known Cardiovascular Disease Risk Factors: Updated Systematic Review for the U.S. Preventive Services Task Force [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2022 [cited 2025 Aug 7]. (U.S. Preventive Services Task Force Evidence Syntheses, formerly Systematic Evidence Reviews). Available from: http://www.ncbi.nlm.nih.gov/books/NBK583091/
125. Kreuter MW, Wray RJ. Tailored and Targeted Health Communication: Strategies for Enhancing Information Relevance. am j health behav. 2003 Nov 1;27(1):227–32.
126. Whitlock EP, Orleans CT, Pender N, Allan J. Evaluating primary care behavioral counseling interventions: An evidence-based approach 1. American Journal of Preventive Medicine. 2002 May 1;22(4):267–84.
127. Requirements for a chronic condition management plan - Health professionals - Services Australia [Internet]. [cited 2025 Aug 13]. Available from: https://www.servicesaustralia.gov.au/requirements-for-chronic-condition-management-plan?context=20

128. Knight E, Petrella RJ. Prescribing Physical Activity for Healthy Aging: Longitudinal Follow-Up and Mixed Method Analysis of a Primary Care Intervention. The Physician and Sportsmedicine. 2014 Nov 1;42(4):30–8.

129. Schütze H, Rix EF, Laws RA, Passey M, Fanaian M, Harris MF. How feasible are lifestyle modification programs for disease prevention in general practice? Aust J Prim Health. 2012;18(2):129.

130. Merchant RA, Tsoi CT, Tan WM, Lau W, Sandrasageran S, Arai H. Community-Based Peer-Led Intervention for Healthy Ageing and Evaluation of the 'HAPPY' Program. The Journal of nutrition, health and aging. 2021 Apr;25(4):520–7.

131. Australian Government Department of Health D and A. Aboriginal and Torres Strait Islander Aged Care Framework [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Aug 5]. Available from: https://www.health.gov.au/resources/publications/aboriginal-and-torres-strait-islander-aged-care-framework?language=en

132. Davern M, Winterton R, Brasher K, Woolcock G. How Can the Lived Environment Support Healthy Ageing? A Spatial Indicators Framework for the Assessment of Age-Friendly Communities. IJERPH. 2020 Oct 21;17(20):7685.

133. Our Story [Internet]. Southcentral Foundation Nuka System of Care. [cited 2025 Aug 5]. Available from: https://scfnuka.com/

134. Eby DK. Customer-Ownership in Equity-Oriented Health Care. Milbank Quarterly. 2018 Dec;96(4):672–4.

135. Henderson DAG, Donaghy E, Dozier M, Guthrie B, Huang H, Pickersgill M, et al. Understanding primary care transformation and implications for ageing populations and health inequalities: a systematic scoping review of new models of primary health care in OECD countries and China. BMC Med. 2023 Aug 24;21(1):319.

136. Korylchuk N, Pelykh V, Nemyrovych Y, Didyk N, Martsyniak S. Challenges and Benefits of a Multidisciplinary Approach to Treatment in Clinical Medicine. Journal of Pioneering Medical Sciences. 2024 Jun 30;13:1–9.

137. Albarqi M. Assessing the Impact of Multidisciplinary Collaboration on Quality of Life in Older Patients Receiving Primary Care: Cross Sectional Study. Healthcare [Internet]. 2024 Jun 25;12. Available from: https://consensus.app/papers/assessing-the-impact-of-multidisciplinary-collaboration-albarqi/f6a9d5993f6f5144b88b510b0dd66555/

138. Hayes C. Effectiveness of Community-Based Multidisciplinary Integrated Care for Older Adults with General Practitioner Involvement: A Systematic Review and Meta-Analysis. Age and Ageing [Internet]. 2024 Sep 1; Available from: https://consensus.app/papers/effectiveness-of-communitybased-multidisciplinary-hayes/5241416b2004558c9cfc7c02bfefa27d/

139. Heckman GA, Gimbel S, Mensink C, Kroetsch B, Jones A, Nasim A, et al. The Integrated Care Team: A primary care based-approach to support older adults with complex health needs. Healthc Manage Forum. 2024 Oct 22;08404704241293051.

140. Jumabhoy F, Ninan S, Narayana D. 2852 A proactive multidisciplinary approach to reviewing health and care needs of nursing home residents in a primary care network. Age and Ageing [Internet]. 2025 Jan 1; Available from: https://consensus.app/papers/2852-a-proactive-multidisciplinary-approach-to-reviewing-narayana-jumabhoy/e2fbb745a52b5ca99d14508d4ba0edfc/

141. Radcliffe E, Servin R, Cox N, Lim S, Tan QY, Howard C, et al. What makes a multidisciplinary medication review and deprescribing intervention for older people work well in primary care? A realist review and synthesis. BMC geriatrics. 2023 Sep 25;23(1):591.

142. Virulhakul P, Intalapaporn S, Luerithipong S, Tantai N, Maneeon S, Muangpaisan W. Clinical Effectiveness Evaluation and Cost-effectiveness Analysis of Comprehensive Geriatric Assessment and Multidisciplinary Team for Ambulatory Older Patients: A Cohort Study. Siriraj Medical Journal [Internet]. 2025 Jan 1; Available from: https://consensus.app/papers/clinical-effectiveness-evaluation-and-intalapaporn-luerithipong/9d80782e0e0051798706caab7fb2c948/

143. Woodall TR Amy; Tak, Casey; McLean, William. Addressing Healthcare Utilization and Costs for Older Adults with Limited Mobility Through a Multidisciplinary Home-Based Primary Care Program. Journal of the American Board of Family Medicine : JABFM. 2023;36(4):550–6.

144. Blom JWH WB Van den; Elzen, WPJ Den; Drewes, Y M; Bleijenberg, N; Fabbricotti, I N; Jansen, AP D; Kempen, GIJ M; Koopmans, R; Looman, WM. Effectiveness and cost-effectiveness of proactive and multidisciplinary integrated care for older people with complex problems in general practice: an individual participant data meta-analysis. Age & Ageing. 2018;47(5):705–14.

145. Deschodt M, Laurent G, Cornelissen L, Yip O, Zúñiga F, Denhaerynck K, et al. Core components and impact of nurse-led integrated care models for home-dwelling older people: A systematic review and meta-analysis. International journal of nursing studies. 2020 Feb 29;105:103552.

146. Frost R, Nair P, Aw S, Gould RL, Kharicha K, Buszewicz M, et al. Supporting frail older people with depression and anxiety: a qualitative study. Aging & mental health. 2020 Dec;24(12):1977–84.
147. Platzer E, Singler K, Dovjak P, Wirnsberger G, Perl A, Lindner S, et al. Evidence of Inter-Professional and Multi-Professional Interventions for Geriatric Patients: A Systematic Review. International Journal of Integrated Care [Internet]. 2020 Feb 24;20. Available from: https://consensus.app/papers/evidence-of-interprofessional-and-multiprofessional-wirnsberger-singler/003265ab1d8e566db6d9008f4a2610b0/
148. Ruikes FGH, Zuidema SU, Akkermans RP, Assendelft WJJ, Schers HJ, Koopmans RTCM. Multicomponent Program to Reduce Functional Decline in Frail Elderly People: A Cluster Controlled Trial. Journal of the American Board of Family Medicine : JABFM. 2016 Mar;29(2):209–17.
149. Ellis G, Sevdalis N. Understanding and improving multidisciplinary team working in geriatric medicine. Age and ageing [Internet]. 2019 Jul 1; Available from: https://consensus.app/papers/understanding-and-improving-multidisciplinary-team-ellis-sevdalis/f887b5689ab7547e80bb8b3f380afb71/
150. Grol S, Molleman G, Kuijpers A, Van Der Sande R, Fransen G, Assendelft W, et al. The role of the general practitioner in multidisciplinary teams: a qualitative study in elderly care. BMC Family Practice [Internet]. 2018 Mar 10;19. Available from: https://consensus.app/papers/the-role-of-the-general-practitioner-in-multidisciplinary-fransen-sande/a87e3580032a51f3984acd07b929aa13/
151. Im J, Kirst M, Burns T, Goldhar J, O'Campo P, Wojtak A, et al. What Works in Integrated Care Programs for Older Adults with Complex Needs? A Realist Review. International Journal of Integrated Care. 2017 Oct 17;17:107.
152. Tsakitzidis G, Timmermans O, Callewaert N, Verhoeven V, Lopez-Hartmann M, Truijen S, et al. Outcome Indicators on Interprofessional Collaboration Interventions for Elderly. International Journal of Integrated Care [Internet]. 2016 May 16;16. Available from: https://consensus.app/papers/outcome-indicators-on-interprofessional-collaboration-verhoeven-timmermans/ec75a8a09535540b8e9d5a21d3087ea4/
153. Dooley M. Integrated Care in Action: A Case Study of Collaborative Multidisciplinary Approach for Older Adults in Ireland. Age and Ageing [Internet]. 2024 Sep 1; Available from: https://consensus.app/papers/integrated-care-in-action-a-case-study-of-collaborative-dooley/41b4b51b797e5b6ba08a5f7f499f5301/
154. FitzGerald C, Mullaney M, Hardiman J, Harnett P, Ahern E, Hayes C, et al. Key components of the Community Specialist Team Older People service model – service user and stakeholder Consensus Building. International Journal of Integrated Care [Internet]. 2025 Apr 9; Available from: https://consensus.app/papers/key-components-of-the-community-specialist-team-older-condon-collins/3585e6061060546884c23a461b039702/
155. Kanne GEM Eleanor S; Disco, Marilyn E; Black, Melissa C; Upchurch, Gina; Matters, Loretta M; Halpern, David J; White, Heidi K; Heflin, Mitchell T. The interagency care team: A new model to integrate social and medical care for older adults in primary care. Geriatric nursing (New York, NY). 2023;50(0):72–9.
156. Austin N, Rudoler D, Allin S, Dolovich L, Glazier R, Grudniewicz A, et al. Team-based primary care reforms and older adults: a descriptive assessment of sociodemographic trends and prescribing endpoints in two Canadian provinces. BMC Primary Care [Internet]. 2023 Jan 10;24. Available from: https://consensus.app/papers/teambased-primary-care-reforms-and-older-adults-a-grudniewicz-austin/9cb6598238f45415872a99e31b45ed1d/
157. Elliott J, Stolee P, Boscart V, Giangregorio L, Heckman G. Coordinating care for older adults in primary care settings: understanding the current context. BMC Family Practice [Internet]. 2018 Aug 7;19. Available from: https://consensus.app/papers/coordinating-care-for-older-adults-in-primary-care-giangregorio-boscart/544ff8b998af5a09b046e3df6f11730d/
158. Hayes C, Manning M, FitzGerald C, Condon B, Griffin A, O'Connor M, et al. Effectiveness of Community-Based Multidisciplinary Integrated Care for Older Adults with General Practitioner Involvement: A Systematic Review and Meta-Analysis. Health & Social Care in the Community [Internet]. 2024 Jan 1; Available from: https://consensus.app/papers/effectiveness-of-community%E2%80%90based-multidisciplinary-manning-condon/b925fc000a9f51cbbcc61ae700840f10/
159. Radcliffe E, Saucedo A, Howard C, Sheikh C, Bradbury K, Rutter P, et al. Development of a complex multidisciplinary medication review and deprescribing intervention in primary care for older people living with frailty and polypharmacy. PLOS One [Internet]. 2025 Apr 22;20. Available from: https://consensus.app/papers/development-of-a-complex-multidisciplinary-medication-ibrahim-rutter/47815f3b61895bc29b64b8b2bd52ab0f/
160. Zaij S, Maia KP, Leguelinel-Blache G, Roux-Marson C, Kinowski JM, Richard H. Intervention of pharmacist included in multidisciplinary team to reduce adverse drug event: a qualitative systematic review. BMC Health Services Research [Internet]. 2023 Aug 30;23. Available from:

https://consensus.app/papers/intervention-of-pharmacist-included-in-maia-leguelinel-blache/eaa8f1f904735e1b835dc799c91cb82a/

161. Groos S, Tan S, Linn A, Kuiper J, Van Schoor N, Van Weert J, et al. Multidisciplinary care pathways for falls prevention in older adults: visualizing the needs of primary care-based health care professionals. European Geriatric Medicine. 2025 Jan 9;16:229–36.
162. Sourial N, Teper MH, Arsenault-Lapierre G, Mehta K, Kay K, Vedel I. Interprofessional primary care: indispensable for family physicians yet invisible to older patients. Journal of Interprofessional Care. 2022 Feb 22;36:786–92.
163. Prepare a GPCCMP or MHCC - Health professionals - Services Australia [Internet]. [cited 2025 Aug 6]. Available from: https://www.servicesaustralia.gov.au/prepare-gpccmp-or-mhcc?context=20
164. Pearse J. Evaluation of the Health Care Homes trial: Final Evaluation Report Volume 2 Main Report. 2022.
165. Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A. Improving Chronic Illness Care: Translating Evidence Into Action. Health Affairs. 2001 Nov;20(6):64–78.
166. Australian Government Department of Health D and A. Health Care Homes trial – evaluation reports collection [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Aug 6]. Available from: https://www.health.gov.au/resources/collections/health-care-homes-trial-evaluation-reports-collection
167. Briggs R, McDonough A, Ellis G, Bennett K, O'Neill D, Robinson D. Comprehensive Geriatric Assessment for community-dwelling, high-risk, frail, older people. Cochrane Effective Practice and Organisation of Care Group, editor. Cochrane Database of Systematic Reviews [Internet]. 2022 May 6 [cited 2025 Aug 6];2022(5). Available from: http://doi.wiley.com/10.1002/14651858.CD012705.pub2
168. Quigley R, Sarah G Russell, Desley Harvey, Jennifer Mann. OPEN ARCH integrated care model: experiences of older Australians and their carers. Australian Journal of Primary Health. 2021;27(3):236–42.
169. Department of Health. Victoria A. Evaluation of the Geriatric Evaluation and Management program in Victoria [Internet]. State Government of Victoria, Australia; [cited 2025 Aug 6]. Available from: https://www.health.vic.gov.au/patient-care/evaluation-of-the-geriatric-evaluation-and-management-program-in-victoria
170. Australian Government Department of Health D and A. Transition Care Programme Guidelines [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Aug 6]. Available from: https://www.health.gov.au/resources/publications/transition-care-programme-guidelines?language=en
171. Jackson GL, Powers BJ, Chatterjee R, Prvu Bettger J, Kemper AR, Hasselblad V, et al. The Patient-Centered Medical Home: A Systematic Review. Ann Intern Med. 2013 Feb 5;158(3):169–78.
172. Agency for Clinical Innovation. Navigating the Healthcare Neighbourhood. Agency for Clinical Innovation (ACI); 2022 [cited 2025 Aug 6]. Key Principles of Patient Centred Medical Homes. Available from: https://aci.health.nsw.gov.au/nhn/patient-centred-medical-home-model/key-principles
173. Janamian T. Implementation of the Health Care Homes model in Australian primary care. Int J Integr Care. 2019 Aug 8;19(4):376.
174. Pearse J, Mazevska D. The Patient Centered Medical Home: barriers and enablers: an Evidence Check rapid review brokered by the Sax Institute for COORDINARE. 2018.
175. Crabtree BF, Nutting PA, Miller WL, Stange KC, Stewart EE, Jaen CR. Summary of the National Demonstration Project and Recommendations for the Patient-Centered Medical Home. The Annals of Family Medicine. 2010 May 1;8(Suppl_1):S80–90.
176. Laurant M, Van Der Biezen M, Wijers N, Watananirun K, Kontopantelis E, Van Vught AJ. Nurses as substitutes for doctors in primary care. Cochrane Effective Practice and Organisation of Care Group, editor. Cochrane Database of Systematic Reviews [Internet]. 2018 Jul 16 [cited 2025 Aug 7];2019(2). Available from: http://doi.wiley.com/10.1002/14651858.CD001271.pub3
177. Moulton JE, Withanage NN, Subasinghe AK, Mazza D. Nurse-led service delivery models in primary care: a scoping review protocol. BJGP Open. 2022 Sep;6(3):BJGPO.2021.0194.
178. Robinson TE, Boyd ML, North D, Wignall J, Dawe M, McQueen J, et al. Proactive primary care model for frail older people in New Zealand delays aged-residential care: A quasi-experiment. J American Geriatrics Society. 2021 Jun;69(6):1617–26.
179. Lyndon H, Latour JM, Marsden J, Kent B. Designing a nurse-led assessment and care planning intervention to support frail older people in primary care: An e-Delphi study. Journal of Advanced Nursing. 2022 Apr;78(4):1031–43.
180. Floriancic N, Garnett A, Donelle L. Chronic Disease Management in a Nurse Practitioner-Led Clinic: An Interpretive Description Study. SAGE Open Nursing. 2024 Jan;10:23779608241299292.

181. King AIl, Boyd ML, Raphael DL, Jull A. The effect of a gerontology nurse specialist for high needs older people in the community on healthcare utilisation: a controlled before-after study. BMC Geriatr. 2018 Dec;18(1):22.
182. Kasa AS, Peta Drury, Victoria Traynor, Shu-Chun Lee, Hui-Chen (Rita) Chang. The effectiveness of nurse-led interventions to manage frailty in community-dwelling older people: a systematic review. Systematic Reviews. 2023;12.
183. Wosinski J, Suzanne Bouchard Cordier, Annie Oulevey Bachmann, Marie-Pierre Gagnon, Blanche Kiszio. Effectiveness of nurse-led healthy aging strategies for older adults living in the community: a systematic review protocol. International Journal of Evidence-based Healthcare. 2016;14(2):5–15.
184. Lei Y, Ya SRT, Zheng Y, Cui X. Effectiveness of nurse-led multidisciplinary interventions in primary health care: A systematic review and meta-analysis. Int J of Nursing Practice. 2023 Dec;29(6):e13133.
185. NSW Health. Greater Randwick Integrated Health Services Plan. 2016.
186. Ham C, Timmins N. The Quest For Integrated Health And Social Care [Internet]. London: The King’s Fund; 2013 [cited 2025 Aug 7]. Available from: https://www.kingsfund.org.uk/insight-and-analysis/reports/quest-integrated-health-and-social-care
187. Goodwin N. Providing integrated care for older people with complex needs. Lomdon: The King’s Fund; 2014.
188. Guo C, Deng M, Yu M. Interventions based on salutogenesis for older adults: An integrative review. Journal of Clinical Nursing. 2024 Jul;33(7):2456–75.
189. Kroik L, Tishelman C, Stoor K, Edin-Liljegren A. A Salutogenic Perspective on End-of-Life Care among the Indigenous Sámi of Northern Fennoscandia. Healthcare. 2021 Jun 19;9(6):766.
190. Pendet NMDP, Januraga PP, Wijanadi MC, Gautama MSN. Evaluating the Impact of Nurse-led Geriatric Homecare Interventions: A Systematic Review of Randomized Controlled Trials. Home Health Care Management & Practice. 2025 May;37(2):118–28.
191. Parker S, Fuller J. Are nurses well placed as care co-ordinators in primary care and what is needed to develop their role: a rapid review? Health Soc Care Community. 2016 Mar;24(2):113–22.
192. Reimagining the Community and Primary Health Care System. A White Paper by ACN.
193. Laurant M, Van Der Biezen M, Wijers N, Watananirun K, Kontopantelis E, Van Vught AJ. Nurses as substitutes for doctors in primary care. Cochrane Effective Practice and Organisation of Care Group, editor. Cochrane Database of Systematic Reviews [Internet]. 2018 Jul 16 [cited 2025 Aug 5];2019(2). Available from: http://doi.wiley.com/10.1002/14651858.CD001271.pub3
194. Silverchain - About us [Internet]. [cited 2025 Aug 5]. Available from: https://silverchain.org.au/about-us
195. Silverchain - Silverchain - The future of aged care calls for a rethink [Internet]. [cited 2025 Aug 5]. Available from: https://silverchain.org.au/future-of-aged-care-calls-for-rethink-8046ad65d7bc15270e4593c0e0f4179c
196. Evaluation of the Silver Chain Community Palliative Care Service Western Sydney – Social Impact Investment [Internet]. Paxton Group; 2020 May. Available from: https://www.nsw.gov.au/sites/default/files/2023-05/silver-chain-evaluation-report.pdf
197. Canadian Institute for Health Information. Seniors in Transition: Exploring Pathways Across the Care Continuum. Ottawa; 2017.
198. Stewart MJ, Georgiou A, Westbrook JI. Successfully integrating aged care services: A review of the evidence and tools emerging from a long-term care program. International Journal of Integrated Care [Internet]. 2013 Feb 22 [cited 2025 Aug 7];13(1). Available from: https://ijic.org/articles/10.5334/ijic.963
199. Cumming J, Middleton L, Silwal P, Tenbensel T. Integrated Care in Aotearoa New Zealand 2008–2020. International Journal of Integrated Care. 2021 Nov 8;21(4):17.
200. De Carvalho A, Epping-Jordan J, Pot A, Kelley E, Toro N, Thiyagarajan J, et al. Organizing integrated health-care services to meet older people’s needs. Bulletin of the World Health Organization. 2017 May 26;95:756–63.
201. Mann J, Rachel Quigley, Desley Harvey, Megan Tait, Gillian Williams, Edward Strivens. OPEN ARCH: integrated care at the primary-secondary interface for the community-dwelling older person with complex needs. Australian Journal of Primary Health. 2020;26(2):104–8.
202. Mathew J, Patel HP. Integrated care for older adults living with frailty. 2021;9:100078.
203. Dambha-Miller H, Simpson G, Hobson L, Olaniyan D, Hodgson S, Roderick P, et al. Integrating primary care and social services for older adults with multimorbidity: a qualitative study. Br J Gen Pract. 2021 Oct;71(711):e753–61.

204. Liljas AEM, Brattström F, Burström B, Schön P, Agerholm J. Impact of Integrated Care on Patient-Related Outcomes Among Older People – A Systematic Review. International Journal of Integrated Care. 2019 Jul 24;19(3):6.
205. Alotaibi RF, Rajkhan WH, Shaikh FW, Kattan AE, Abunawas OM, Almutairi MA, et al. Evaluating The Impact Of Social Services Integration On Healthcare Delivery And Patient Satisfaction. SFS [Internet]. 2023 [cited 2025 Aug 7]; Available from: https://sifisheriessciences.com/index.php/journal/article/view/2333
206. Muhl C, Mulligan K, Giurca BC, Polley MJ, Bloch G, Nowak DA, et al. Building common understanding: seeking consensus and defining social prescribing across contexts – a collective commentary on a Delphi study. BMC Health Serv Res. 2024 Oct 24;24(1):1280.
207. Economic & Social Impact Report [Internet]. [cited 2025 Aug 7]. Available from: https://www.socialprescribing.ca/a-healthier-canada
208. Gupta M, Ali HK, Savo D, Conroy M, Wilkins KM. Integrated Primary and Mental Health Care for Older Adults: Successes, Challenges, and Recommendations. Curr Geri Rep. 2019 Sep;8(3):137–47.
209. Hopman P, De Bruin SR, Forjaz MJ, Rodriguez-Blazquez C, Tonnara G, Lemmens LC, et al. Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: A systematic literature review. Health Policy. 2016 Jul;120(7):818–32.
210. Owusu-Addo E, Gilbert AS, Feldman P, Garratt SM, Mackell P, Brijnath B. Integrated Care Models for Older People: An Umbrella Review. Ageing Int. 2025 Sep;50(3):35.
211. Dadich A, Lan A, Shanmugarajan S, Childs S, Alford J, Chróinín DN. Models of Care for Older People: A Scoping Review. J American Geriatrics Society. 2025 May;73(5):1588–97.
212. Australian Institute of Healh and Welfare. Australian hospital statistics 2012-13. Subacute and non-acute admitted patient care. 2013.
213. Independent Health and Aged Care Pricing Authority. Subacute and non-acute care: Health care Classification. [Internet]. Available from: https://www.ihacpa.gov.au/health-care/classification/subacute-and-non-acute-car
214. Hou X, Sharma J, Zhao F. Building Integrated Services for Older Adults around Primary Health Care [Internet]. World Bank Group; 2023 [cited 2025 Aug 7]. Available from: https://openknowledge.worldbank.org/entities/publication/57f2e279-2f5f-4d0b-85b1-64dc76f0cf9f
215. Hildebrandt H, Hermann C, Knittel R, Richter-Reichhelm M, Siegel A, Witzenrath W. Gesundes Kinzigtal Integrated Care: improving population health by a shared health gain approach and a shared savings contract. Int J Integr Care [Internet]. 2010 Jun 23 [cited 2025 Aug 7];10(2). Available from: http://www.ijic.org/article/10.5334/ijic.539/
216. Carswell P. Te Whiringa Ora: person-centred and integrated care in the Eastern Bay of Plenty, New Zealand. Int J Integr Care [Internet]. 2015 Sep 23 [cited 2025 Aug 14];15(6). Available from: http://www.ijic.org/article/10.5334/ijic.2242/
217. Winterton R, Kathleen Brasher, M Ashcroft. Evaluating the Co-design of an Age-Friendly, Rural, Multidisciplinary Primary Care Model: A Study Protocol. Methods and protocols. 2022;5(2):23–23.
218. Age-Friendly Health Systems | Institute for Healthcare Improvement [Internet]. [cited 2025 Aug 8]. Available from: https://www.ihi.org/partner/initiatives/age-friendly-health-systems
219. Age Friendly NE Victoria. Business Name. [cited 2025 Aug 8]. Indigo 4Ms Age-Friendly Health Care Program: Age-Friendly Communities. Available from: https://www.agefriendlynev.au/indigo-4ms.html
220. Leijten FRM, Struckmann V, Van Ginneken E, Czypionka T, Kraus M, Reiss M, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy. 2018 Jan;122(1):12–22.
221. Lenartowicz M. Geriatric Consultative Models in Primary Care. In: Wasserman M, Riopelle J, editors. Primary Care for Older Adults [Internet]. Cham: Springer International Publishing; 2018 [cited 2025 Aug 4]. p. 5–12. Available from: http://link.springer.com/10.1007/978-3-319-61329-1_2
222. Clinical Excellence. Clinical Excellence Queensland. 2025 [cited 2025 Aug 8]. Older persons enablement and rehabilitation for complex health conditions (OPEN ARCH). Available from: https://www.clinicalexcellence.qld.gov.au/improvement-exchange/older-persons-enablement-and-rehabilitation-for-complex-health-conditions-open-arch
223. Older persons enablement and rehabilitation for complex health conditions (OPEN ARCH). Final evaluation report for Queensland Health (QH), Clinical Excellence Division : University of Southern Queensland Repository [Internet]. [cited 2025 Aug 8]. Available from: https://research.usq.edu.au/item/q62zq/older-persons-enablement-and-rehabilitation-for-complex-health-conditions-open-arch-final-evaluation-report-for-queensland-health-qh-clinical-excellence-division

224. Mann J, Thompson F, McDermott R, Esterman A, Strivens E. Impact of an integrated community-based model of care for older people with complex conditions on hospital emergency presentations and admissions: a step-wedged cluster randomized trial. BMC health services research. 2021 Jul 16;21(1):701.
225. Living Independently with GRACE | Commonwealth Fund [Internet]. [cited 2025 Aug 7]. Available from: https://www.commonwealthfund.org/publications/case-study/2021/oct/living-independently-grace
226. Schubert CC, Myers LJ, Allen K, Counsell SR. Implementing Geriatric Resources for Assessment and Care of Elders Team Care in a Veterans Affairs Medical Center: Lessons Learned and Effects Observed. J American Geriatrics Society. 2016 Jul;64(7):1503–9.
227. Gullery C, Hamilton G. Towards integrated person-centred healthcare – the Canterbury journey. Future Hospital Journal. 2015 Jun;2(2):111–6.
228. McGeoch G, Gullery C, Hamilton G. The Canterbury Initiative – implementation of integration. J Prim Health Care. 2022 Apr 13;14(1):6–9.
229. The King's Fund [Internet]. [cited 2025 Aug 8]. Developing Accountable Care Systems. Available from: https://www.kingsfund.org.uk/insight-and-analysis/reports/developing-accountable-care-systems
230. Blaazer G. From fragmentation to integration: Lessons for the NHS from New Zealand [Internet]. Integrated Care Journal. 2024 [cited 2025 Aug 8]. Available from: https://integratedcarejournal.com/from-fragmentation-to-integration-lessons-nhs-new-zealand/
231. Bliek-Bueno K, Gimeno A, Poblador B, Guerrero I, Cano MI, Bestué M, et al. Overcoming multimorbidity: Chrodis Integrated Multimorbidity Care Model pilot implementation. European Journal of Public Health. 2020 Sep 1;30(Supplement_5):ckaa166.1110.
232. Forjaz M, Rodriguez-Blazquez C, Guerrero-Fernández De Alba I, Gimeno-Miguel A, Bliek-Bueno K, Prados-Torres A, et al. Application of the JA-CHRODIS Integrated Multimorbidity Care Model (IMCM) to a Case Study of Diabetes and Mental Health. IJERPH. 2019 Dec 17;16(24):5151.
233. Rodriguez-Blazquez C, João Forjaz M, Gimeno-Miguel A, Bliek-Bueno K, Poblador-Plou B, Pilar Luengo-Broto S, et al. Assessing the Pilot Implementation of the Integrated Multimorbidity Care Model in Five European Settings: Results from the Joint Action CHRODIS-PLUS. IJERPH. 2020 Jul 22;17(15):5268.
234. Palmer K, Marengoni A, Forjaz M, Jurevičienė E, Laatikainen T, Mammarella F, et al. Multimorbidity care model: Recommendations from the consensus meeting of the Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (JA-CHRODIS). Health policy. 2018 Feb 9;122 1:4–11.
235. Hendry A, Vanhecke E, Carriazo AM, López-Samaniego L, Espinosa JM, Sezgin D, et al. Integrated Care Models for Managing and Preventing Frailty: A Systematic Review for the European Joint Action on Frailty Prevention (ADVANTAGE JA). Transl Med UniSa. 2019;19:5–10.
236. Eriksson M. Key Concepts in the Salutogenic Model of Health. In: Mittelmark MB, Bauer GF, Vaandrager L, Pelikan JM, Sagy S, Eriksson M, et al., editors. The Handbook of Salutogenesis [Internet]. Cham: Springer International Publishing; 2022 [cited 2025 Aug 8]. p. 59–60. Available from: https://link.springer.com/10.1007/978-3-030-79515-3_8
237. Eriksson M. The Sense of Coherence in the Salutogenic Model of Health. In: Mittelmark MB, Sagy S, Eriksson M, Bauer GF, Pelikan JM, Lindström B, et al., editors. The Handbook of Salutogenesis [Internet]. Cham: Springer International Publishing; 2017 [cited 2025 Aug 8]. p. 91–6. Available from: http://link.springer.com/10.1007/978-3-319-04600-6_11
238. Álvarez ÓS, Ruiz-Cantero MT, Cassetti V, Cofiño R, Álvarez-Dardet C. Salutogenic interventions and health effects: a scoping review of the literature. Gaceta Sanitaria. 2021 Sep;35(5):488–94.
239. Harrop E, Addis S, Elliott E, Williams G. Resilience, coping and salutogenic approaches to maintaining and generating health: a review. Cardiff: Cardiff Institute of Society, Health and Ethics; 2006.
240. Kjelsnes AA, Feiring E. Models of integrated care for older people with frailty: a horizon scanning review. BMJ Open. 2022;12(4):e060142–e060142.
241. Fabbricotti I. Walcheren Integrated Care Model (WICM): Geriatric Care-Chain in Walcheren [Internet]. [cited 2025 Oct 13]. Available from: http://www.isrctn.com/ISRCTN05748494
242. Vo NT, Tu YK, Lin KC, Chiu HY, Huang HC. Diagnostic Accuracy of the FRAIL Scale, Groningen Frailty Indicator, Tilburg Frailty Indicator, and PRISMA-7 for Frailty Screening Among Older Adults in Community Settings: A Systematic Review and Network Meta-Analysis. Heyn PC, editor. The Gerontologist. 2024 Jun 1;64(6):gnae008.
243. Looman W, Isabelle Fabbricotti, Robbert Huijsman. Effects of an integrated care intervention on frail elderly's health and quality of life: a quasi- experimental study. International Journal of Integrated Care. 2015;15(5).

244. Makai P, Looman W, Adang E, Melis R, Stolk E, Fabbricotti I. Cost-effectiveness of integrated care in frail elderly using the ICECAP-O and EQ-5D: does choice of instrument matter? Eur J Health Econ. 2015 May;16(4):437–50.
245. Garm A, H Park G, Song X. Using an Electronic Comprehensive Geriatric Assessment and Health Coaching to Prevent Frailty in Primary Care: The CARES Model. Med Clin Rev [Internet]. 2018 [cited 2025 Aug 8]; Available from: http://medical-clinical-reviews.imedpub.com/using-an-electronic-comprehensive-geriatric-assessment-and-health-coaching-toprevent-frailty-in-primary-care-the-cares-model.php?aid=20392
246. Sarwar T, Jimeno Yepes AJ, Zhang X, Chan J, Hudson I, Evans S, et al. Development and validation of retrospective electronic frailty index using operational data of aged care homes. BMC Geriatr. 2022 Dec 1;22(1):922.
247. Sepehri K, Braley MS, Chinda B, Zou M, Tang B, Park G, et al. A Computerized Frailty Assessment Tool at Points-of-Care: Development of a Standalone Electronic Comprehensive Geriatric Assessment/Frailty Index (eFI-CGA). Front Public Health. 2020 Mar 31;8:89.
248. Program of All-Inclusive Care for the Elderly | Medicaid [Internet]. [cited 2025 Aug 8]. Available from: https://www.medicaid.gov/medicaid/long-term-services-supports/program-all-inclusive-care-elderly
249. Mukamel D, Temkin-Greener H, Delavan R, Peterson D, Gross D, Kunitz S, et al. Team performance and risk-adjusted health outcomes in the Program of All-Inclusive Care for the Elderly (PACE). The Gerontologist. 2006 Apr 1;46 2:227–37.
250. Fleet A, Simoun A, Shalev D, Spaeth-Rublee B, Patterson T, Wardlow L, et al. A Framework for Behavioral Health Integration in the Program of All-Inclusive Care for the Elderly (PACE). Journal of the American Geriatrics Society [Internet]. 2025 Jan 17;73. Available from: https://consensus.app/papers/a-framework-for-behavioral-health-integration-in-the-spaeth%E2%80%90rublee-shalev/3b87d65309875ca0884e57955c20d752/
251. Gyurmey T, Kwiatkowski J. Program of All-Inclusive Care for the Elderly (PACE): Integrating Health and Social Care Since 1973. Rhode Island medical journal. 2019 Jun 4;102 5:30–2.
252. Wieland D, Lamb V, Sutton S, Boland R, Clark M, Friedman S, et al. Hospitalization in the Program of All-inclusive Care for the Elderly (PACE): Rates, Concomitants, and Predictors. Journal of the American Geriatrics Society [Internet]. 2000 Nov 1;48. Available from: https://consensus.app/papers/hospitalization-in-the-program-of-all%E2%80%90inclusive-care-for-clark-brummel%E2%80%90smith/aa02a0a89ae25979af2f2aab539c825a/
253. Mui A. The Program of All-Inclusive Care for the Elderly (PACE). Journal of Aging & Social Policy. 2002 Jul 25;13:53–67.
254. Perry M, McCall S, Nardone M, Dorris J, Obbin S, Stanik C. Program of All-Inclusive Care for the Elderly (PACE) Organizations Flip the Script in Response to the COVID-19 Pandemic. Journal of the American Medical Directors Association [Internet]. 2023 Dec 1; Available from: https://consensus.app/papers/program-of-allinclusive-care-for-the-elderly-pace-perry-nardone/aa1008622e615b5ba421616b7d0f5dc3/
255. Yorkshire NENE and. NHS England — North East and Yorkshire » Centre's integrated services transform care for frail and elderly residents [Internet]. [cited 2025 Aug 8]. Available from: https://www.england.nhs.uk/north-east-yorkshire/blogs/centres-integrated-services-transform-care-for-frail-and-elderly-residents/
256. Murtagh FEM, Okoeki M, Ukoha-kalu BO, Khamis A, Clark J, Boland JW, et al. A non-randomised controlled study to assess the effectiveness of a new proactive multidisciplinary care intervention for older people living with frailty. BMC Geriatr. 2023 Jan 5;23(1):6.
257. Murtagh FE, Ramsenthaler C, Firth A, Groeneveld EI, Lovell N, Simon ST, et al. A brief, patient- and proxy-reported outcome measure in advanced illness: Validity, reliability and responsiveness of the Integrated Palliative care Outcome Scale (IPOS). Palliat Med. 2019 Sep;33(8):1045–57.
258. Mann J, Thompson F, McDermott R, Adrian Esterman, Edward Strivens. Impact of an integrated community-based model of care for older people with complex conditions on hospital emergency presentations and admissions: a step-wedged cluster randomized trial. BMC Health Services Research. 2021;21(1):701.
259. DeGroot L, Pavlovic N, Perrin N, Gilotra N, Dy S, Davidson P, et al. Palliative Care Needs of Physically Frail Community-Dwelling Older Adults with Heart Failure. Journal of pain and symptom management [Internet]. 2023 Jan 31; Available from: https://consensus.app/papers/palliative-care-needs-of-physically-frail-dy-perrin/522bb50b16875fb9ba3d4b28e440e9b8/

260. Evans C, Bone A, Yi D, Gao W, Morgan M, Taherzadeh S, et al. Community-based short-term integrated palliative and supportive care reduces symptom distress for older people with chronic noncancer conditions compared with usual care: A randomised controlled single-blind mixed method trial. International journal of nursing studies. 2021 May 24;120:103978.

261. Li Y, Li J, Fu M, Payo RM, Tian X, Sun Y, et al. Effectiveness of palliative care interventions on patient-reported outcomes and all-cause mortality in community-dwelling adults with heart failure: A systematic review and meta-analysis. International journal of nursing studies. 2024 Sep 1;160:104887.

262. Di Pollina L, Guessous I, Petoud V, Combescure C, Buchs B, Schaller P, et al. Integrated care at home reduces unnecessary hospitalizations of community-dwelling frail older adults: a prospective controlled trial. BMC Geriatrics [Internet]. 2017 Feb 14;17. Available from: https://consensus.app/papers/integrated-care-at-home-reduces-unnecessary-gaspoz-schaller/e9dc26279fb9514c8a7a500c79bd256c/

263. Sachs G, Johnson N, Gao S, Torke A, Hickman S, Pemberton A, et al. Palliative Care Program for Community-Dwelling Individuals With Dementia and Caregivers: The IN-PEACE Randomized Clinical Trial. JAMA [Internet]. 2025 Jan 29; Available from: https://consensus.app/papers/palliative-care-program-for-communitydwelling-vrobel-gao/1bd0a125f9c95de180ffbc43336c3a28/

264. Ng HL, Wu X, Yap SY, Yeo SNB, Dino MJ, Jiang Y. Exploring the Experiences of Older Adults and Their Caregivers in Home-Based Palliative Care Setting: A Systematic Review and Meta-Synthesis. Seminars in oncology nursing. 2024 Nov 1;151753.

265. Nicholson C, Combes S, Mold F, King H, Green R. Addressing inequity in palliative care provision for older people living with multimorbidity. Perspectives of community-dwelling older people on their palliative care needs: A scoping review. Palliative Medicine. 2022 Aug 24;37:475–97.

266. Carmont SA. An integrated approach to palliative care for frail older people living in the community: exploring a model of multidisciplinary collaboration. [Internet] [PhD Thesis]. The University of Queensland; 2020 [cited 2025 Aug 8]. Available from: http://espace.library.uq.edu.au/view/UQ:594a7df

267. University of Technology Sydney. Improving Palliative, Aged and Chronic Care through Clinical Research and Translation [Internet]. [cited 2025 Aug 8]. Available from: https://www.uts.edu.au/research/centres/impacct

268. Palliative Care Australia. Palliative care is for people with chronic disease, not just cancer [Internet]. [cited 2025 Aug 8]. Available from: https://palliativecare.org.au/story/palliative-care-is-for-people-with-chronic-disease-not-just-cancer/

269. Liao SJ, Chao SM, Fang YW, Rong JR, Hsieh CJ. The Effectiveness of the Integrated Care Model among Community-Dwelling Older Adults with Depression: A Quasi-Randomized Controlled Trial. IJERPH. 2022 Mar 11;19(6):3306.

270. Abbasi M, Khera S, Dabravolskaj J, Chevalier B, Parker K. The Seniors' Community Hub: An Integrated Model of Care for the Identification and Management of Frailty in Primary Care. Geriatrics. 2021 Feb 12;6(1):18.

271. Spoorenberg SLW, Wynia K, Fokkens AS, Slotman K, Kremer HPH, Reijneveld SA. Experiences of Community-Living Older Adults Receiving Integrated Care Based on the Chronic Care Model: A Qualitative Study. Harris F, editor. PLoS ONE. 2015 Oct 21;10(10):e0137803.

272. Yi YM, Park YH, Cho B, Lim KC, Jang SN, Chang SJ, et al. Development of a Community-Based Integrated Service Model of Health and Social Care for Older Adults Living Alone. IJERPH. 2021 Jan 19;18(2):825.

273. Tops L, Beerten SG, Vandenbulcke M, Vermandere M, Deschodt M. Integrated Care Models for Older Adults with Depression and Physical Comorbidity: A Scoping Review. International Journal of Integrated Care. 2024;24.

274. Morgan MAJ, Coates MJ, Dunbar JA, Reddy P, Schlicht K, Fuller J. The TrueBlue model of collaborative care using practice nurses as case managers for depression alongside diabetes or heart disease: a randomised trial. BMJ Open. 2013;3(1):e002171.

275. Mann J, Devine S, Robyn McDermott. Integrated care for community dwelling older Australians. Journal of Integrated Care. 2019;27(2):173–87.

276. Klug G, Gallunder M, Hermann G, Singer M, Schulter G. Effectiveness of multidisciplinary psychiatric home treatment for elderly patients with mental illness: a systematic review of empirical studies. BMC Psychiatry. 2019 Dec;19(1):382.

277. Practice Incentives Program - Health professionals - Services Australia [Internet]. [cited 2025 Aug 13]. Available from: https://www.servicesaustralia.gov.au/practice-incentives-program?context=20

Chapter 8: Workforce planning for healthy ageing in primary care

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Background: Workforce planning for healthy ageing in primary care

By 2066, it is projected that older people in Australia will comprise between 21% and 23% of the total population (1). Australia's increasingly ageing population, both in proportion and numbers, is placing growing pressure on health care services and on health workforce capacity to meet health care demand and need (2). The ABS 2019–20 Patient Experience Survey showed that 95% of individuals aged 65 and over had visited a general practitioner in the past 12 months, compared with 80% of those under 65. People 85 and over were almost three times more likely to have consulted a medical specialist and to have been hospitalised than younger people aged 15–24 (1).

Primary health care professionals play a crucial role in supporting healthy ageing, as they are uniquely positioned to address the full spectrum of health needs of individuals over time, from prevention, early detection of illness, understanding of a patient's broader social circumstances, to providing ongoing management of chronic conditions and health and end of life care in advanced older age (3).

The quality and effectiveness of primary health care are dependent on a workforce that is well-trained, equitably distributed and supported to deliver consistent, high-quality care (4). While Australia meets the World Health Organisation's minimum benchmark of 4.45 skilled health workers (including physicians, nurses and midwives) per 1,000 population, a threshold that is linked to the United Nations Sustainable Development Goals (4), primary care workforce shortages remain a prominent problem, particularly in rural and remote regions. In 2019, there were 121 GP full-time equivalents (FTEs) per 100,000 people in major cities, compared to 101-115 in regional areas and 69-83 in remote and very remote areas (5). These gaps present substantial barriers to the delivery of both preventive and ongoing care for older people in these communities.

Rural and remote areas face significantly greater health needs, including higher rates of morbidity, mortality and socioeconomic disadvantage. With limited access to specialist care, these groups rely more heavily on primary health care providers for essential health services (5).

Several national strategies and plans have been developed in response to increasing pressures on the health workforce, resulting from ageing of the population, the rising prevalence and complexity of chronic conditions, rapidly evolving healthcare technologies and growing capacity demands (6). These workforce strategies (see box 8.1) focus on a wide range of health professionals, including GPs, nurses, allied and mental health workers.

Alongside workforce distribution, workforce training is an essential component of effective health workforce planning. Adequate and appropriate education and training ensures the healthcare system has the right number of qualified professionals with the skills needed to meet both current and future healthcare demands. This process involves forecasting workforce needs, identifying skill gaps and implementing targeted training programs to address those gaps (7). A multidisciplinary workforce in primary care is well recognised as essential for prevention of avertable chronic conditions and to clinically and cost effectively manage those conditions. Education and health policy needs to build primary health care capacity to improve health and wellbeing at all stages of ageing through comprehensive and coordinated medical, nursing and allied health care and, as needed, social services (14).

Box 8.1. Australian workforce strategies and reforms

Scope of Practice Review 2024 assessed how to support health professionals in delivering their full scope of practice within primary care. Building on the 2022 Strengthening Medicare Taskforce Report, the review emphasised funding reforms to support multidisciplinary teams, continuity of care, prevention and system integration. It produced 18 recommendations across four key themes: workforce development and planning, regulation, funding models and enabling factors. Key proposals included a national skills and capability framework, interprofessional education principles, a workforce development program, a blended payment model, an independent advisory mechanism and direct referral pathways to improve access and reduce fragmentation (7).

National Medical Workforce Strategy (2021–2031*)* prioritises generalist professional skills, flexible training pathways and a responsive workforce aligned to community needs. This strategy aims to develop a sustainable, high-quality medical workforce that is well-distributed and capable of meeting the evolving needs of the Australian population. The strategy supports a shift toward community-based, generalist-led models of care that are better suited to managing chronic and complex conditions common in older populations (8). It highlights the need for training reforms that increase exposure to primary care, rural health and multidisciplinary team environments. The strategy explicitly stresses "the need for a sustainable generalist medical workforce" to meet the growing demands of an ageing and comorbid population

National Nursing Workforce Strategy (in development). A research report to inform the development of this Strategy highlighted the importance of nurse-led models in chronic disease management, frailty, mental health and aged care, supporting person-centred, community-based care and expanding access to primary care services. It recognised that the future of healthcare will rely increasingly on personalised, out-of-hospital care, with nurses playing a central role in leading embedded community models (9).

National Allied Health Workforce Strategy (in development). This Strategy is to address the range of health professional groups that provide more than a quarter of the total health workforce in Australia. Federal, state and territory governments are developing the strategy to address the current shortage of allied health professionals in Australia. A consultation paper on a draft strategy, published in January 2025 (10), said demand for allied health services is rising. This is due to the significant role that allied health professionals play in disease prevention and early intervention through screening and early detection of conditions, and their role in working with patients to reduce risk factors, prescribing health promotion activities and managing complex and chronic health issues. The consultation paper cited data from the Australian Institute of Health and Welfare showing that four out of the five top causes of disease in Australia require ongoing support from multidisciplinary teams that include allied health services (10).

Primary Health Care 10-Year Plan (2022–2032*)* focussed on strengthening primary care through a focus on prevention, early intervention and expanded roles for practice nurses, nurse practitioners, pharmacists and allied health professionals to deliver more coordinated, team-based care. The Plan highlighted the uneven distribution of GPs, nurses and allied health professionals, along with the underuse of nurse-led and allied health models in caring for older people (11). The Plan includes funding provision for MBS-funded telehealth for general practice, nurse practitioners, allied health and specialist services with a greater focus on allied health providers and nursing as central to the primary health care team. The Plan also led to a number of workforce strategies cited above (11) .

Stronger Rural Health Strategy 2018-2019 provided an overarching framework for initiatives focused on improving healthcare access and workforce retention in rural and remote areas. It aimed to support multidisciplinary team-based primary care models and to deliver 3,000 additional doctors and 3,000 nurses by 2028 (12).

Improving access to primary health care to support healthy ageing

Growing demand for health services, particularly among people aged 65 and older, is outpacing population growth and placing sustained pressure on workforce availability across general practice, nursing and allied health professions (15,16).

Despite high medical school enrolments and a steady increase in the number of employed doctors and health professionals, significant imbalances in workforce supply and distribution persist. The National Medical Workforce Strategy 2021–2031 notes that Australia no longer faces an overall shortage of doctors, but contends with persistent geographic maldistribution, workforce oversupply in certain specialties and undersupply in general practice and aged care (8). Similar disparities exist across nursing and allied health, where workforce shortages are particularly acute in rural and regional communities. In 2023, over 80% of health professional occupations were classified as being in shortage, with general practice and aged care nursing identified among the highest areas of need. These shortages constrain the capacity of primary care to support early intervention, complex care coordination and long-term health maintenance for older Australians (8).

In response to workforce maldistribution, the literature identifies several effective strategies for improving access to primary care:

Nurse-led clinics

Nurse-led clinics have been introduced in recent years to close care gaps, address demand on overstretched services and improve access in underserved communities (17). Research has shown that patients attending nurse-led clinics experience improved symptom management, better mental health and reductions in polypharmacy, falls and hospitalisations compared to those receiving standard GP care (18).

Six urgent care nurse-led walk-in clinics have been established in the Australian Capital Territory (ACT) for some time, located in suburban centres across Canberra. The ACT clinics are led by nurse practitioners with a team of advanced practice nurses. The clinics are funded by the ACT government and provide extended hours, no-appointment, expert, urgent care 7 days a week, expanding available primary health care access options (19). Other nurse clinics have also been established, including several supported by the Australian Primary Health Care Nurses Association (APNA). In 2021, the Gippsland Primary Health Network partnered with APNA to launch the ‘Supporting Establishment of Nurse Clinics for Risk Prevention Project.’ From this project two early-intervention clinics were established, serving 80 patients over eight months. These clinics were well received by patients and facilitated timely prevention, referral and screening, contributing to improving patient wellbeing and reducing the risk of chronic disease progression (20).

A scoping review of nurse-led clinics in regional, rural and remote Australia identified other benefits, including prevention and management of chronic disease and improved measures of health access, health outcomes and hospital services (21). The APNA provides a Building Nurse Capacity Program, funded by the Australian Government Department of Health, Disability and Aged Care, to support the development of nurse clinics in primary care. The program has established clinics throughout Australia. However, barriers to the establishment of nurse-led clinics are consistently shown to be limitations in Medicare funding, non-metropolitan settings, organisational factors and role ambiguity. Despite the effectiveness and value of nurse-led clinics, they remain underfunded and underutilised (22).

Optimising the skills of primary care nurses can ease system pressures, reduce delays in care and improve equitable access to services across communities (20). A systematic review undertaken by researchers in the USA concluded that redesigning the health workforce by increasing the number of nurse practitioners in primary care could significantly impact the health outcomes of people living with dementia (23). The review found that nurse practitioners (NPs), when involved in co-management roles, significantly improved adherence to dementia care protocols. One study within the review also reported that patients managed by nurses, nurse practitioners or physician assistants incurred 6-7% lower total care costs compared to those treated only by physicians (23).

A 2025 consultation and research report informing the development of the Nursing Workforce Strategy advocated for expansion of nurse-led models of care, stating that *“there is a demand for primary health models led by nurses that ‘front end’ embedded community approaches.”* (p.37) (9).

Rural placements and trainings

The Australian Government's Rural Health Multidisciplinary Training Program provides health students with opportunities to train in rural and remote communities through a network of training facilities, including (24):

- Rural Clinical Schools (RCS)
- University Departments of Rural Health (UDRHs)
- Dental faculties offering extended rural placements
- Northern Territory Medical Program
- 28 regional training hubs that support medical training pathways within a region and guide students and trainees.

Walker et al. and Walsh et al. highlight that positive exposure to rural clinical training significantly influences medical graduates' decisions to practice in rural areas, which is particularly critical given the existing geographical maldistribution of the healthcare workforce in Australia (25,26). A longitudinal study examining the long-term outcomes of rural training found that, 15–17 years later, factors such as having previously lived in a rural area and having a first job (as part of placement through a UDRH) in a rural setting were significantly associated with current rural practice among allied health professionals and nurses (27). Overall, the evidence indicates that rural training is a strong predictor of rural workforce retention and supports provision of dedicated funding to establish and sustain rural training and career pathways in nursing and allied health, similar to the structured pathways already in place for pharmacy and medicine (27).

GPs enrolled in the Australian General Practice Training (AGPT) program are also required by the Department of Health, Disability and Aged Care to complete 12 months of their GP term or extended skills training in one of the following settings: a rural location, an outer metropolitan area, or an Aboriginal and Torres Strait Islander health training post, either within an Aboriginal Community Controlled Health Service or another approved Aboriginal Medical Service (28). Evidence indicates that the mandated requirement for general practice registrars to train in regional and rural locations is linked to an increased likelihood of their long-term retention in these areas, despite substantial government investment in expanding general practice training in regional and rural settings (29).

For Australian-trained doctors, motivations for relocating to regional areas often include lifestyle considerations, such as employment opportunities for a partner, access to quality education for children and recreational options (30). However, retaining GPs in rural and remote areas remains a challenge as many GPs in these regions are overseas-trained doctors, who may be required to work in rural or remote regions under legislative provisions, and who often report limited access to ongoing training. Retention is more likely when these doctors feel welcomed, valued and integrated into the local community (30).

Building multidisciplinary teams within and integrated with primary health care

Multidisciplinary teamwork in primary care has been discussed in academic and clinical literature for several decades. An early description of the purpose of primary health care teams proposed that '*the true concept of primary health care (PHC) encompasses not only medical care but also health promotion and illness-prevention strategies. These are aimed at maintaining and enhancing the health* *of the practice population through health education and early identification of health problems. (This) requires a diversity of skills and for this reason a team approach to care has been advocated for'* (31).

Key features of multidisciplinary teams in general practice include the use of shared clinical records to facilitate coordinated care (32), formal employment or contractual arrangements that enable clear role definitions and team integration, and, where possible, co-location in shared physical spaces to support collaboration and communication (33). More recently, the RACGP has established five codependent principles for effective teamwork and collaboration in healthcare including shared goals; clear roles; mutual trust; effective communication and measurable processes and outcomes (34). The RACGP identifies multidisciplinary team-based care as particularly relevant to the care of older patients.

A number of multidisciplinary models have been implemented across Australian primary care for many years, reflecting diverse local needs and resource availability. However, the full potential of these teams remains constrained. One major limitation is the structure of Medicare funding, which largely supports fee-for-service models and individual provider billing, rather than team-based care, making access to such care difficult, particularly for patients with complex chronic and multiple conditions who require coordinated care (35). Additionally, many innovative multidisciplinary approaches rely on time-limited project or pilot funding, making long-term sustainability and scaling difficult.

To realise the benefits of multidisciplinary teams for older populations and those with complex needs, system improvements are required to enable stable, long-term investment in integrated, team-based primary care. This particularly requires appropriate funding models that are designed to enable more team-based, person-centred approaches (35) with integration of allied health professionals, pharmacists, care coordinators, peer workers and community-based roles that bridge health, aged care and social support systems (36). These multidisciplinary care teams can support busy GPs and increase patient access to affordable and coordinated primary care (37).

The Strengthening Medicare Taskforce Report (38) emphasises that delivering high-quality primary care increasingly relies on well-coordinated healthcare teams that use the full range of skills across the health workforce. This includes general practitioners, nurses, nurse practitioners and midwives, pharmacists, allied health professionals, Aboriginal and Torres Strait Islander health workers, practice managers and other practice staff. Literature highlights several of these roles as particularly relevant to delivering preventive and proactive care across the ageing continuum. These key roles, that are relevant to preventive healthcare through the stages of ageing are outlined below:

Geriatric specialists

Many older adults benefit from a Comprehensive Geriatric Assessment (CGA), which has been shown to reduce emergency department (ED) presentations, hospital admissions and premature institutionalisation (39). However, access to CGA in the community is limited. This is due in part to a shortage of specialised geriatric services, often associated with long wait times as most geriatricians are employed in hospital-based settings (39). Primary care capacity to implement CGA is limited, largely due to lack of support through Medicare funding, which restricts the provision of CGA to non-GP specialists, creating a financial barrier to implementing this assessment more broadly within general practice. This is compounded by the lack of geriatric expertise in the private sector and a lack of interprofessional collaboration (40,41). These factors collectively limit the availability and integration of CGA in primary care, despite its potential benefits for older adults (42).Evidence shows that involving a specialist geriatrician as part of a multidisciplinary team or outreach service can be promising in improving care for older adults (43,44). For instance, the Spanish program, +AGIL, which is consistent with Integrated Care for Older People (ICOPE) guidelines, focused on frailty management and included multi-component strategies based on a Comprehensive Geriatric Assessment (CGA), with physical activity as a central element. This demonstrated enhanced overall physical function of older patients when delivered through an integrated care model involving a geriatrician in both the assessment and the intervention (45). In NSW, a local area initiative called the Geriatrician in the Practice (GIP) program included specialists and GPs to provide joint consultations in general practice settings for dementia care. This model of care led to increased confidence among primary care staff in diagnosing and managing dementia, while also improving access to specialist care for older adults in a familiar environment (44). A similar Canadian model showed that combining the expertise and resources of GPs and geriatric specialists enhanced diagnostic accuracy, reduced unnecessary testing and shortened wait times for complex geriatric cases (46). These examples (refer to box 2 for more details on the GIP and +AGIL programs) demonstrate that integration of geriatric expertise in primary and community settings can increasingly support older adults in primary and community settings.

Box 8.6. Examples of primary care and geriatrician integrated care

The +AGIL Barcelona program

- **Program description:** +AGIL Barcelona program is an ongoing co-designed program running since July 2016, where a geriatrician and a physical therapist visits the primary care center 1 day/week to assess older adults with low intrinsic capacity as previously identified by the primary care team (i.e., general physicans and/or nurses) (47). Geriatrician and physical therapist implement a multi-component intervention focused on physical activity, nutrition (Mediterranean diet), health education, and medication review. The geriatrician also works closely with prescribing physicians to reduce polypharmacy and optimise treatment. A single follow-up visit at three months is conducted to revise the care plan, with ongoing follow-up managed by primary care. Regular consultations and shared electronic health records support continuity and integration of care (45).
- **Program outcomes:** In a study undertaken of the first tranche of participants referred to the program between its inception in July 2016 and March 2020, statistically significant improvements in physical performance were observed at three months post-intervention, highlighting the benefits of coordinated, integrated care (48).

Geriatrician in the practice (GIP) program

- **Program description:** The GIP program was a NSW local initiative that was implemented in the Shoalhaven region of New South Wales (NSW) through the Southern NSW Local Health District (LHD). It was part of the NSW Health Integrated Care Strategy. This program was based on the Physician in the Practice model, where the specialist and general practitioner provide joint consultations at the general practice. The program ran from 2015-2018 within the Illawarra Shoalhaven Local Health District (LHD). It included joint consultations involving GPs, practice nurses, a geriatrician and a Clinical Nurse Consultant (CNC). The program focused on dementia assessment and management, aiming to support early diagnosis, improve care planning, and enhance communication between patients, carers, and clinicians. Key components included co-location of services within general practices, use of shared referral pathways, interdisciplinary care planning, and on-site training for practice nurses. Ongoing care was led by the GP, with access to specialist support as needed. The program also featured a dedicated workforce comprising a part-time geriatrician, CNC (also acting as program manager), and clerical support (44).
- **Program outcomes:** This program was well received by patients, GPs, and practice nurses, with patients reporting high confidence in their clinicians, satisfaction with communication, and improved access to specialist care in a familiar setting, which helped reduce anxiety. GPs and practice nurses showed increased confidence and knowledge in dementia assessment and management following participation (44).

Allied health professionals

Allied health professionals, such as physiotherapists, dietitians, speech pathologists and mental health practitioners, bring diverse and specialised expertise to support various aspects of health and wellbeing. Despite making up around 20% of Australia's healthcare workforce, the role and impact of allied health remains poorly recognised in health policy and reform discussions (49).

There is strong evidence supporting the integration of allied health professionals into aged care and primary care teams to improve patient outcomes and alleviate the burden on time-sensitive GPs. For example, an American study found that COPD patients participating in a multidisciplinary clinic led by nurses and allied health professionals had reduced COPD-associated mortality risk and lower hospital service use compared to those receiving usual care (50). Similarly, a NSW-based randomised control trial demonstrated that case management for frail older adults led by physiotherapists, combined with regular case conferences involving geriatricians, nurses, physicians, and allied health professionals such as rehabilitation physicians and dietitians, has been shown to improve physical function and nutritional outcomes (51).

In line with the growing evidence, allied health professionals' organisations, such as the Australian Physiotherapy Association (APA), advocate for the implementation of multidisciplinary teams in primary care. The APA has called for direct access to allied health professionals through a multidisciplinary model, such as involving physiotherapists for assessing and managing musculoskeletal conditions and dietitians for diabetes management. This approach can lead to improved patient outcomes and reduce unnecessary burden on GPs (52).

Oral health professionals

Oral health is a fundamental component of overall health and wellbeing, yet it remains largely overlooked in health policy and focus (53). Despite being largely preventable or treatable, oral health conditions in older adults are often neglected, with many not receiving routine care needed to maintain good oral health (53). This contributes to an increased risk of systemic inflammation, malnutrition, social isolation and reduced quality of life (54,55).

Although the negative consequences of poor oral health are well recognised, integration of oral health into primary care has been limited (56). Recent advocacy and strategy documents from the World Health Organisation continue to emphasise the urgent need to include oral health into broader health systems to reduce disease burden (57). A systematic review of 49 studies identified various strategies for integration, with most supporting collaboration between dentists, community health workers and primary care providers. The majority of studies advocated for expanding the scope of non-dental professionals such as GPs, nurses and midwives and tested the delivery of oral health education and basic interventions by these health workers, as well as the co-location of dental services within primary care settings to enhance oral health access (57). These approaches have been associated with improved oral health outcomes for patients, improved awareness of oral health among non-dental workers, better referral pathways between medical and dental services and increased uptake of dental services (57).

Community or link workers

Social prescribing is an approach that enables general practitioners (GPs) and other health professionals to refer individuals to a broad range of non-clinical services delivered by the voluntary and community sector (58). Internationally, two primary models of social prescribing have emerged: direct referral and the link worker model. In the direct referral model, health professionals connect patients directly with community-based programs and activities. The link worker model involves a dedicated practitioner, often referred to as a link worker or community connector, to whom a general practitioner or practice can refer an individual and who works alongside the individual to develop a tailored plan connecting the person to relevant local resources to enhance their health and wellbeing (59).

The link worker model is increasingly emerging in primary care, particularly for its potential to support people with complex health and social needs. Evidence suggests that including link workers within general practice can improve access to community supports, empower individuals to better self-manage chronic physical and mental health conditions and reduce reliance on clinical services (58). In the UK, provision of link workers in primary care has gained formal recognition and systematic support. The NHS Long Term Plan expanded the reach of social prescribing across Primary Care Networks (PCNs), providing targeted funding for the integration of social prescribing link workers (60). One of the earliest and most prominent examples of this approach is the Scottish Government-funded Link Worker Programme launched in high-deprivation areas of Glasgow. As part of the program, community links practitioners were integrated within GP practices to address the broader social determinants of health (61). According to the Glasgow City Health and Social Care Partnership's Annual Report 2022-23, these link workers supported patients in navigating a range of non-clinical issues, including housing instability, financial hardship, food insecurity, mental health concerns, carer stress and social isolation (62). A marked increase in GP referrals to link workers reflected growing awareness of their contribution in easing the pressure on general practice by addressing patients' complex non-medical needs (62).

In Australia, both the direct referral and link worker models have been found to be beneficial, though the link worker model is considered particularly promising (59). Link workers are often better positioned than GPs to stay up to date with local services and are able to invest more time in building relationships with clients, identifying appropriate supports and ensuring ongoing engagement (59). Their involvement also allows for the management of social or practical issues without requiring additional GP appointments, especially if integrated feedback systems are in place (59). Despite the limited number of formal social prescribing programs currently operating in Australia, momentum is growing. There is strong support from consumers, GPs and allied health professionals and national and state-level policies have begun to reflect this shift (63). For example, the Queensland Parliamentary Inquiry into social isolation and loneliness recommended a broad rollout of social prescribing across the state (63). The Victorian government social prescribing initiative, called Local Connections, has been trialed in the six Mental Health and Wellbeing Local Services (64). These state initiatives align with national priorities, including the *National Preventive Health Strategy 2021–2030* and *Australia's 10-Year Primary Health Care Plan 2022–2032*, both of which highlight social prescribing as a key strategy for promoting population health and preventing long-term illness (59). Funding for a feasibility study of non-medical prescribing was provided in the 2022-23 Australian government budget to 'establish evidence for a preventive health program that connects patients from primary health care to local, community-based services to address the risk factors and influences of poor health and wellbeing (65).'

Aboriginal and/or Torres Strait Islander health workers and health practitioners

Aboriginal and Torres Strait Islander people are employed in the health care and social assistance sector more than in any other industry. However, they represent less than 2% of the total health workforce (8). These workers play a vital role in strengthening the relationship between Aboriginal and

Torres Strait Islander people and the health care system. By combining cultural knowledge with primary health care training, they promote continuity of care and help ensure Aboriginal and Torres Strait Islander people remain connected to and engaged with health services (66).

The *National Association of Aboriginal and Torres Strait Islander Health Workers and Practitioners (*NAATSIHWP) recommends integrating these professionals into general practice teams as their inclusion can help improve health outcomes for Aboriginal and Torres Strait Islander patients, enhance the management of chronic conditions through better continuity of care and attract and support the retention of Aboriginal and Torres Strait Islander patients within the healthcare system (66).

General Practices may also be eligible for general State or Territory grants and incentives for employment of Aboriginal and Torres Strait Islander workforce members, these grants are listed in the NAATSIHWP Guide for General Practice (66).

Carers and consumers

A sustainable and effective healthcare workforce is one that is responsive to the needs, values and preferences of the people it serves. Person-centred care is widely recognised as the gold standard in healthcare delivery and a core aspect of this approach involves actively engaging carers and consumers in decisions about their care (67,68). Person-centred care is grounded in trust, mutual respect and shared knowledge, factors that are essential to achieving better health outcomes (67)

Research shows that when consumers are involved as co-managers in their care, results can include more appropriate use of resources, higher satisfaction for both patients and providers, greater uptake of preventive health services, and improved health outcomes overall (69).

Families and carers also play a vital role in supporting older people and should be recognised, respected and supported as partners in care (68). The RACGP's Silver Book highlights that a multidisciplinary team approach that includes family and carers is more likely to meet the individual needs of older people. In turn, this can enhance their physical, emotional and social wellbeing, while also strengthening the carer's ability to provide ongoing support (34).

Partnering with consumers and carers involves a range of interconnected practices, including involving them in effective communication, structured listening, shared decision-making, self-management support and collaborative care planning (34,67). Furthermore, the Silver Book recommends that when initiating care for an older person, organising a case conference and including the family or carer can help establish a strong foundation for care (34).

Building workforce capabilities – training and upskilling

Meeting the health and care needs of an ageing population requires a workforce that has a comprehensive range of skills and capabilities to screen and intervene early to prevent avertable health conditions and to provide comprehensive care for chronic health conditions over time. However, much of the health workforce is trained with a focus on acute care and communicable diseases, rather than being equipped to support the long-term physical and mental changes that come with ageing. There is limited emphasis on shared decision making and patient-centred and integrated care to allow older people to take control over their own health and wellbeing (70). A national consultation led by the Australian Government's Aged Care Workforce Strategy Taskforce highlighted the need for both vocational education and training and higher education systems to produce a more flexible, skilled and responsive workforce which is capable of delivering coordinated care across various settings, including the community, residential aged care, and hospitals (71).

Development of a health workforce with the skills needed to meet the wide range of health needs can provide more effective, high-quality care, improve patient outcomes and increase efficiency, reducing the strain on healthcare services and optimising resources (72). Improving skills can be achieved through targeted investment and training interventions through accredited courses, competency-based learning and vocational and undergraduate education and training (8,73). The following examples of national and international interventions show how strengthening workforce competencies in areas like geriatrics, care coordination, frailty management and dementia support can lead to better outcomes and more integrated, person-centred care for ageing populations from diverse backgrounds.

Multidisciplinary team-based care

The Strengthening Medicare Taskforce Report in 2023 identified that a person-centred team care approach in general practice needs strengthened education and training programs to support multidisciplinary teams. The Taskforce also recommended that the Workforce Incentives Program be increased to support multidisciplinary teams in general practice and to empower team members to work to the full scope of their practice (74).

However, there is limited literature on education and training for multidisciplinary team-based care is and there is some evidence that existing education and training on interprofessional learning and training is inconsistent across disciplines with the benefit of the education provided during undergraduate training often lost in the complexities and demands of practice (75,76).

The potential for vocational level training and intra-practice training to better equip health professionals to work as multidisciplinary teams has been raised in a recent report by Australian authors (77). The report considers two questions on how approaches to team-based education can be tailored to different practice settings and what strategies are best for delivering interprofessional training in general practice. The authors drew on the considerations of a panel of 56 primary health care professionals (medical, nursing, allied health and workforce experts) based in Tasmania. The panel considered that best practice in interprofessional training for collaborative primary healthcare required a set of capabilities for interprofessional learning outcomes (what is needed) and a range of teaching and learning strategies (how to do it). Capabilities that needed focus through interprofessional training include applying principles of teamwork, communication and reflection. Approaches to interprofessional learning within general practice were identified as practice-based, small group learning programs; simulation-based interprofessional learning and interprofessional learning based on issues/problems/cases.

The COVID-19 pandemic impact on the population and the health care system, including the health workforce with restricted capacity for face to face learning, made the role of technology in health workforce training an urgent consideration. In a guest editorial in the Journal of Interprofessional Care, two academics in the UK proposed that 'dynamicist thinking' should be applied – that is, that learning should occur as a naturalistic, system-based activity over time and should occur within a functional team setting. The authors proposed this be considered a *clinical-training space, a distributed cognitive system,* which includes both in person and online learning spaces and encompasses team members comprising students and health workers; patients; educators and the institutions providing training

(78). This approach shifts the emphasis from the learning of individuals to the learning occurring within the whole – the clinical training space. The authors considered mobile health (mHealth) was leading this approach.

A scoping review to inform a study in the Netherlands on person-centred integrated care (PC-IC) in primary care, to improve the care of multimorbidity and social issues affecting the health of individual, identified core competencies considered in both academic and grey literature to be necessary for healthcare professionals working in collaborative teams in primary care settings (79,80). Four core competencies were identified: interprofessional education; interprofessional collaborative teamwork; leadership and patient-centred communication. The review determined that there is little evidence on the knowledge, skills and attitudes that are necessary for integrated care nor on how the competencies can be acquired (79).

Comprehensive geriatric care

Geriatrics training, both in formal medical education and ongoing professional development, is considered essential in preparing healthcare professionals to meet the diverse needs of older adults. The World Health Organisation has called for greater investment in high-quality undergraduate education in geriatric medicine as a key strategy to address these future needs (81). Despite this, there is a lack of evidence for the optimal delivery of training in this area (81).

In the US, Leipzig et al. developed a nationally recognised set of 26 Minimum Geriatrics Competencies for graduating medical students. These were endorsed by the Association of American Medical Colleges and developed through a consensus approach involving almost half of all US medical schools, along with key education bodies and clinicians (82). The competencies span eight key areas: medication management, self-care capacity, falls and mobility, cognitive and behavioural disorders, hospital care, atypical disease presentation, healthcare planning and promotion and palliative care (82). Similar to Leipzig, the Japanese core curriculum also has a detailed and comprehensive set of geriatric topics and competencies, including the requirement for newly qualified doctors to be trained in Comprehensive Geriatric Assessment (CGA) (82). The curriculum sets a clear, structured benchmark for what medical students and new doctors should know and be able to do in caring for older adults.

Given that primary care, family and internal medicine physicians deliver the majority of care to older adults, their understanding of geriatrics has a direct impact on the quality of care provided (83,84). To address existing gaps in training, targeted approaches have been designed, such as Project ECHO-Geriatrics, a US-based initiative where geriatric specialists used video conferencing to deliver mentoring, education, and clinical consultation to primary care providers in rural and regional areas (85). Evaluation of the program showed this model to be a feasible and effective way to boost confidence and competence in geriatrics, particularly in underserved primary care settings (85).

While geriatric-specific training is not mandated for all non-specialist health professionals in Australia, there are several competency-based programs that have been designed to build capacity among those working with older populations. One of these is the Gerontological Nursing Competencies (GNCs) program, an evidence-based mentorship initiative for registered nurses. This program is delivered through a mix of interactive virtual workshops and self-paced online learning, This program supports nurses to provide person-centred, evidence-informed care to older adults and their families (86). Another is the Victorian Geriatric Medicine Training Program (VGMTP), a long-standing collaboration led by the Australian and New Zealand Society for Geriatric Medicine, with funding from the Victorian

Department of Health. The program aligns with the geriatric medicine curriculum of the Royal Australasian College of Physicians and is designed to build specialist geriatric expertise while also providing free access education and training to other healthcare providers, such as junior doctors, nurses and physicians who care for older people (87).

Frailty management

Both the Royal Australian College of General Practitioners and the Australian and New Zealand Society for Geriatric Medicine have produced clinical guidelines on the causes and clinical management of frailty (34,88). However, there is a lack of relevant education and training for health professionals (88).

A European study examining the views of primary health care professionals found that a lack of education and training in geriatrics remains a major barrier to effective frailty management (89). In Australia, a large online survey of medical, nursing and allied health professionals assessed perceptions of knowledge of frailty and barriers to frailty assessment and management in practice. Most respondents (73%) worked in hospitals with respondents distributed across all states and territories. Less than half of respondents reported receiving any training in frailty while 14% had received specific training. Most respondents felt that identifying and providing clinical management of frailty was part of their role. However, barriers to doing so included lack of evidence about which frailty assessment to use and lack of a defined protocol for managing frailty. Respondents indicated a high interest in access to training. The authors of this study also concluded that implementation of evidence- based frailty-informed care into routine clinical practice would require attention to barriers such as competing priorities for health professionals, lack of time and lack of multidisciplinary teams to support frailty assessment and management (88).

A 2022 systematic review by Australian authors identified just nine frailty training programs in the published literature, with only one of these in Australia (90), highlighting a significant training gap (91). The frailty training programs varied in structure, length and mode of delivery, only a third of the programs were specifically focussed on frailty with the others including frailty in broader education about older people's healthcare. Programs included multidisciplinary participants and used flexible teaching approaches to provide clinically tailored training. Assessment of effectiveness was largely based on professional perceptions rather than measured improvement in patient outcomes. Most of the programs were well-received and showed improvement in practitioners' understanding of frailty and their confidence in assessing and managing it in clinical settings (91). Successful elements of these training initiatives included tailoring the content to specific roles or care settings, assessing participants' prior experience, blending theory with hands-on practice, challenging common misconceptions about frailty and providing access to ongoing resources such as handouts, online materials, mentoring or placements (91).

Dementia care

Dementia is currently the second leading cause of death in Australia, yet timely diagnosis in primary care remains a significant challenge. Despite the critical role early diagnosis plays in helping individuals and families access treatment, plan ahead and access support, around 60% of dementia cases go undiagnosed in primary practice settings (92). Evaluating and managing people living with dementia requires a skilled and adaptable workforce because care needs in this population can vary significantly (93). As cognitive decline progresses, people with dementia may struggle to express their needs or lose verbal communication altogether (94). This makes it essential for care workers to possess strong communication skills and the professional awareness needed to interpret subtle non-verbal cues and respond with empathy and flexibility (94).

To address the growing demand for dementia care, many Australian organisations have invested in structured educational programs aimed at improving the competencies of healthcare providers. Dementia Australia, Australia Dementia Network and Dementia Training Australia (DTA) offer a range of resources, including accredited training for aged care, community and health workers, as well as free online learning platforms and support tools (95–97). Education models have also been shown to enhance dementia diagnosis and care in general practice by improving GPs' and primary care nurses' understanding of dementia and confidence in its management (92).

The Royal Commission into Aged Care Quality and Safety was set up in 2018 to look into issues related to the quality of residential and in-home aged care (98). The Commission's final report had 148 wide-ranging recommendations, including mandatory dementia training for staff working in residential aged care and home care (98). These recommendations were a key driver behind the National Dementia Action Plan 2024–2034. The National Action Plan outlines a coordinated, whole-of-government approach to dementia care, including significant investment in workforce development. The 2024–25 Federal Budget provided $7.7 million to support dementia-specific training initiatives, focussed on building the capability of the workforce to deliver timely diagnosis, quality care and post-diagnostic support (99).

Advance care planning and palliative care

As the first and continuing point of contact with the health system, primary care is well placed to identify patients who may benefit from advanced care conversations in the early stages of life-limiting diseases and in older age and from palliative care in the latter stages of life-limiting diseases (100).

Advance care planning is encouraged by the Australian Government Department of Health, Disability and Ageing and supported by state and territory governments with specific provisions varying between each jurisdiction (101). The Advance Project, supported by the Australian Government and led by HammondCare, provides evidence-based resources and online training modules for GPs, nurses and support staff in general practice and primary care, along with residential and community aged care professionals. The Advance Project Toolkit for general practice supports implementation of a team-based approach to initiating advance care planning (ACP) and palliative care into everyday clinical practice (102). The RACGP states that advance care planning should be incorporated into routine general practice and encourages practitioners to access relevant state and territory information and resources (103). Some Primary Health Networks also provide Advance Care Planning Services and online tools.

Many primary care professionals are willing to provide palliative care, however, they often face barriers, including limited knowledge, lack of training and inadequate structural supports such as interoperable electronic medical records or financial incentives (100,104). Palliative care education programs, when paired with appropriate support, can significantly improve the capacity of primary care providers to meet the needs of adults with serious illnesses (104).

Internationally, the International Association for Hospice and Palliative Care (IAHPC) provides the Global Directory of Educational Programs in Palliative Care which gives access to a broad international range of academic education programs in palliative care. In Australia, these include a number of interdisciplinary graduate certificate and diploma programs for health professionals (105).

Palliative care education and training for primary care health professionals and primary care settings and for a broad range of health professionals and health care settings is provided as a national program in both the UK and Canada by non government organisations.

In the UK, the Gold Standards Framework (GSF) provides a range of professional and settings based training programs aimed at improving end of life care through organisational change, care collaboration and coordination and reduced hospitalisations (106). These programs include resources for identification of patients most likely to benefit from a palliative care approach, that is, those who are nearing the end of life through three main trajectories of illness for expected deaths – rapid predictable decline such as cancer; erratic decline such as organ failure; and gradual decline such as frailty and dementia. These resources guide professionals in advance care planning support and in establishing and maintaining palliative care within their practices, including maintaining/updating electronic medical records and patient registries (106). The GSF provides accreditation and re-accreditation for services that have participated in training programs and implemented quality end-of-life care practices within their settings. These programs in primary care have been provided since 2003 and a review of evaluations of the framework found that the program led to more patients identified on a palliative care registry, earlier access to palliative care, strengthened interprofessional coordination and increased family and caregiver satisfaction (107). The program emphasises the importance of knowledge translation and tailored application to local contexts and communities.

In Canada**,** *Pallium Canada* has led a national approach to palliative care education since 2000 (104). The organisation provides interprofessional education through Learning Essential Approaches to Palliative Care (LEAP) courses with a core course providing interprofessional education for health care professionals and a range of courses including palliative care in heart, lung and renal care, oncology, paediatric care, paramedic and emergency services, home care and long-term care. Other courses provide for carers and personal support workers (108). The core course is accredited with the College of Family Physicians of Canada and the Royal College of Physicians and Surgeons of Canada and other courses are accredited with relevant professional colleges (108). A study has shown LEAP has effectively improved practitioner competencies across multiple areas of palliative care (108). Between 2015 and 2019, over 1,600 LEAP (Learning Essential Approaches to Palliative Care) courses were delivered across the country, training nearly 30,000 health professionals from a range of disciplines (104,108). LEAP helps clinicians recognise when patients may benefit from a palliative approach, promotes early advance care planning and offers practical tools for managing common concerns like pain, delirium, nutrition and hydration (109). It also helps prepare patients and families for the final stages of life. Pilot studies in cancer and primary care show LEAP has effectively improved practitioner competencies across multiple areas of palliative care (104,110,111).

The Australian Government funds several palliative care education and quality improvement programs, including the Palliative Care Education and Training Collaborative, delivered by the Queensland University of Technology, which provides access to a range of national palliative care education projects and resources. Courses include palliative care teaching and learning resources for undergraduate education; end of life law for clinicians; the Program of Experience in the Palliative Approach (PEPA) and Indigenous PEPA and paediatric palliative care education (112). These programs are aimed at strengthening the skills and knowledge of health and aged care workers. Programs include webinars, online modules, in-person workshops and resources focused on advance care planning discussions and early palliative care screening and interventions (113).

One prominent palliative care education program in Australia is provided by the Advance Project, which aims to build the capacity of GPs and general practice nurses (GPNs) to screen for end-of-life care needs and initiate advance care planning conversations (114). The Advance project has been endorsed by the Australian Primary Health Care Nurses Association (APNA) (114). An evaluation study of the Advance Project showed that this learning course not only improved how practitioners identify and respond to palliative needs, but also strengthened collaboration between GPs and nurses (115).

The Program of Experience in the Palliative Approach (PEPA) delivers placements and workshops to upskill non-specialist health professionals. Around 90% of care providers who completed a PEPA placement reported feeling better equipped to care for adults with life-limiting illnesses following the program (114).

Voluntary Assisted Dying (VAD) training

VAD refers to the assistance provided by a healthcare practitioner to help a person with a terminal illness end their life either through self-administration of prescribed medication or administration by a practitioner (116). VAD is now legal in all Australian states, though specific legal requirements and procedures vary across jurisdictions (116). As a result, it is essential for healthcare providers to be familiar with the laws in their state or territory as well as the protocols of their workplace (117).

VAD training is mandatory for medical practitioners who wish to provide these services (118). Each state has its own legislation and offers approved online training that covers legal eligibility criteria, procedural safeguards, communication techniques, documentation and ethical considerations. Some states also permit nurse practitioners to participate directly in VAD, while other healthcare professionals such as nurses, pharmacists and allied health workers may undertake training to better understand their roles in supporting the VAD process (116).

Shared decision-making training

Shared decision-making is recognised as a key element of high-quality, patient-centred care. Given the strong relationships between GPs and patients and the broad range of health conditions managed in primary care, general practice is an ideal setting for shared decision-making to be established (119). However, shared decision making is not yet widely embedded in routine practice in primary care settings. A recent rapid evidence review suggests that training GPs in shared decision making can improve clinical practice and enhance patient adherence to treatment (120). For example, a 2016 Dutch trial tested an advance care planning program for people with dementia which included training in shared decision making for 38 GPs across multiple practices. The study found that the training increased the initiation of advance care planning discussions and broadened the scope of both medical and non-medical preferences during the consultations (121).

A 2018 systematic review (122) also examined shared decision making interventions across a range of healthcare professionals, including hospital doctors, specialists, GPs, nurses and patients. The review included 87 studies conducted in a number of European countries. Of these, 44 studies evaluated interventions for patients; 15 studies evaluated interventions specifically for healthcare providers and 28 studies evaluated interventions with both patients and healthcare professionals. Training in shared decision making was often delivered through a multidisciplinary approach and studies consistently reported positive outcomes after training interventions, such as improvements in the areas of patient involvement and counselling and advice, as well as the perceived usefulness of training programs and increased knowledge among clinicians (122). However, the authors concluded that the certainty of evidence to date was very low and did not determine whether any interventions to increase shared decision making by health professionals were effective.

Consumer and carer involvement in shared decision making training has been shown to be effective (124,125). Consumers and carers with lived experience can play a central role in helping health professionals better understand what matters most to patients, particularly when navigating complex, preference-sensitive decisions (124,125). Their participation in training, whether through storytelling, co-design or panel contributions can help strengthen clinicians' capability in providing patient-centred care (126).

Inclusive and culturally sensitive care

Older Australians represent a growing and increasingly diverse population. Among them, Aboriginal and Torres Strait Islander people aged 50 and over account for 1.5% of the total Australian population in this age group and make up 16% of the total Indigenous population (127). In addition, around one in five Australians aged 65 and over were born overseas and come from culturally and linguistically diverse (CALD) backgrounds. These population groups are particularly vulnerable to unconscious cultural bias and discrimination within healthcare settings (128). At the same time, age-related discrimination is also a major concern and a barrier to receiving care. Australians aged 55 to 64 are among the most likely to experience ageism with approximately one in three people aged 55–59 (32%) and three in ten aged 60–64 (31%) reporting instances of age-based discrimination (129).

Without appropriate training, healthcare professionals may unintentionally display ageist or culturally insensitive behaviours. These actions, often unconscious, can undermine trust, reduce treatment adherence and negatively affect the well-being and health outcomes of older adults (130–132). Supporting healthcare workers to recognise and respond to cultural and age-related needs is key to building safer, more respectful care environments. Clear processes and culturally responsive practices enable patients, families and communities to feel safe and engaged in their care (131). Experts also suggest that gerontological education can help reduce ageist attitudes among healthcare workers (133).

Embedding cultural safety into workforce training is essential to address the needs of Aboriginal and Torres Strait Islander people, culturally and linguistically diverse (CALD) communities and older adults with intersecting forms of disadvantage (131).

In Australia, cultural safety training is mandated for healthcare professionals in relation to Aboriginal and Torres Strait Islander health. The Australian Health Practitioner Regulation Agency (Ahpra) and National Boards require registered practitioners to complete consistent, career-long training in cultural awareness and interactive cultural safety education (134). This is to ensure care is delivered in a way that is respectful, inclusive and free from racism (134). There is no national requirement for training that specifically addresses ageism or the care of CALD populations across all healthcare settings. There are, however, some prominent training programs that aim to build cultural responsiveness in aged care. For example, *Culturally Responsive Practice with Older People in Health and Aged Care* is an online program developed by Flinders University, Resthaven Inc., and AnglicareSA, with funding from the state Department of Health. It equips aged care clinicians and practitioners with the knowledge and skills to deliver culturally responsive care to older people from migrant and refugee backgrounds (135). Similarly, the *eCALD* training modules, delivered online or in-person, aim to improve cross-cultural communication and awareness in health, mental health, and primary care settings by helping practitioners understand how cultural backgrounds influence patient interactions, diagnoses, and treatment (136).

Redressing the impact of ageism in healthcare is also receiving attention. The Australian Human Rights Commission reported in 2023 that participation in a short (2.5 hour), one-off interactive educational workshop was effective in reducing ageist attitudes among aged care and community workers (137). Results showed significant improvements in participants' attitudes and expectations about ageing, with many of these changes persisting 2–3 months later. This intervention underscores the value of short educational efforts in shifting perspectives and improving interactions with older adults (137).

Workforce retention and engagement strategies

Beyond the aim to achieve improved workforce distribution to enable equitable access to health care, building and maintaining a sustainable health workforce is critical to ensuring quality care for all Australians. While salary and other forms of compensation play a significant role in staff retention, non-financial factors such as job satisfaction, access to training and professional development, adequate resourcing, and supportive working conditions are equally important (73,138). The evidence on effective recruitment strategies is mixed; however, initiatives such as increasing support for undergraduate and postgraduate placements and actively recruiting medical and nursing students from underserved regions, show promise. Ultimately, even the most well-designed strategies will have limited impact without appropriate and sustained financial investment.

Improve funding models

The Review of General Practice Incentives consultation report (published in 2024) recommends rethinking funding flows within practices, particularly how GPs and other healthcare providers are paid and engaged (139). To improve retention, especially in high-demand and rural areas, funding models should move beyond the contractor approach and should offer stable income and leave entitlements to primary health care workers, helping to make general practice a more secure and attractive career. Supporting new ownership models in addition to private practice could also expand access where it is needed most (139). Importantly, payments for GPs and nurses need to be competitive to ensure their retention and positively impact their intention to stay (140). According to RACGP's Health of the Nation 2023 survey, 81% of GPs who received a salary in 2022 and 2023 reported moderate to high job satisfaction, compared to only 66% of GPs who are remunerated by proportion of billings (139).

Team-based, multidisciplinary care requires fit-for-purpose funding, to support a mix of GP- and nurse-led models of care, better integration of allied health professionals and pharmacists within general practice and enable all healthcare professionals within multidisciplinary team care to work to their full scope of practice (139,141). Current fee-for-service arrangements could be augmented. The RACGP recommends leveraging existing funding mechanisms, such as the Workforce Incentive Program and Practice Incentives Program, to strengthen team coordination, clinical supervision and ongoing evaluation (142).

Appropriate working environment for well-functioning staff

Job dissatisfaction in primary health care can stem from a range of factors, including limited opportunities for career progression, poor time and task management, workplace tensions, financial pressures and a general lack of engagement or passion for the role (143). Strategies shown to support the recruitment and retention of a well-functioning health workforce include offering flexible and reasonable working hours, fostering strong communication within teams and promoting peer support (144). Improving workplace structures, such as enabling greater professional autonomy and adjusting work hours as nurses and GPs near retirement, has also been effective in retaining health workers in several countries (144).

Digital technology to support workforce

Investment in digital technology plays a crucial role in improving workforce sustainability. Innovations such as telehealth, digital therapeutics and remote patient monitoring (RPM) accelerated during the COVID-19 pandemic and are now transforming the delivery of primary health care (145). Studies show that clinicians and administrators view RPM positively, particularly for its ability to expand access and reduce in-person visits (144). RPM systems enable healthcare providers to monitor patients remotely using digital devices and software, especially benefiting those in rural and remote areas (146).

Technology also contributes to reduced administrative burden, one of the leading causes of staff burnout. Over 60% of healthcare workers report excessive paperwork as a top stressor, with more than one-third citing long work hours (147). Automation tools such as robotic process automation (RPA) and AI can streamline repetitive tasks like documentation, data entry, and scheduling (147).

Clinical workflows and administrative burden could also be improved by incorporating all-in-one practice management software. A leading practice management software platforms used in Australian medical practices is *Best Practice (Bp) Premier* which was developed by a physician and specifically tailored to enhance the clinical, administrative and financial operations of both general practices and specialist clinics (148). Its key features include robust clinical management capabilities, such as comprehensive electronic medical records and integrated clinical decision support tools such as cardiovascular risk calculators and mental health assessment scales, which can facilitate early detection and timely patient care (149). Additionally, patient engagement tools, including *Bp Comms* and the *Best Health App,* promote effective communication by allowing patients to receive electronic prescriptions, health summaries, and appointment reminders, thereby fostering a more interactive healthcare experience (150,151). The software also supports customisable workflows, enabling practices to adapt clinical processes to meet local service delivery needs, and enhances communication through tools like *SmartForms*, which streamline referrals and clinical correspondence (152).

In addition to practice management systems, the literature identifies clinical decision support and population health management platforms as key enablers of a sustainable and data-informed primary care workforce. One example is Primary Sense, a PHN owned and developed, clinical decision support and population health platform developed for general practices and PHNs in Australia (153). Integrated with electronic medical records, it offers real-time alerts, data analytics, and automation to support medication safety, chronic disease management, and early intervention for at-risk patients (154,155). This platform also extracts de-identified data to enable proactive care planning, quality improvement and population health monitoring. It reduces the cognitive and administrative burden on clinicians by automating risk stratification, recalls and reporting aligned with practice accreditation and PHN reporting needs (154). Primary Sense also helps practices identify care gaps such as missed immunisations and aligns with broader health system planning while supporting personalised care. It is currently in use across Queensland, New South Wales and other jurisdictions with evaluations showing improved clinical decision-making and patient management (154,155).

By freeing staff to focus on more meaningful clinical work, technologies such as these boost job satisfaction, engage the workforce and help reduce turnover (147).

Barriers to effective workforce planning for healthy ageing

Despite multiple national and other strategies and evident policy intent, several enduring barriers continue to limit the effectiveness of workforce planning for healthy ageing in the Australian context. These barriers compromise care continuity, fragment services and reduce the capacity of the system to support older Australians across the life course.

Maldistribution of the health workforce

Australia continues to have a skewed distribution of the health workforce with ongoing shortages of general practitioners, nurses and allied health professionals in regional, rural, and outer metropolitan areas. Substantially lower numbers of general practitioners in rural and remote communities in Australia continue, despite current policy initiatives. More than 50% of people in outer regional, remote and very remote regions waited more than 24 hours for an urgent appointment with a GP over the period 2018 – 2024, with 44% of people living in major cities also experiencing more than a 24 hour wait (156,157).

Naccarella (2014) also points to a decline in generalist training pathways and a lack of incentives for clinicians to practice in community-based settings (158). The National Nursing Workforce Strategy (published in 2024) identified challenges in attracting and retaining nurses in rural and aged care roles, where continuity of care and trusted patient-provider relationships are essential (159). The 2022 Australian Primary Health Care Nurses Association (APNA) Workforce Survey highlighted a continuing shortfall of nurses in rural settings and that aged care nurses reported their skills remained underutilised (160).

These workforce gaps reduce access to preventive and coordinated care and limit the capacity of local health systems in these areas to support older adults living with chronic conditions or functional decline.

Short-term and fragmented funding models

The common provision of short-term, project-based funding undermines workforce retention and development. Many key primary care roles, including care coordination, chronic disease prevention and outreach care are funded through pilot programs or fixed-term grants. These models contribute to high turnover, limit the scale-up of practical initiative, and create uncertainty across the sector. The RACGP (as cited in Naccarella, 2014) (159) has called for predictable and integrated funding arrangements to support the sustainability of generalist care. The National Nursing Workforce Strategy echoes these concerns, stating that short funding cycles prevent long-term investment in models required to meet the health needs of older people (9).

Fragmented health and aged care

Fragmented planning remains a significant barrier to workforce effectiveness. Workforce strategies across general practice, hospital services, aged care and community-based supports are often developed in isolation. This separation contributes to duplicated roles, disconnected care pathways and challenges for older people navigating between health and aged care systems. The Royal

Commission into Aged Care Quality and Safety (2021) (161) identified a lack of integrated planning and coordination as a key driver of poor outcomes. The National Nursing Workforce Strategy and the RACGP recommend the adoption of shared workforce frameworks to align training, service delivery and system design (9,162).

Lack of workforce planning and outcome evaluation

One of the key challenges contributing to workforce shortages and maldistribution is the underutilisation of data in workforce planning. While health workforce data is routinely collected, it is not being effectively applied to guide resource allocation, strategic planning or the equitable distribution of healthcare services in line with the population's changing needs (163).

Effective data analysis involves collecting, processing and interpreting information to reveal patterns and trends that can inform decision-making. In the context of workforce planning, this means examining data on patient outcomes, staffing levels, workforce skills, turnover rates and projected future needs to make informed decisions about the health workforce of the future (164). Experts advocate for strategic workforce planning that is enhanced through AI, predictive models, decision support systems and evaluation tools to optimise healthcare staffing and distribution (165)

The Australian Medical Association, in its Workforce 2025–206 pre-budget submission, also called for the establishment and funding of an independent national health workforce planning agency. This agency would be responsible for consolidating, analysing, and applying workforce data to develop evidence-based policies and strategies. Reestablishment of an independent workforce planning agency would support a proactive and efficient response to evolving healthcare demands and help ensure all Australians have access to high-quality care (163). In a state-level effort, Victorian Government has developed a Knowledge Bank to support access to relevant workforce data. This interactive repository acts as a resource library about the health and human services workforce to assist stakeholders to better plan, understand and lead the development of strategic initiatives that support health and human services workforce development at all stages of careers (166).

The Australian Institute of Health and Welfare (167) identifies patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) as important indicators of health system performance, including workforce capacity. According to the AIHW framework, system effectiveness should be assessed not only through clinical outcomes but also by whether care is person-centred, coordinated and respectful of individual preferences. PROMs and PREMs can assess critical elements such as relational continuity, support for health literacy and participation in care planning, particularly relevant for older adults and their caregivers (167).

A recent scoping review on the implementation of PROMs and PREMs found that integrating these measures into routine care is associated with better communication between patients and clinicians, improved symptom management and more efficient service use, including decline in avoidable hospital admissions (168). However, this review also highlights implementation challenges such as system readiness, digital infrastructure and the need for workforce training to ensure consistent and meaningful use of these tools (168). Further literature suggests that PROMs and PREMs can inform workforce evaluation by providing insights into the effectiveness of team-based care, care coordination, and innovative primary care models (169,170). Nurse-led interventions and multidisciplinary teams have been particularly associated with improvements in PROM outcomes, including enhanced functional status, self-efficacy and health-related quality of life (170).

References

1. Australian Institute of Health and Welfare. Older Australians [Internet]. 2024. Available from: https://www.aihw.gov.au/getmedia/73a6a317-b508-4ecc-834a-cb0a54378b9d/older-australians.pdf?v=20240702075543&inline=true.
2. Australian Institute of Health and Welfare. Australia's health 2014 feature article - Ageing and the health system: challenges, opportunities and adaptation [Internet]. 2014 [cited 2025 Oct 5]. Available from: https://www.aihw.gov.au/getmedia/19dbc591-b1ef-4485-80ce-029ff66d6930/6_9-health-ageing.pdf.aspx
3. Pond CD, Regan C. Improving the delivery of primary care for older people. Med J Aust. 2019 Jul;211(2):60.
4. The Lancet Healthy Longevity. Primary care workers vital for healthy longevity. Lancet Healthy Longev. 2023 Aug 1;4(8):e357.
5. Fielding A, Moad D, Tapley A, Davey A, Holliday E, Ball J, et al. Prevalence and associations of rural practice location in early-career general practitioners in Australia: a cross-sectional analysis. BMJ Open. 2022 Apr 26;12(4):e058892.
6. Australian Institute of Health and Welfare. Health workforce [Internet]. 2024 [cited 2025 Jun 10]. Available from: https://www.aihw.gov.au/reports/workforce/health-workforce
7. Australian Government Department of Health and Aged Care. Unleashing the Potential of our Health Workforce – Scope of Practice Review [Internet]. 2025 [cited 2025 Jun 5]. Available from: https://www.health.gov.au/our-work/scope-of-practice-review
8. Australian Government Department of Health. National Medical Workforce Strategy 2021–2031. 2021 [cited 2025 Jun 19]; Available from: https://www.health.gov.au/sites/default/files/documents/2022/03/national-medical-workforce-strategy-2021-2031.pdf
9. Australian Government Department of Health, Disability and Ageing. National Nursing Workforce Strategy – Volume 1 Research Report [Internet][cited 2025 May 21]. Available from: https://www.health.gov.au/resources/publications/national-nursing-workforce-strategy-volume-1-research-report?language=en
10. Australian Government Department of Health, Disability and Ageing. Consultation: Draft National Allied Health Workforce Strategy [Internet]. 2025 [cited 2025 Jun 23]. Available from: https://consultations.health.gov.au/primary-care-mental-health-division/nahwsdraft/
11. Department of Health. Future focused primary health care: Australia's Primary Health Care 10 Year Plan 2022-2032 [Internet]. 2022. Available from: https://www.health.gov.au/resources/publications/australias-primary-health-care-10-year-plan-2022-2032?language=enhttps://www.health.gov.au/sites/default/files/documents/2022/03/australia-s-primary-health-care-10-year-plan-2022-2032.pdf
12. Australian Government Department of Health Disability and Ageing. Stronger Rural Health Strategy [Internet]. 2021 [cited 2025 Jun 23]. Available from: https://www.health.gov.au/topics/rural-health-workforce/stronger-rural-health-strategy
13. Australian Government Department of Health and Aged Care. Scoping Framework for the National Medical Workforce Strategy, 2019 [Internet]. 2019 [cited 2025 May 27]. Available from: https://www.health.gov.au/resources/publications/national-medical-workforce-strategy-scoping-framework
14. Albarqi MN. Assessing the Impact of Multidisciplinary Collaboration on Quality of Life in Older Patients Receiving Primary Care: Cross Sectional Study. Healthc Basel Switz. 2024 Jun 25;12(13):1258.
15. Australian Institute of Health and Welfare. Australian Institute of Health and Welfare. 2024 [cited 2025 Jun 19]. Health workforce. Available from: https://www.aihw.gov.au/reports/workforce/health-workforce
16. Australian Government Department of Health and Aged Care. Australia's Primary Health Care 10 Year Plan 2022–2032 [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2025 Jun 19]. Available from: https://www.health.gov.au/resources/publications/australias-primary-health-care-10-year-plan-2022-2032?language=en
17. Fedele R. Nurse-led clinics are a valuable service that should be promoted, finds study - ANMJ [Internet]. 2024 [cited 2025 May 28]. Available from: https://anmj.org.au/advanced-practice-nurses-need-more-support-to-run-nurse-led-clinics/
18. Terry D, Hills D, Bradley C, Govan L. Nurse-led clinics in primary health care: A scoping review of contemporary definitions, implementation enablers and barriers and their health impact. J Clin Nurs. 2024 May;33(5):1724–38.
19. The Australian Primary Health Care Nurses Association (APNA). APNA welcomes nurse-led Medicare Urgent Care Clinics [Internet]. 2023 [cited 2025 Jul 15]. Available from:

https://www.apna.asn.au/about/media/archive-media-releases/apna-welcomes-nurse-led-medicare-urgent-care-clinics

20. Millard J. Nurse clinics: Optimising community access to primary health care [Internet]. 2022 [cited 2025 May 28]. Available from: https://www.apna.asn.au/hub/primary-times-articles/primary-times--summer-2022-23/nurse-clinics--optimising-community-access-to-primary-health-care
21. Beks H, Walsh S, Alston L, Jones M, Smith T, Maybery D, et al. Approaches Used to Describe, Measure, and Analyze Place of Practice in Dentistry, Medical, Nursing, and Allied Health Rural Graduate Workforce Research in Australia: A Systematic Scoping Review. Int J Environ Res Public Health. 2022 Jan 27;19(3):1438.
22. Australian Medical Association. Australian Medical Association. 2025 [cited 2025 May 28]. Nurse-led clinics not adequately funded. Available from: https://www.ama.com.au/qld/news/nurseledclinics
23. Poghosyan LB Jessica M; Hovsepian, Vaneh; Pollifrone, Madeline; Schlak, Amelia E; Sadak, Tatiana. The Growing Primary Care Nurse Practitioner Workforce: A Solution for the Aging Population Living With Dementia. Am J Geriatr Psychiatry Off J Am Assoc Geriatr Psychiatry. 2021;29(6):517–26.
24. Australian Government Department of Health Disability and Ageing. Rural Health Multidisciplinary Training (RHMT) program [Internet]. Australian Government Department of Health, Disability and Ageing; 2025 [cited 2025 Jun 23]. Available from: https://www.health.gov.au/our-work/rhmt
25. Walker L, Isaac V, Walters L, Craig J. Flinders University rural medical school student program outcomes. Aust J Gen Pract. 2021 May 1;50(5):319–21.
26. Walsh SM, Versace VL, Thompson SC, Browne LJ, Knight S, Lyle DM, et al. Supporting nursing and allied health student placements in rural and remote Australia: a narrative review of publications by university departments of rural health. Med J Aust [Internet]. 2023 Aug 7 [cited 2025 Jun 23];219(S3). Available from: https://onlinelibrary.wiley.com/doi/10.5694/mja2.52032
27. Playford D, Moran M, Thompson S. Factors associated with rural work for nursing and allied health graduates 15–17 years after an undergraduate rural placement through the University Department of Rural Health program. Rural Remote Health [Internet]. 2020 Jan 31 [cited 2025 Jun 23]; Available from: https://www.rrh.org.au/journal/article/5334
28. RACGP. The Royal Australian College of General Practitioners. 2025 [cited 2025 May 29]. Training location obligations. Available from: https://www.racgp.org.au/education/gp-training/explore-a-gp-career/training-location-obligations
29. Tran, Fielding, Moad, Tapley, Holliday, Ball, et al. Factors associated with early-career GPs' retention as independent specialists in former training practices. Rural Remote Health [Internet]. 2024 Sep 11 [cited 2025 Jun 10]; Available from: https://www.rrh.org.au/journal/article/8808
30. Wisbey M. NewsGP. 2024 [cited 2025 May 29]. Connection key to retaining rural GPs: Study. Available from: https://www1.racgp.org.au/newsgp/professional/connection-key-to-retaining-rural-gps-study
31. Poulton BC, West MA. Effective multidisciplinary teamwork in primary health care. J Adv Nurs. 1993 Jun;18(6):918–25.
32. Eastwood J, Maitland-Scott I. Patient Privacy and Integrated Care: The Multidisciplinary Health Care Team. Int J Integr Care. 2020 Nov 19;20(4):13.
33. Kozlowska O, Lumb A, Tan GD, Rea R. Barriers and facilitators to integrating primary and specialist healthcare in the United Kingdom: a narrative literature review. Future Healthc J. 2018 Feb;5(1):64–80.
34. RACGP aged care clinical guide (Silver Book) - Part A - Common clinical conditions in aged care | Aged Care Quality and Safety Commission [Internet]. [cited 2025 Jun 2]. Available from: https://www.agedcarequality.gov.au/quality-standards/racgp-aged-care-clinical-guide-silver-book-part-common-clinical-conditions-aged-care
35. Angeles MR, Crosland P, Hensher M. Challenges for Medicare and universal health care in Australia since 2000. Med J Aust. 2023 Apr 17;218(7):322–9.
36. Duckett S, Stobart A, Swerissen H. The next steps for aged care: forging a clear path after the Royal Commission. Carlton, VIC: Grattan Institute; 2021. 1 p. (Grattan Institute report).
37. WA Primary Health Alliance. Commissioning multidisciplinary teams into general practice [Internet]. 2025 [cited 2025 May 29]. Available from: https://www.wapha.org.au/multidisciplinary-teams-into-general-practice/
38. Department of Health and Aged Care. Strengthening Medicare Taskforce Report. Encouraging multidisciplinary team-based care [Internet]. 2022. Available from: https://www.health.gov.au/our-work/strengthening-medicare-measures/encouraging-multidisciplinary-team-based-care
39. Heckman GA, Gimbel S, Mensink C, Kroetsch B, Jones A, Nasim A, et al. The Integrated Care Team: A primary care based-approach to support older adults with complex health needs. Healthc Manage Forum. 2024 Oct 22;08404704241293051.

40. Buhr G, Dixon C, Dillard J, Nickolopoulos E, Bowlby L, Canupp H, et al. Geriatric Resource Teams: Equipping Primary Care Practices to Meet the Complex Care Needs of Older Adults. Geriatr Basel Switz. 2019 Oct 21;4(4):59.
41. De Coninck L, Bekkering GE, Bouckaert L, Declercq A, Graff MJL, Aertgeerts B. Home- and Community-Based Occupational Therapy Improves Functioning in Frail Older People: A Systematic Review. J Am Geriatr Soc. 2017 Aug;65(8):1863–9.
42. Department of Health and Aged Care. Item 145 | Medicare Benefits Schedule [Internet]. [cited 2025 Jul 2]. Available from: https://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=145&qt=item
43. Lai SH, Tsoi T, Tang CT, Hui RJY, Tan KK, Yeo YWS, et al. An integrated, collaborative healthcare model for the early diagnosis and management of dementia: Preliminary audit results from the first transdisciplinary service integrating family medicine and geriatric psychiatry services to the heart of patients' homes. BMC Psychiatry. 2019 Dec;19(1):61.
44. Christley J, Cuenca J, Davis KJ, Evry N, Hartwell T, Shepherd K. Evaluation of the geriatrician in the practice model of care for dementia assessment and management in rural Australia. Aust J Rural Health. 2022 Feb;30(1):55–64.
45. Inzitari M, Pérez LM, Enfedaque MB, Soto L, Díaz F, Gual N, et al. Integrated primary and geriatric care for frail older adults in the community: Implementation of a complex intervention into real life. Eur J Intern Med. 2018 Oct;56:57–63.
46. Lee L, Hillier LM, Stolee P, Heckman G, Gagnon M, McAiney CA, et al. Enhancing Dementia Care: A Primary Care–Based Memory Clinic. J Am Geriatr Soc. 2010 Nov;58(11):2197–204.
47. Decade of Healthy Ageing. Integrated Primary and Geriatric Care with a longitudinal approach for healthy aging [Internet]. 2023 [cited 2025 Jul 21]. Available from: https://www.decadeofhealthyageing.org/find-knowledge/innovation/reports-from-the-field/integrated-primary-and-geriatric-care-with-a-longitudinal-approach-for-healthy-aging
48. Ferrara MC, Pérez LM, Sole AR, Villa-García L, Ars J, Soto-Bagaria L, et al. Sustained improvement of intrinsic capacity in community-dwelling older adults: The +AGIL Barcelona multidomain program. J Intern Med. 2023 Dec;294(6):730–42.
49. Philip K. Allied health: untapped potential in the Australian health system. Aust Health Rev. 2015;39(3):244.
50. Rosenberg K. Multidisciplinary Clinic Associated with Improved Outcomes in Patients with COPD. AJN Am J Nurs. 2024 Oct;124(10):61–61.
51. Cameron ID, Fairhall N, Langron C, Lockwood K, Monaghan N, Aggar C, et al. A multifactorial interdisciplinary intervention reduces frailty in older people: randomized trial. BMC Med. 2013 Dec;11(1):65.
52. Australian Physiotherapy Association. Primary care reform: the multidisciplinary approach [Internet]. 2025 [cited 2025 Jun 23]. Available from: https://australian.physio/inmotion/primary-care-reform-multidisciplinary-approach
53. Patel R, Gallagher JE. Healthy ageing and oral health: priority, policy and public health. BDJ Open. 2024 Oct 9;10(1):79.
54. Hajek A, Kretzler B, König HH. Oral Health, Loneliness and Social Isolation. A Systematic Review and Meta-Analysis. J Nutr Health Aging. 2022;26(7):675–80.
55. Natarajan P, Madanian S, Marshall S. Investigating the link between oral health conditions and systemic diseases: A cross-sectional analysis. Sci Rep. 2025 Mar 26;15(1):10476.
56. Emami E, Harnagea H, Girard F, Charbonneau A, Voyer R, Bedos CP, et al. Integration of oral health into primary care: a scoping review protocol. BMJ Open. 2016 Oct;6(10):e013807.
57. Christian B, George A, Veginadu P, Villarosa A, Makino Y, Kim WJ, et al. Strategies to integrate oral health into primary care: a systematic review. BMJ Open. 2023 Jul;13(7):e070622.
58. Kiely B, Connolly D, Clyne B, Boland F, O'Donnell P, Shea EO, et al. Primary care-based link workers providing social prescribing to improve health and social care outcomes for people with multimorbidity in socially deprived areas (the LinkMM trial): Pilot study for a pragmatic randomised controlled trial. J Multimorb Comorbidity. 2021;11:26335565211017781.
59. Baker JR, Bissett M, Freak-Poli R, Dingle GA, Zurynski Y, Astell-Burt T, et al. Australian link worker social prescribing programs: An integrative review. Ager ME, editor. PLOS ONE. 2024 Nov 11;19(11):e0309783.
60. Oxford Social Prescribing Research Network. Connecting, linking or navigating patients to social prescribing services? Clarifying terminology to support improved implementation [Internet]. 2020 [cited 2025 Jun 5]. Available from: https://socialprescribing.phc.ox.ac.uk/news-views/views/connecting-linking-or-navigating-patients-to-social-prescribing-services-clarifying-terminology-to-support-improved-implementation

61. Skivington K, Smith M, Chng NR, Mackenzie M, Wyke S, Mercer SW. Delivering a primary care-based social prescribing initiative: a qualitative study of the benefits and challenges. Br J Gen Pract J R Coll Gen Pract. 2018 Jul;68(672):e487–94.
62. The Health and Social Care Alliance Scotland, We Are With You. Glasgow City HSCP Community Link Worker Programme. 2021.
63. Sharman LS, McNamara N, Hayes S, Dingle GA. Social prescribing link workers—A qualitative Australian perspective. Health Soc Care Community. 2022;30(6):e6376–85.
64. Victorian Government, Department of Health. Local Connections – a social prescribing initiative [Internet]. State Government of Victoria, Australia; 2025 [cited 2025 Jun 5]. Available from: https://www.health.vic.gov.au/mental-health-wellbeing-reform/local-connections-social-prescribing-initiative
65. Australian Government, Department of Health, Diability and Ageing. Budget 2022-2023 [Internet]. 2022 [cited 2025 Jul 21]. Available from: https://www.health.gov.au/sites/default/files/documents/2022/04/budget-2022-23-stakeholder-pack_0.pdf
66. The National Association of Aboriginal and Torres Strait Islander Health Workers and Practitioners (NAATSIHWP). Aboriginal and/or Torres Strait Islander Health Workers and Health Practitioners in Primary Health Care: Guide for General Practice [Internet]. 2025. Available from: https://www.naatsihwp.org.au/storage/naatsihwp-guide-for-general-practice-2025_v2.pdf
67. Australian Commission on Safety and Quality in Health Care. Partnering with patients in their own care [Internet]. 2025 [cited 2025 Jul 15]. Available from: https://www.safetyandquality.gov.au/standards/nsqhs-standards/partnering-consumers-standard/partnering-patients-their-own-care
68. Victorian Government Department of Health. Working together with families and carers [Internet]. State Government of Victoria, Australia; 2023 [cited 2025 Jul 15]. Available from: https://www.health.vic.gov.au/chief-psychiatrist/working-together-with-families-and-carers
69. Hickmann E, Richter P, Schlieter H. All together now – patient engagement, patient empowerment, and associated terms in personal healthcare. BMC Health Serv Res. 2022 Sep 2;22(1):1116.
70. World Health Organization, Health Care Team. Health workforce for ageing populations [Internet]. [cited 2025 May 15]. Available from: https://cdn.who.int/media/docs/default-source/mca-documents/ageing/health-workforce-ageing-populations.pdf?sfvrsn=da6b8877_1
71. Poulos CJP Roslyn G. A function-focused approach in primary care for older people with functional decline: Making the most of reablement and restorative care. Aust J Gen Pract. 2019;48(7):434–9.
72. Department of Health. WA Health Workforce Strategy | 2034 [Internet]. 2024. Available from: https://www.health.wa.gov.au/~/media/Corp/Documents/Reports-and-publications/workforce-strategy-2034/workforce-strategy-2034.pdf
73. Shiri R, El-Metwally A, Sallinen M, Pöyry M, Härmä M, Toppinen-Tanner S. The Role of Continuing Professional Training or Development in Maintaining Current Employment: A Systematic Review. Healthcare. 2023 Nov 3;11(21):2900.
74. Australian Government Department of Health and Aged Care. Strengthening Medicare Taskforce Report [Internet]. Australian Government Department of Health and Aged Care; 2023 [cited 2025 Jun 5]. Available from: https://www.health.gov.au/resources/publications/strengthening-medicare-taskforce-report?language=en
75. Collin V, Meiring S, Noden S, Barber S, Hayhoe BWJ. Training health and social care professionals in multidisciplinary team working: a document analysis of undergraduate educational requirements. J Interprof Care. 2025 May 4;39(3):448–58.
76. Rawlinson C, Carron T, Cohidon C, Arditi C, Hong QN, Pluye P, et al. An Overview of Reviews on Interprofessional Collaboration in Primary Care: Barriers and Facilitators. Int J Integr Care. 2021 Jun 22;21(2):32.
77. Bentley M, Kerr R. Multidisciplinary team-based primary care: questions for general practice training. Health Educ Pract J Res Prof Learn [Internet]. 2024 Sep 25 [cited 2025 Jun 23];7(1). Available from: https://openjournals.library.sydney.edu.au/HEP/article/view/18524
78. Winters N, Patel KD. Can a reconceptualization of online training be part of the solution to addressing the COVID-19 pandemic? J Interprof Care. 2021 Mar 4;35(2):161–3.
79. Michielsen L, Bischoff EWMA, Schermer T, Laurant M. Primary healthcare competencies needed in the management of person-centred integrated care for chronic illness and multimorbidity: Results of a scoping review. BMC Prim Care. 2023 Apr 12;24(1):98.

80. Raaijmakers LHA, Schermer TR, Wijnen M, Van Bommel HE, Michielsen L, Boone F, et al. Development of a Person-Centred Integrated Care Approach for Chronic Disease Management in Dutch Primary Care: A Mixed-Method Study. Int J Environ Res Public Health. 2023 Feb 21;20(5):3824.
81. Pearson GME, Welsh T, Pocock LV, Ben-Shlomo Y, Henderson EJ. Transforming undergraduate education in geriatric medicine: an innovative curriculum at Bristol Medical School. Eur Geriatr Med. 2022 Sep 7;13(6):1487–91.
82. Masud T, Ogliari G, Lunt E, Blundell A, Gordon AL, Roller-Wirnsberger R, et al. A scoping review of the changing landscape of geriatric medicine in undergraduate medical education: curricula, topics and teaching methods. Eur Geriatr Med. 2022 Jun;13(3):513–28.
83. Gotanda H, Zhang JJ, Reuben DB, Walling AM, Xu H, Jena AB, et al. Association between physicians' geriatric training and patterns of end-of-life care delivered to persons with dementia. J Am Geriatr Soc. 2023 Nov;71(11):3457–66.
84. Rentsch S, Vitale CA, Zietlow K. Prioritizing geriatrics in medical education improves care for all. Med Educ Online. 2022 Dec 31;27(1):2105549.
85. Bennett KA, Ong T, Verrall AM, Vitiello MV, Marcum ZA, Phelan EA. Project ECHO-Geriatrics: Training Future Primary Care Providers to Meet the Needs of Older Adults. J Grad Med Educ. 2018 Jun;10(3):311–5.
86. Aged Dementia Health Education and Research. Gerontological Nursing Competencies (GNCs) [Internet]. [cited 2025 May 20]. Available from: https://www.adhere.org.au/gerontological-nursing-competencies
87. VGMTP. Welcome to the Victorian Geriatric Medicine Training Program [Internet]. [cited 2025 May 20]. Available from: https://www.vgmtp.org/
88. Shafiee Hanjani L, Fox S, Hubbard RE, Gordon E, Reid N, Hilmer SN, et al. Frailty knowledge, training and barriers to frailty management: A national cross-sectional survey of health professionals in Australia. Australas J Ageing. 2024 Jun;43(2):271–80.
89. Avgerinou C, Kotsani M, Gavana M, Andreou M, Papageorgiou DI, Roka V, et al. Perceptions, attitudes and training needs of primary healthcare professionals in identifying and managing frailty: a qualitative study. Eur Geriatr Med. 2021 Apr;12(2):321–32.
90. Arakawa Martins B, Jadczak AD, Dollard J, Barrie H, Mahajan N, Tam KL, et al. Fifth-year medical students' perceptions of the importance of frailty and competence in assessing, diagnosing and managing frailty before and after a geriatric medicine course. Australas J Ageing [Internet]. 2020 Sep [cited 2025 May 20];39(3). Available from: https://onlinelibrary.wiley.com/doi/10.1111/ajag.12788
91. Warren N, Gordon E, Pearson E, Siskind D, Hilmer SN, Etherton-Beer C, et al. A systematic review of frailty education programs for health care professionals. Australas J Ageing. 2022 Dec;41(4):e310–9.
92. Schütze H, Shell A, Brodaty H. Development, implementation and evaluation of Australia's first national continuing medical education program for the timely diagnosis and management of dementia in general practice. BMC Med Educ. 2018 Dec;18(1):194.
93. Rasmussen BM, Andersen PT, Waldorff FB, Berg-Beckhoff G. Effectiveness of dementia education for professional care staff and factors influencing staff-related outcomes: An overview of systematic reviews. Int J Nurs Stud. 2023 Jun;142:104469.
94. Krøier JK, McDermott O, Ridder HM. Conceptualizing attunement in dementia care: a meta-ethnographic review. Arts Health. 2022 Jan 2;14(1):32–48.
95. Dementia Australia. Dementia information and education sessions | [Internet]. [cited 2025 May 20]. Available from: https://www.dementia.org.au/get-support/dementia-information-and-education-sessions
96. Dementia Training Australia (DTA),. Free online courses and resources [Internet]. [cited 2025 May 20]. Available from: https://dta.com.au/
97. Australian Dementia Network (ADNeT). Australian Dementia Network (ADNeT). [cited 2025 May 20]. Home Page. Available from: https://www.australiandementianetwork.org.au/
98. Australian Institute of Healh and Welfare. Australian Institute of Health and Welfare. 2024 [cited 2025 May 20]. Dementia in Australia, National policy response to dementia. Available from: https://www.aihw.gov.au/reports/dementia/dementia-in-aus/contents/national-policy-response-to-dementia
99. Australian Government Department of Health and Aged Care. National action plan on dementia released [Internet]. Australian Government Department of Health and Aged Care; 2024 [cited 2025 May 20]. Available from: https://www.health.gov.au/ministers/the-hon-mark-butler-mp/media/national-action-plan-on-dementia-released
100. Matthew M, Bainbridge D, Bishop V, Sinding C, Winemaker S, Kilbertus F, et al. Implementing palliative care education into primary care practice: a qualitative case study of the CAPACITI pilot program. BMC Palliat Care. 2023 Sep 28;22(1):143.

101. Advance Care Planning Australia. Australian Capital Territory: create your plan [Internet]. 2025 [cited 2025 Jun 24]. Available from: https://www.advancecareplanning.org.au/create-your-plan/create-your-plan-act
102. The Advance Project. General Practice Training and Resources [Internet]. 2024 [cited 2025 Jun 24]. Available from: https://www.theadvanceproject.com.au/About/The-Advance-Project-General-Practice
103. RACGP. Advance care planning [Internet]. 2025 [cited 2025 Jun 24]. Available from: https://www.racgp.org.au/running-a-practice/practice-resources/practice-tools/advance-care-planning
104. Seow H, Bainbridge D, Winemaker S, Stajduhar K, Pond G, Kortes-Miller K, et al. Increasing palliative care capacity in primary care: study protocol of a cluster randomized controlled trial of the CAPACITI training program. BMC Palliat Care. 2023 Jan 5;22(1):2.
105. IAHPC. Global Directory of Educational Programs - [Internet]. 2025 [cited 2025 Jun 24]. Available from: https://iahpc.org/resources/catalogue/global-directory-of-educational-programs/
106. Gold Standard Framework. Training Programmes [Internet]. [cited 2025 Jun 24]. Available from: https://www.goldstandardsframework.org.uk/training-programmes
107. Shaw J, Nizzer S, McKay S. Technology, Aging and Home and Community Care: Picking the Right Problems to Solve. Healthc Pap. 2024 Jul;22(2):25–30.
108. Pereira J, Meadows L, Kljujic D, Strudsholm T, Parsons H, Riordan B, et al. Learner Experiences Matter in Interprofessional Palliative Care Education: A Mixed Methods Study. J Pain Symptom Manage. 2022 May;63(5):698–710.
109. Pallium Canada. LEAP Core | Award-winning palliative care course [Internet]. Pallium Canada. 2025 [cited 2025 May 20]. Available from: https://www.pallium.ca/course/leap-core/
110. Evans JM, Mackinnon M, Pereira J, Earle CC, Gagnon B, Arthurs E, et al. Integrating early palliative care into routine practice for patients with cancer: A mixed methods evaluation of the INTEGRATE Project. Psychooncology. 2019 Jun;28(6):1261–8.
111. Evans JM, Mackinnon M, Pereira J, Earle CC, Gagnon B, Arthurs E, et al. Building capacity for palliative care delivery in primary care settings: Mixed-methods evaluation of the INTEGRATE Project. Can Fam Physician. 2021 Apr;67(4):270–8.
112. The Palliative Care Education and Training Collaborative. Palliative Care Education Collaborative [Internet]. Available from: https://palliativecareeducation.com.au/
113. Care Search. National Palliative Care Project initiatives - Health Professional Options - Health Practitioner Education - Health Professionals [Internet]. 2024 [cited 2025 May 20]. Available from: https://www.caresearch.com.au/Health-Professionals/Health-Practitioner-Education/Health-Professional-Options/National-Palliative-Care-Project-initiatives
114. Urbis. EVALUATION OF THE NATIONAL PALLIATIVE CARE PROJECTS [Internet]. 2019 [cited 2025 May 20]. Available from: chrome-extension://bdfcnmeidppjeaggnmidamkiddifkdib/viewer.html?file=https://www.health.gov.au/sites/default/files/documents/2020/03/evaluation-of-the-national-palliative-care-projects-final-report.pdf
115. Vilapakkam Nagarajan S, Lewis V, Halcomb EJ, Rhee J, Tieman J, Clayton JM. Australian general practice experiences of implementing a structured approach to initiating advance care planning and palliative care: a qualitative study. BMJ Open. 2022 Mar;12(3):e057184.
116. End of Life Directions for Aged Care. End of Life Law - Voluntary Assisted Dying - Overview [Internet]. 2024 [cited 2025 Jul 16]. Available from: https://www.eldac.com.au/Our-Toolkits/End-of-Life-Law/Voluntary-Assisted-Dying/Overview
117. Phelan C. End-of-Life Essentials. 2024 [cited 2025 Jul 16]. Why Voluntary Assisted Dying Training is Essential for Hospital Staff. Available from: https://www.endoflifeessentials.com.au/News-and-Resources/Blog/ArtMID/21544/ArticleID/5395/Why-Voluntary-Assisted-Dying-Training-is-Essential-for-Hospital-Staff
118. Victorian Government Department of Health A. Voluntary assisted dying training for medical practitioners [Internet]. 2024 [cited 2025 Jul 16]. Available from: https://www.health.vic.gov.au/voluntary-assisted-dying/training-for-medical-practitioners
119. Jaeken J, Billiouw C, Mertens L, Van Bostraeten P, Bekkering G, Vermandere M, et al. A systematic review of shared decision making training programs for general practitioners. BMC Med Educ. 2024 May 29;24(1):592.
120. Nyamapfene T, Merchant H. Shared decision-making training in general practice: a rapid review. Future Healthc J. 2023 Jul;10(2):147–53.
121. Tilburgs B, Koopmans R, Vernooij-Dassen M, Adang E, Schers H, Teerenstra S, et al. Educating Dutch General Practitioners in Dementia Advance Care Planning: A Cluster Randomized Controlled Trial. J Am Med Dir Assoc. 2020 Jun;21(6):837-842.e4.

122. Légaré F, Adekpedjou R, Stacey D, Turcotte S, Kryworuchko J, Graham ID, et al. Interventions for increasing the use of shared decision making by healthcare professionals. Cochrane Effective Practice and Organisation of Care Group, editor. Cochrane Database Syst Rev [Internet]. 2018 Jul 19 [cited 2025 Jun 10];2018(7). Available from: http://doi.wiley.com/10.1002/14651858.CD006732.pub4
123. Yap G, Joseph C, Melder A. Shared decision making training programs for doctors: A Rapid Review. [Internet]. 2019 [cited 2025 Jun 6]. Available from: https://monashhealth.org/wp-content/uploads/2019/06/SDM-Rapid-Review-Final-010319.pdf
124. Repper J, Breeze J. User and carer involvement in the training and education of health professionals: A review of the literature. Int J Nurs Stud. 2007 Mar;44(3):511–9.
125. Clerke T, Margetts J, Donovan H, Shepherd HL, Makris A, Canty A, et al. Piloting a shared decision-making clinician training intervention in maternity care in Australia: A mixed methods study. Midwifery. 2023 Nov;126:103828.
126. Australian Commission on Safety and Quality in Health Care. Standard 2: Partnering with Consumers [Internet]. 2025. Available from: https://www.safetyandquality.gov.au/sites/default/files/migrated/Standard-2-Tip-Sheet-3-Training-for-partnerships-with-consumers.pdf
127. Australian Institute of Health and Welfare. Older Australians, Older Aboriginal and Torres Strait Islander people [Internet]. 2024 [cited 2025 May 21]. Available from: https://www.aihw.gov.au/reports/older-people/older-australians/contents/population-groups-of-interest/indigenous-australians
128. Khatri RB, Assefa Y. Access to health services among culturally and linguistically diverse populations in the Australian universal health care system: issues and challenges. BMC Public Health. 2022;22(1).
129. Australian Institute of Health and Welfare. Older Australians, Justice and safety - Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 May 21]. Available from: https://www.aihw.gov.au/reports/older-people/older-australians/contents/justice-and-safety
130. World Health Organization. Ageism is a global challenge: UN [Internet]. 2021 [cited 2025 May 21]. Available from: https://www.who.int/news/item/18-03-2021-ageism-is-a-global-challenge-un
131. Australian Commission on Safety and Quality in Health Care. Action 1.21: Improving cultural competency | [Internet]. 2025 [cited 2025 May 20]. Available from: https://www.safetyandquality.gov.au/standards/national-safety-and-quality-health-service-nsqhs-standards/resources-nsqhs-standards/user-guide-aboriginal-and-torres-strait-islander-health/action-121-improving-cultural-competency
132. Peprah P, Lloyd J, Ajang DA, Harris MF. A qualitative study of negative sociocultural experiences of accessing primary health care services among Africans from refugee backgrounds in Australia: implications for organisational health literacy. BMC Prim Care. 2024 Sep 4;25(1):327.
133. Fernández-Puerta L, Caballero-Bonafé A, de-Moya-Romero JR, Martínez-Sabater A, Valera-Lloris R. Ageism and Associated Factors in Healthcare Workers: A Systematic Review. Nurs Rep. 2024 Dec 16;14(4):4039–59.
134. Ahpra. Australian Health Practitioner Regulation Agency - Cultural Safety Accreditation and Continuing Professional Development Upskilling Project [Internet]. 2024 [cited 2025 May 20]. Available from: https://www.ahpra.gov.au/About-Ahpra/Aboriginal-and-Torres-Strait-Islander-Health-Strategy/CS-ACPD-Project.aspx
135. Center for Cultural Diversity in Ageing. Training programs from across the sector [Internet]. 2025 [cited 2025 May 21]. Available from: https://www.culturaldiversity.com.au/training-webinars/training-programs-from-across-the-sector
136. eCALD. Culture and Cultural Competency [Internet]. [cited 2025 May 21]. Available from: https://www.ecald.com/programmes/general-health-workforce/cald-1-culture-and-cultural-competency
137. Australian Human Rights Commission. Changing perspectives: testing an ageism intervention (2023) [Internet]. 2023 [cited 2025 May 21]. Available from: https://humanrights.gov.au/changingperspectives
138. Karaferis D, Aletras V, Niakas D. Job satisfaction of primary healthcare professionals: a cross-sectional survey in Greece. Acta Bio-Medica Atenei Parm. 2023 Jun 14;94(3):e2023077.
139. Expert Advisory Panel (the panel). Review of General Practice Incentives: Consultation Report [Internet]. 2024 [cited 2025 Jun 6]. Available from: https://www.health.gov.au/resources/publications/review-of-general-practice-incentives-expert-advisory-panel-report-to-the-australian-government?language=en
140. de Vries N, Boone A, Godderis L, Bouman J, Szemik S, Matranga D, et al. The Race to Retain Healthcare Workers: A Systematic Review on Factors that Impact Retention of Nurses and Physicians in Hospitals. Inq J Med Care Organ Provis Financ. 2023;60:469580231159318.

141. Australian Primary Health Care Nurses Association. Sharing the care - Multidisciplinary team-based models [Internet]. 2023 [cited 2025 Jun 6]. Available from: https://www.apna.asn.au/hub/primary-times-articles/primary-times-winter-2023/sharing-the-care
142. Tsirtsakis A. newsGP - What is the future of general practice multidisciplinary care? [Internet]. 2025 [cited 2025 Jun 6]. Available from: https://www1.racgp.org.au/newsgp/professional/shaping-the-future-of-multidisciplinary-team-based
143. Mitra LG, Sharma J, Walia HS. Improving Work-life Balance and Satisfaction to Improve Patient Care. Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med. 2024 Apr;28(4):326–8.
144. Endalamaw A, Khatri RB, Erku D, Zewdie A, Wolka E, Nigatu F, et al. Barriers and strategies for primary health care workforce development: synthesis of evidence. BMC Prim Care. 2024 Mar 27;25(1):99.
145. The Productivity Commission. Leveraging digital technology in healthcare Research paper [Internet]. 2024 [cited 2025 Jun 6]. Available from: https://www.pc.gov.au/research/completed/digital-healthcare/digital-healthcare.pdf
146. Australian Digital Health Agency. Remote Patient Monitoring [Internet]. 2025 [cited 2025 Jun 6]. Available from: https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/digital-health-standards/digital-health-standards-guidelines/get-started/5-standards-for-systems-and-technologies/remote-patient-monitoring
147. Partida D. How to Increase Health Care Staff Retention with Technology - [Internet]. 2023 [cited 2025 Jun 6]. Available from: https://thejournalofmhealth.com/how-to-increase-health-care-staff-retention-with-technology/
148. Best Practice. Best Practice. [cited 2025 May 28]. Best Practice. Available from: https://bestpracticesoftware.com/
149. BP Premier Spectra. Available clinical functions [Internet]. 2025 [cited 2025 Jul 16]. Available from: https://kb.bestpracticesoftware.com/bppremier/spectra/Clinical/PatientRecord/ClinicalFunctions.htm
150. Valenti L. Best Practice releases Best Health App [Internet]. Best Practice. 2019 [cited 2025 Jul 16]. Available from: https://bestpracticesoftware.com/blog/best-practice-releases-best-health-app/
151. Best Practice. Bp Comms [Internet]. Best Practice. [cited 2025 Jul 16]. Available from: https://bestpracticesoftware.com/products/bp-comms/
152. Valenti L. Streamlining Aged Care Support: HealthLink | Best Practice Software [Internet]. Best Practice. 2022 [cited 2025 Jul 16]. Available from: https://bestpracticesoftware.com/blog/streamlining-aged-care-support/
153. WA Primary Health Alliance. Introducing Primary Sense [Internet]. [cited 2025 Feb 18]. Available from: https://www.wapha.org.au/health-professionals/primary-sense/
154. GoldNet Research and Education Netwrok. Primary Sense - Research tool [Internet]. 2019 [cited 2025 Jul 18]. Available from: https://www.goldnetresearch.com.au/primary-sense
155. Primary Sense. Primary Sense. [cited 2025 Jul 18]. Primary Sense. Available from: https://www.primarysense.org.au
156. Australian Government, Department of Health, Disability and Ageing. General Practice Workforce providing Primary Care services in Australia [Internet]. 2025 [cited 2025 Jun 24]. Available from: https://hwd.health.gov.au/resources/data/gp-primarycare.html
157. RACGP. General Practice Health of Nation [Internet]. 2024 [cited 2025 Jun 24]. Available from: https://www.racgp.org.au/health-of-the-nation-1/chapter-2-state-of-the-general-practice-workforce/gp-distribution#:~:text=Similar%20to%20previous%20years%2C%20there,Australian%20Capital%20Territory%20(91).
158. Practitioners TRAC of general. Australian Family Physician. The Royal Australian College of general Practitioners; [cited 2025 May 22]. Generalism workforce planning. Available from: https://www.racgp.org.au/afp/2014/january-february/generalism-workforce-planning
159. Naccarella L. Australian Family Physician. The Royal Australian College of general Practitioners; 2014 [cited 2025 Jun 24]. Generalism workforce planning. Available from: https://www.racgp.org.au/afp/2014/january-february/generalism-workforce-planning
160. Australian Primary Health Care Nurses Association. Aged care nurses underutilised despite workforce shortage - national survey [Internet]. 2023 [cited 2025 Jun 6]. Available from: https://www.apna.asn.au/about/media/archive-media-releases/aged-care-nurses-underutilised-despite-workforce-shortage---survey
161. Aged Care Quality and Safety | Royal Commissions [Internet]. 2021 [cited 2025 May 22]. Available from: https://www.royalcommission.gov.au/aged-care

162. RACGP - Collaboration and multidisciplinary team-based care [Internet]. [cited 2025 May 22]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/silver-book/silver-book-part-b/collaboration-and-multidisciplinary-team-based-car
163. Australian Medical Association. Workforce 2025-26 Pre-budget Submission: Chapter 5 [Internet]. 2025 [cited 2025 Jul 18]. Available from: https://www.ama.com.au/sites/default/files/2025-02/ama-budget-submission-2025-2026-workforce.pdf
164. Analysing data to drive workforce planning decisions [Internet]. Skills for Health. 2025 [cited 2025 Jul 18]. Available from: https://www.skillsforhealth.org.uk/article/data-driven-strategies-for-smarter-workforce-planning/
165. Khashu K. Forbes. 2025 [cited 2025 Jul 16]. How Data-Driven Workforce Planning Can Revolutionize Healthcare. Available from: https://www.forbes.com/councils/forbestechcouncil/2025/06/18/how-data-driven-workforce-planning-can-revolutionize-healthcare/
166. Victorian Government Department of Health. Workforce data and planning [Internet]. 2019 [cited 2025 Jul 21]. Available from: https://www.health.vic.gov.au/strategy-and-planning/workforce-data-and-planning
167. Australian Institute of Healh and Welfare. Australia's health 2018: Chapter 7 - Patient-reported experience and outcome measures [Internet]. 2018 [cited 2025 Jul 18]. Available from: https://www.aihw.gov.au/getmedia/31d2844d-323e-400a-875e-e9183fafdfad/aihw-aus-221-chapter-7-17.pdf.aspx
168. Amat-Fernandez C, Pardo Y, Ferrer M, Bosch G, Lizano-Barrantes C, Briseño-Diaz R, et al. Evaluating the implementation of PROMs and PREMs in routine clinical care: co-design of tools from the perspective of patients and healthcare professionals. Health Qual Life Outcomes. 2025 Feb 17;23(1):15.
169. Lowry MTH, Kimenai DM, Doudesis D, Georgiev K, McDermott M, Bularga A, et al. The electronic frailty index and outcomes in patients with myocardial infarction. Age Ageing [Internet]. 2024 Jul 2;53(7). Available from: https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=mnh&AN=39011637&site=ehost-live&custid=s1145751
170. Lukewich J, Martin-Misener R, Norful AA, Poitras ME, Bryant-Lukosius D, Asghari S, et al. Effectiveness of registered nurses on patient outcomes in primary care: a systematic review. BMC Health Serv Res. 2022 Dec;22(1):740.

Chapter 9: Measuring outcomes

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Beyond clinical indicators: towards person-centred measures of healthy ageing

Traditionally, health system performance has been measured using disease-specific clinical and utilisation-based indicators, such as hospital admission rates, biomedical assessments (e.g., blood pressure and pathology results), medication usage and length of stay. Originally designed for routine oversight of system operations, these indicators primarily focus on clinical performance, resource utilisation, safety and efficiency. While valuable, they are primarily structural or process-based and poorly aligned with outcomes that reflect patient experience, functional ability or wellbeing (1).

These limitations are particularly significant for older adults, whose care often involves managing multiple chronic conditions, as well as social, emotional and functional needs (2,3). Evidence consistently shows that older adults value outcomes such as maintaining independence, preserving cognitive and physical function, staying socially connected and being supported to live well in their own homes and communities - goals rarely captured in traditional metrics (2,3,4).

Many existing quality indicators remain heavily compliance-driven, focusing on service delivery rather than outcomes that uphold autonomy, dignity and emotional wellbeing. Measures of resilience, purpose and personal goal attainment are also often missing, despite their importance to healthy ageing and quality of life (4). Partnering with consumers and carers in determining what and how to measure, ensures that health system performance reflects lived priorities and supports decision-making that is meaningful at the individual and community level (5).

This chapter examines how performance measurement for older adults should move beyond traditional biomedical and utilisation-based indicators toward person-centred and value-based measures. It highlights the role of co-design in developing and refining patient-reported outcome and experience measures (PROMs/PREMs) to capture what matters most to older adults. Drawing on international and Australian case studies, this chapter explores how embedding PROMs and PREMs into primary care and health ageing policy can improve clinical workflows, support continuous improvement and strengthen equity and value in care delivery.

Gaps in measurement and misaligned metrics

While integrated, person-centred care is widely promoted across both international and national policy, most outcome measurements in use remain siloed, tied to specific settings such as hospitals or residential care. This fragmented approach has limited capacity to follow an older person’s care journey across multiple services - primary care, community support and home-based services where much of healthy ageing occurs (3,4,6).

Qualitative research highlights persistent barriers to measuring outcomes that reflect the complexity of older people’s lives. These include poor information sharing, lack of interoperable electronic records and disjointed care plans - all of which compromise continuity and obscure a comprehensive view of health and wellbeing (3). The WHO Primary Health Care Measurement Framework calls for disaggregated, people-centred data systems that can track outcomes across life stages and service settings (4). Similarly, Australia’s Primary Health Care 10 Year Plan 2022-2032 emphasises the need for more integrated and co-designed measurement approaches to support older Australians to age in place (6).

The benefit of tracking outcomes in primary care

Primary care is the first point of contact for older adults and plays a crucial role in coordinating comprehensive long-term, holistic support (6). As the needs of older adults evolve, the understanding of what constitutes quality in primary care also needs to progress, moving beyond biomedical measures to outcomes that reflect personal goals, wellbeing and lived experience of care (2,7,8). This shift forms part of a broader re-evaluation of how health systems define and assess performance (1,9).

Outcome measurements are essential for tracking what matters in primary care, such as functional ability, prevention and wellbeing. Embedding patient-reported outcome and experience measures (PROMs/PREMs) enables older adults and their carers to directly influence the assessment of care quality. By co-designing outcome measures with consumers and drawing on lived-experience perspectives, health services can ensure that what is measured aligns with what older adults value most - maintaining independence, connection, dignity and control over their daily lives (10).

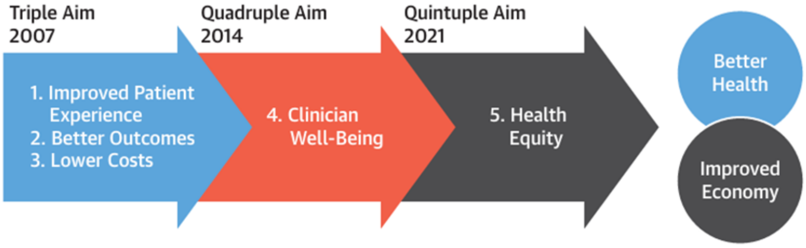
Further, these person-centred indicators help demonstrate the value of primary care in supporting older adults to age in place and address the intersecting health and social needs of older adults through early intervention, continuity and coordinated care (11,12). Evidence of measurable outcomes in these areas reinforces the importance of tailored, goal-oriented care and builds a compelling case for strategic investment in primary care (2).

The 2024 Commonwealth Fund International Health Policy Survey of Older Adults lends further weight to this perspective. The survey found that countries with stronger primary care systems, such as the Netherlands, consistently demonstrate measurable improvements in access, care coordination and medication management for older adults. In the Netherlands, older adults report the highest rates of timely appointments and same-day responses to medical questions, as well as lower rates of avoidable emergency department use. These outcomes are supported by system features such as mandated after-hours GP care, illustrating how robust outcome measurement enables health systems to identify and replicate practices that improve care quality while reducing reliance on costly hospital services (13). In a framework for high-performing general practice and a sustainable healthcare system, the Royal Australian College of General Practitioners (RACGP) emphasises the importance of outcome measurements in primary care, including that improved outcomes tracking can enhance continuity of care, strengthen patient trust and support coordinated planning, which are critical components for managing chronic conditions and complex needs in older adults (12).

To support these objectives, and in alignment with Australia’s Primary Health Care 10 Year Plan 2022-2032, the RACGP framework adopts the quadruple aim as the foundation for general practice and a sustainable healthcare system, embedding this framework into the current Standards for general practices (5th edition) (6,14). The quadruple aim is a widely recognised global framework for health system redesign that evolved from the original triple aim developed by the Institute for Healthcare Improvement (IHI), United States of America (15,16). The RACGP framework “seeks to drive healthcare redesign to improve the health of the population, improve the patient experience of care, reduce healthcare costs and improve the work life of health providers”, focusing on four core goals: improving patient experience, enhancing population health, reducing per capita healthcare costs, and supporting provider wellbeing (12,15).

More recently, the IHI quadruple aim has been extended to the quintuple aim, which introduces health equity as the fifth goal. The inclusion of health equity underscores the importance of ensuring equitable access to healthcare for all individuals, regardless of their social, economic or geographic circumstances (16,17). The 6th edition of the RACGP Standards for general practices, currently in draft and undergoing pilot testing, is expected to be released in 2026 and will incorporate the quintuple aim, reflecting the growing emphasis on equity in outcome measurement and system reform (18).

Figure 9.1. The evolution of the quintuple aim (16).



The IHI framework's five core aims are defined as follows:

- **Improve patient experience:** Strengthen continuity of care through long-term GP relationships, enabling trust, shared decision-making and person-centred care (12).
- **Improve population health:** Focus on prevention, early intervention and chronic condition management to support ageing well and reduce disease burden (12).
- **Reduce healthcare costs:** Shift care away from hospitals by investing in general practice, preventing avoidable admissions and supporting community care (12).
- **Improve provider experience:** Support GPs and teams through adequate resources, reduced administrative burden and a collaborative team-based approach (12).
- **Advancing health equity:** Ensure fair "access to quality care by addressing social determinants of health" and delivering culturally safe services, tailoring support for marginalised and underserved populations, including those facing language, financial or geographic barriers (16,17).

Figure 9.2. The quintuple aim for primary care (19)

The relevance of the quadruple and quintuple aims of primary care lies in their focus on core functions that general practice is uniquely positioned to deliver, such as preventive care, long-term continuity and management of complex, chronic conditions. This is evident in the care of unrepresented older adults (individuals who lack decision-making capacity and have no appropriate surrogate to act on their behalf), a population frequently encountered in primary care yet often overlooked in routine identification and outcome tracking. This highlights the need for proactive, equity-driven models of care, informed by lived-experience perspectives, that align with the quintuple aim (17). Furthermore, Rangachari (2023) highlights the untapped potential of these frameworks to foster a broader culture of health, with primary care positioned as a central lever for reform (20).

Embedding outcome measures within these frameworks enables general practice to demonstrate value beyond episodic care, capturing the benefits of prevention, equity and long-term wellbeing (18,20).

The potential of outcome measurement in Australian primary care remains a challenge in the absence of a unifying, strategic framework (8). As highlighted by Dawda et al. (2022) ongoing gaps in system design, policy alignment and data infrastructure, including limited national uptake of patient reported outcomes and fragmented tools such as Practice Incentives Program Quality Improvement (PIP QI), Medicine Insight, Lumos and Population Level Analysis and Reporting (POLAR), continue to impede Australia's ability to assess outcomes that reflect the lived experience and priorities of older adults (8).

Dawda et al. (2022) identified several state-led initiatives that have begun to operationalise outcome-focused models of care, drawing on linked data assets, patient-reported measures, and local partnerships to support more integrated and person-centred delivery within primary care (8). One of the most prominent examples of such innovation is the New South Wales (NSW) value-based healthcare initiative (see Case study 9.1).

Box 9.1. NSW Health: linking data and outcomes in value-based care for older adults (8,21–23).

The New South Wales (NSW) value-based healthcare initiative is a statewide, whole-of-system program guided by the quadruple aim, aiming to improve patient outcomes, care experience, efficiency and provider wellbeing. It supports integrated care, outcome measurement and quality improvement through initiatives such as Lumos, a statewide linked data asset that combines de-identified general practice data with hospital, emergency department and specialist care datasets across NSW. A key enabler of this work is Lumos, a statewide data asset that links de-identified general practice data with hospital, emergency department and specialist care datasets across NSW. Initially piloted in Western Sydney, Lumos now includes over 800 general practices and captures the care journeys of more than 5 million patients across ten statewide Primary Health Networks (PHNs), spanning metropolitan, rural and remote areas. It provides a rich foundation for understanding population health trends, supporting service planning and driving quality improvement in general practice.

Lumos reports have been instrumental in highlighting the value of primary care in managing chronic conditions. For instance, outcome tracking for individuals with diabetes showed that patients diagnosed in general practice were more likely to receive appropriate medications, GP management plans and ongoing monitoring, with fewer hospitalisations and lower mortality rates over two years compared to those diagnosed in hospital settings. At the practice level, Lumos reports are used to inform quality improvement activities, with 70% of surveyed GPs reporting that the data had influenced or had the potential to inform changes to improve care. One example included a general practice setting a targeted goal to reduce Chronic Obstructive Pulmonary Disease presentations by 25%, using Lumos insights to guide clinical focus.

Lumos data also underpin broader, equity-focused initiatives such as the Rapid Care for Elderly and Frail program, which uses integrated datasets to identify older adults at risk of avoidable hospitalisation and coordinate proactive, multidisciplinary care. This includes care planning, geriatric outreach, and nurse-led chronic disease management, with interim evaluations indicating improved coordination and more person-centred models of care.

The global shift towards person-centred care

Global health reform agendas are driving a system-level transition from traditional biomedical models to value-based, holistic and person-centred models of care. Governments and health systems are rethinking how outcomes are defined, measured and applied to better reflect the needs of ageing populations. This shift places increasing emphasis on outcomes that older adults themselves prioritise, particularly maintaining independence, fostering social connection and enhancing overall quality of life (7,24,25).

Box 9.2. Defining value-based healthcare (8,26,27).

Value-based healthcare (VBHC) provides a framework for this transformation. Value is defined by NSW health as "outcomes and experiences that matter most to the people receiving and delivering care, relative to the cost of achieving those outcomes". VBHC shifts away from fee-for-service or volume-based approaches toward models that emphasise outcomes, cost-effectiveness, and personalised care.

Core components include:

- **Patient-centred outcomes:** improving health results that matter to patients and consistently measuring them for every patient.
- **Cost-effectiveness:** maximising value for money and reducing or eliminating low-value services.
- **Four essentials:** "health outcomes that matter to patients, experiences of receiving care, experiences of providing care, and effectiveness and efficiency of care delivery."
- **Integrated care:** coordinating across providers and settings to deliver seamless, person-centred care.

The World Health Organization's Decade of Healthy Ageing reinforces that healthy ageing extends beyond merely being free of disease and illness, but also the ongoing development and maintenance of functional ability, shaped by both intrinsic capacity and supportive environments that enable wellbeing in older adults (24). While this conceptual shift is widely endorsed, translating it in policy discussions, empirical evidence suggests that embedding it meaningfully into practice remains challenging.

International efforts, including those led by the WHO and the International Consortium for Health Outcomes Measurement (ICHOM), are advancing the use of person-centred measures that capture autonomy, social participation, emotional wellbeing and the ability to live independently, core components of meaningful quality of life in later years (4,24,28). These initiatives demonstrate that embedding person-centred metrics is not only conceptually important but is both feasible and effective in aligning system performance with the lived priorities of older people.

The table below highlights global frameworks that are reshaping outcome measurements in healthy ageing.

Table 9.1. International frameworks supporting person-centred outcome measurement in healthy ageing (11,29,30).

Framework	**Organisation**	**Focus of measurement**	**Relevance to healthy ageing**
Integrated Care for Older People (ICOPE) (11)	World Health Organization (WHO)	Intrinsic capacity, functional ability, community-based care.	Promotes functional ability and ageing in place through early identification and personalised care planning.
Older Person Standard Set (31)	International Consortium for Health Outcomes Measurement (ICHOM)	Autonomy, pain, emotional wellbeing, social participation.	Captures what matters most to older people in routine care and supports person-centred outcome tracking.
Patient-Reported Indicator Surveys (PaRIS) (30)	The Organisation for Economic Co-operation and Development (OECD)	Patient experience, quality of life, access, coordination.	Enables cross-country comparison of health outcomes from the perspective of older adults in primary care.

Current frameworks for measuring person-centred outcomes in healthy ageing

This section outlines three key frameworks that focus on person-centred measurement: the International Consortium for Health Outcomes Measurement (ICHOM), the OECD's Patient-Reported Indicator Surveys (PaRIS), and the Australian Health Performance Framework.

The International Consortium for Health Outcomes Measurement Standard Sets (ICHOM)

The International Consortium for Health Outcomes Measurement (ICHOM) is a non-profit organisation advancing the global adoption of standardised, person-centred outcome measurement frameworks. Established in 2012 through a collaboration between Harvard Business School, the Boston Consulting Group and the Karolinska Institute, ICHOM was established in response to growing recognition that traditional health system metrics often overlook what matters most to patients (25,28,31).

Its mission is to support the transition to value-based healthcare by developing internationally validated standard sets of outcomes that hold significance for patients and are feasible to implement across clinical settings (29). This collaborative approach was informed by literature reviews, clinical expertise, and lived experience input from patients, families and carers. This approach ensures that the resulting measures are grounded in real-world priorities, culturally relevant and applicable across diverse health and care contexts.

To date, ICHOM has built a global network of over 1,200 clinical, research and patient experts across 60 countries, and published 46 standard sets, collectively covering approximately 60% of the global burden of disease (25). Each set is tailored to the specific needs of population groups, with each set containing outcome domains aligned with the priorities of that demographic (25,29,31).

There are two ICHOM Standard Sets that are most relevant to primary care in the context of healthy ageing and outcome measurement:

1. *Patient-Centered Outcome Measures for Older person* (31).
2. *Patient-Centered Outcome Measures for Overall Adult Health* (29).

Patient-Centred Outcome Measures for Older person

This set is designed for routine use in primary and aged care, offering a structured way to assess and track outcomes that reflect older adults' priorities for independence, wellbeing and participation in life. These outcomes are grouped into such as domains such as, autonomy, functioning, mental health; fall, participation and quality of life (31).

These domains are systematically measured using validated tools, including (31):

- Short Form Health Survey (SF-36) for pain, mood and activities of daily living.
- Adult Social Care Outcomes Toolkit (ASCOT) for autonomy and control.
- Zarit Burden Interview for carer burden.
- UCLA-3 Item Loneliness Scale for loneliness and isolation.
- Canadian Study of Health and Ageing Clinical Frailty Scale for frailty.

Patient-Centred Outcome Measures overall adult health

This set offers a broader framework applicable to a general adult population, regardless of health status, with a focus on (29):

- General health status;
- functional ability;
- mental wellbeing;
- social and work-related participation.

It incorporates three validated instruments (29):

- WHO (Five) Wellbeing Index (WHO5).
- PROMIS Scale v1.2 – Global Health.
- WHO Disability Assessment Schedule 2.0 (12 items) to measure functional and social participation.

These domains are intended for use across the adult population, spanning individuals in full health through to those managing chronic conditions with varying degrees of control (29).

Practical application: opportunities and limitations

While ICHOM’s standard sets are widely endorsed, their adoption and practical implementation into routine practice remains inconsistent (25,28). Commonly reported challenges include:

- data collection burden and administrative load;
- limited integration with existing clinical workflows and IT systems;
- insufficient training and lack of supporting infrastructure for staff (25,28).

Recent evaluations highlight these barriers in practice. Bright et al. (2025) found that many providers selectively adopt outcome measures based on data accessibility and system readiness, rather than implementing the full standard set. Variability in how measures were defined and operationalised in local clinical software led to inconsistencies in data quality and benchmarking. Importantly, the authors identified the absence of broadly deployed standards for patient-centred outcomes as a persistent barrier to comparing results across regions, institutions and care models (25). These findings are echoed in the work of Akpan et al. (2020), who emphasised that standardised outcome sets offer a critical opportunity to benchmark and support consistency across care settings, including primary care and public health, regardless of an individual’s health status (31). These findings underscore the importance of addressing technical, contextual and system-level enablers if ICHOM’s standard sets are to be successfully embedded into routine practice, particularly within primary care and healthy ageing contexts (25,28,31).

Patient-Reported Indicator Surveys (PaRIS)

The Patient-Reported Indicator Surveys initiative was established by the Organisation for Economic Co-operation and Development (OECD) in 2017 in response to growing international recognition that traditional performance metrics lack consistent, patient-centred data to evaluate health system performance, particularly in primary care and chronic disease management (30,32,33).

As health systems seek to strengthen primary care and shift toward more patient- and person-centred data and value-based models, PaRIS provides a critical mechanism for measuring healthcare quality from a holistic perspective. Specifically targeted at individuals aged 45 years and older living with chronic conditions who have recently engaged (within the past six months) with their primary care provider, the survey focuses on capturing multidimensional health outcomes. These include physical and mental health, social functioning, wellbeing and general health, alongside experiential domains such as care coordination, communication and accessibility. This holistic perspective enables a more comprehensive assessment of care quality, grounded in lived experience rather than service volume alone. By embedding the patient voice at the centre of performance measurement, PaRIS contributes to value-based healthcare reform and supports international benchmarking of equity, quality and system responsiveness in primary care (33,34).

Two core components that underpin the PaRIS measurement framework: Patient-Reported Outcome Measures (PROMs) and Patient-Reported Experience Measures (PREMs) have been used since the mid-20th century (35). These instruments serve distinct but complementary roles in capturing healthcare performance from the perspective of those receiving care (30).

Patient-Reported Outcome Measures (PROMs)

PROMs are defined as “any report coming directly from subjects without interpretation of the physician or others about how they function overall or feel in relation to a condition and its therapy” (36). Building on this definition, PROMs enable the measurement of patient outcomes that reflect lived experience, including pain, fatigue, emotional distress and social functioning. The development of these measures involved rigorous psychometric validation to ensure reliability, sensitivity to change and relevance to the target population (30,36). Rather than replacing traditional clinical metrics, PROMs complement them by offering insights into dimensions of health not captured in physiological measures alone, contributing to a more comprehensive understanding of outcomes across diverse health settings (36).

Structured questionnaires enable PROMs to quantify subjective experiences such as pain and wellbeing, often using validated tools designed for either condition-specific or general health assessments. PROMs are increasingly used in clinical practice, quality improvement and health service evaluation, providing a bridge between care delivery and patient-defined outcomes (32,36,37).

Patient-Reported Experience Measures (PREMs)

PREMs capture a patient’s account of what occurred during a healthcare encounter and how the care was delivered. This tool is specifically designed to evaluate the quality of care from the patient’s experience, focusing on interpersonal aspects such as communication, respect, timeliness, coordination and decision-making (38).

PREMs are conceptually distinct from PROMs, which measure health status or functional outcomes, and from patient satisfaction surveys that are often shaped by subjective expectations and prior experiences. While satisfaction metrics can be influenced by external factors unrelated to the actual care experience, PREMs offer a more objective basis for evaluating patient-centredness in service delivery. By highlighting specific areas of strength or concern, PREMs enable providers and systems to identify opportunities for improvement that are directly informed by the patient voice (38).

Practical application: opportunities and limitations

Implementation of the PaRIS initiative in Australia has been instrumental in generating evidence about the outcomes and care experiences of people living with chronic conditions. Translating these measurement frameworks into routine practice provides vital insights into how health systems perform for this population, an area the OECD PaRIS specifically seeks to advance (34).

The OECD PaRIS Australian National Report (2025) found that Australia ranks among the top five OECD countries in four key domains of healthcare: quality of care, coordination of care, person-centred care and physical health. Notably, 94% of Australian participants reported positive experiences at their general practice, exceeding the OECD average of 87% (34).

The data showed that patients with multiple chronic conditions (39% of the Australian adult population reported having three or more chronic conditions in the 2022 national census) reported worse outcomes and experiences. This group was less confident in managing their own care and reported lower trust in the healthcare system. Additionally, barriers to care were more prevalent among those with three or more chronic conditions and individuals under the age of 65, particularly relating to travel (18%) and cost (17%). Patients with lower income or education levels also tended to report lower levels of trust and self-management confidence (34). Older Australians, particularly those aged 65 and above, reported more positive experiences across multiple domains, including care coordination, mental health and trust in providers. Longer-term GP relationships (3–5 years) were strongly associated with higher satisfaction and more favourable perceptions of care continuity (34).

While there has been growing interest in PaRIS, and in the use of PROMs and PREMs for patient-centred evaluation, several systemic and operational barriers remain (37). As Benson (2024) notes, systemic complexity in healthcare settings often inhibits the consistent adoption of these measures, compounded by issues of leadership, planning and workflow integration. Interoperability with electronic health records remains limited, with common coding systems (e.g., SNOMED CT, LOINC) unable to accommodate all relevant concepts used in PROM/PREM questionnaires (37).

Practical limitations include low response rates in national survey programs, with questionnaire fatigue often linked to poor design, lack of relevance and perceived burden. Response bias and measurement “noise” (e.g., inconsistencies due to mood, interpretation, or context) can further compromise data reliability (37). Importantly, PROMs and PREMs are not interchangeable and must be carefully selected to suit the intended cohort and purpose. Inappropriate or overly complex instruments risk diminishing clinical and policy utility (37,38). For example, Australia's participation included only 2,392 patients across 54 practices and response rates globally ranged from 6% to 47%, raising concerns of self-selection bias (34).

As noted by Bull and Callander (2024), these challenges are further compounded in Australia by the absence of nationally consistent PROM and PREM measures, highlighting that without coordinated survey programs, efforts remain fragmented and often tokenistic, limiting their usefulness for benchmarking or driving quality improvement. Further, the authors identified that addressing these gaps will require strong leadership, standardisation and a shift away from resource-intensive approaches that place unnecessary burden on patients without delivering system-wide benefit (35).

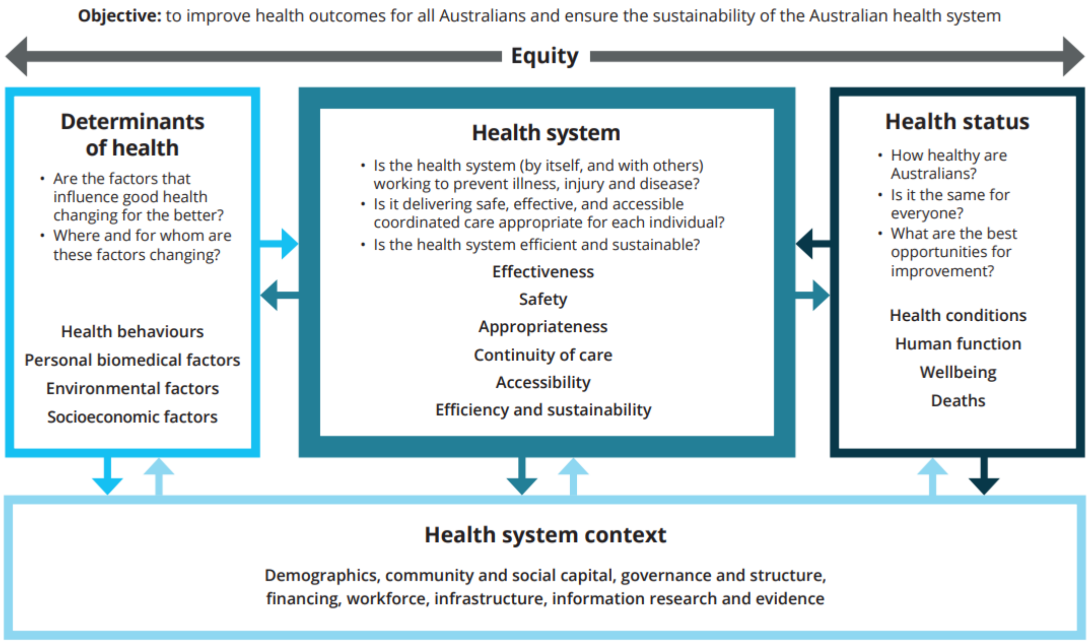
Australian Health Performance Framework

The Australian Health Performance Framework is a nationally endorsed structure for monitoring health and healthcare performance, governed by the Australian Institute of Health and Welfare (AIHW). It replaced the National Health Performance Framework and the Performance and Accountability Framework, creating a single, enduring mechanism to support system-wide reporting, assess sustainability and the identification of national priorities for improvement (39).

The framework groups measurement into three interrelated domains (39,40):

- **Determinants of health (9 indicators):** Health behaviours, personal characteristics and broader socio-economic factors that influence health outcomes, such as income, education, and environment.
- **Health system (21 indicators):** System performance measures including accessibility, continuity of care, effectiveness, efficiency, sustainability and safety, providing insight into how services are delivered and resourced.
- **Health status (15 indicators):** Outcomes such as mortality, disease prevalence, functional health, and population wellbeing.

Figure 9.3. Domains and context for assessing health outcomes, system performance and equity across the Australian health system (41).



Objective: to improve health outcomes for all Australians and ensure the sustainability of the Australian health system

Determinants of health
- Are the factors that influence good health changing for the better?
- Where and for whom are these factors changing?

Health system
- Is the health system (by itself, and with others) working to prevent illness, injury and disease?
- Is it delivering safe, effective, and accessible coordinated care appropriate for each individual?
- Is the health system efficient and sustainable?

Health status
- How healthy are Australians?
- Is it the same for everyone?
- What are the best opportunities for improvement?

The AIHW describes the Australian Health Performance Framework as a flexible, evolving tool designed to support ongoing system-wide health performance reporting. Initially launched with 45 indicators reported at national, state, territory and local levels (where data permits), the framework aims to improve the quality and breadth of performance data over time (39). The AIHW is committed to ongoing development and improvement of the indicators, with a strong emphasis on stakeholder engagement, including input from governments, clinicians, consumers, academia and the private sector to ensure the framework remains responsive, relevant and future-focused. This collaborative approach is intended to enhance data disaggregation (e.g., by age and sex) and better reflect population health outcomes, healthcare quality and system sustainability (39).

In the context of an ageing population, the Australian Health Performance Framework is a foundational tool for mapping system-wide responses. Its value lies in providing a nationally consistent basis for assessing trends in service utilisation, health system responsiveness, and social determinants that shape later-life health (2,42). Many Australian Health Performance Framework indicators can be disaggregated by age group, which allows for monitoring health system performance and outcomes relevant to older populations. For example, the framework includes age-specific reporting on the prevalence of diabetes, incidence of end-stage kidney disease and rates of severe or profound core activity limitations, which are proxies that are particularly relevant to ageing and chronic condition management (39,42). Measures such as psychological distress, self-assessed health status and hospitalisation for injury also support assessment of wellbeing and functional status in later life. Although these indicators are not tailored exclusively for older adults, the Australian Health Performance Framework's structure enables stratified analysis, providing an essential basis for tracking equity, service access and population health trends across the life course (42).

Practical application: opportunities and limitations

The Australian Health Performance Framework provides a nationally consistent structure for monitoring health system performance and is increasingly used to inform planning and evaluation for monitoring health system performance across aged care and primary care contexts (2,42). Its capacity for disaggregated analysis enables policymakers, governments, general practitioners, practice nurses and researchers to assess equity, service access and responsiveness across diverse older populations (42). This is particularly valuable for identifying gaps in primary care and aged care delivery within rural, regional and culturally diverse communities (39).

The Primary Health Network (PHN) Program Performance and Quality Framework aligns with the Australian Health Performance Framework and identifies aged care as one of its seven priority areas for targeted action (43). Relevant indicators include:

- Medicare Benefit Schedule (MBS) services provided by primary care providers in residential aged care facilities.
- Rates of GP health assessments for people aged 75+ to monitor service utilisation.

These indicators enable PHNs to assess equity, continuity of care and outcomes in older populations. In addition, outcome themes such as Improving Access, Coordinated Care and Addressing Needs guide targeted interventions and continuous quality improvement activities. Through this alignment, the Australian Health Performance Framework provides a foundational, nationally consistent mechanism for population health planning and performance evaluation, facilitating service design and resource allocation for Australia's ageing population across diverse regions and settings (43).

Although the framework includes domains such as appropriateness, continuity and effectiveness, it remains weighted toward structural metrics, compliance indicators and service utilisation. It is considered not to sufficiently capture lived experience, quality of life, autonomy or functional ability. These aspects are central to understanding how older adults experience and benefit from care; yet, they continue to be poorly measured across various settings (2,43).

These limitations mirror findings of the Royal Commission into Aged Care Quality and Safety, which criticised the sector's overreliance on clinical compliance and throughput measures, with limited attention to autonomy, emotional wellbeing or life satisfaction. The Royal Commission also highlighted an overall imbalance in the system, with insufficient focus on relational care, meaningful engagement and lived experience (7). While PROMs and PREMs are conceptually referenced in the framework, they remain underdeveloped and inconsistently applied in practice, limiting the framework's ability to capture the lived experience, quality of life and person-centred outcomes valued by older adults (35). Productivity Commission highlighted the absence of robust patient-reported outcome measures across public services and called for a nationally coordinated strategy to improve outcome reporting and consumer transparency (44).

In recent evidence, Inacio et al. (2025) argue for a pragmatic national framework that reflects the realities of multi-setting aged care delivery, emphasising the need for consistent, system-wide outcome measurement (2). Recent reviews of quality indicators also highlight persistent gaps in structural and person-centred metrics in home and community-based settings, particularly in relation to autonomy, responsiveness and lived experience (1,9). Most current indicators remain narrowly focused on residential care, offering limited insight into the broader aged care landscape, failing to reflect the diverse, person-defined outcomes relevant to ageing in place and across integrated care environments (2,9,42).

This incongruity is not only technical but structural, reflecting the broader misalignment between current system performance metrics and the outcomes relevant to the care of older people and valued by older people in their care experience (2,9). Australia lacks a cohesive, national strategy for implementing value-based care, with fragmented data systems, activity-based funding models and limited uptake of patient-defined outcomes across services (2,27).

From a technical standpoint, the AIHW acknowledges that indicator development is complex, resource-intensive and prone to overreach if aspirational metrics are specified prematurely (39,42). To maintain the Australian Health Performance Framework's credibility and long-term utility, investment in new indicators must be strategically governed, with priority given to those that offer the greatest return in advancing system improvement and equity. As data systems and analytics improve, there is significant potential to expand the framework with more meaningful outcome measures for ageing and aged care (2,9,42).

Indicators relevant to healthy ageing in primary care

Research supports the integration of person-centred indicators into primary care to reflect the outcomes that matter to health ageing. These extend beyond biomedical metrics, encompassing functional ability, psychosocial wellbeing and the lived experience of older adults (9,33). Incorporating is essential for monitoring equity, guiding system improvement and advancing value-based models of care (33). Table 9.3 outlines selected indicators, associated measurement tools and their relevance to healthy ageing in primary care.

Table 9.2. Core person-centred indicators, measurement tools and aligned frameworks for healthy ageing in primary care (9,29,31,33,45–47).

Domain	Indicators	Measurement tools	Aligned framework(s)	Primary care relevance
Functional status	• Activities of Daily Living (ADLs) • Instrumental Activities of Daily Living (IADLs) • Mobility and physical performance	• PROMIS Global Health v1.2 – 10 • SF-36 • Gait speed • Katz Index of Independence in ADLs • Lawton-Brody IADL Scale	• ICHOM Older Person Standard Set • OECD PaRIS PROMs • WHO ICOPE	Early identification of decline supports tailored care planning and guides interventions that promote independence and prevent avoidable hospitalisations. It is critical for supporting healthy ageing and ageing in place.
Cognitive function & mental wellbeing	• Cognitive screening • Depression • Anxiety	• PROMIS Global Health v1.2 – 10 • WHO-5 Wellbeing Index • SF-36 mental health subscale	• OECD PaRIS • ICHOM Older Person Standard Set • WHO ICOPE	Early detection of cognitive or mental health decline supports timely interventions, promotes wellbeing, and enables coordinated care planning.
Social participation and loneliness	• Frequency of social interaction and perceived isolation	• UCLA -3 Item Loneliness Scale	• ICHOM Older Person Standard Set	Identifying social isolation supports interventions to enhance participation, reduce loneliness, and maintain quality of life.
Frailty and falls	• Frailty level • History of falls	• Canadian Study of Health & Ageing Clinical Frailty Scale (CSHA CFS)	• ICHOM Older Person Standard Set	Guides care planning, prevents hospitalisation.
Quality of life	• Self-rated overall quality of life • Perceived wellbeing across physical, mental and social dimensions	• ASCOT SCT4 • EQ 5D 5L • WHOQOL- BREF • WHO-5 Wellbeing Index	• OECD PaRIS • WHO ICOPE	Captures subjective wellbeing; monitors service impact.
Satisfaction with care/consumer experience	• Experience of care • Communication and coordination	• OECD PaRIS Patient Questionnaire (PaRIS-PQ) • Client Focused Evaluation Program (CFEP) – Patient Accreditation Improvement Survey (PAIS) • Insync Patient Satisfaction Instrument (PSI)	• OECD PaRIS • RACGP Standards for General Practices (5th ed., QI1.2) • Australian Health Performance Framework	Captures patient perceptions of service quality and responsiveness. Required for practice accreditation. Supports continuous quality improvement when data is analysed, acted upon, and outcomes are communicated back to patients.

		• Patient Reported Experiences and Outcomes of Safety in Primary Care (PREOS-PC-6) • Your Experience of Services (YES) Survey		
Goal attainment	• Personal goals met • Co-developed care plans	• Goal Attainment Scaling	• ICHOM Older Person Standard Set • OECD PaRIS • WHO ICOPE	Assess the extent to which care aligns with individual priorities and measures progress towards personal health and wellbeing goals

Embedding person-centred outcomes in primary care practice: building a learning health system

Embedding patient-reported measures and person-centred indicators into routine primary care requires intentional design so that the measurement becomes a natural part of the care process rather than an administrative burden. Success depends on more than simply adding new survey instruments, measurement tools or outcome metrics. It requires alignment with models of care that are person-centred, relationship-based and focused on outcomes that matter most to individuals (6,33).

Patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) are central to this approach. Both complement traditional biomedical data by providing structured, validated insights into lived experience, personal priorities and wellbeing. In doing so, they strengthen the alignment between care delivery and what matters most to patients, underpinning the person-centred, engagement-driven model of care reflected in this review (32,35,37). Applying continuous improvement cycles to person-centred measurement.

To have an impact, person-centred measurement must be embedded into clinical workflows and actively used to drive continuous improvement. In a learning health system, outcome measurement and quality improvement are linked through ongoing, iterative cycles of reflection (6,33). The Plan-Do-Study-Act (PDSA) cycle provides a practical, scalable framework for operationalising this process in primary care (37):

- **Plan** - Identify priority outcomes and select validated PROM/PREM tools that reflect the needs of the population served. Map integration points within existing workflows (37).
- **Do** - Collect data routinely through patient portals, surveys, or in consultation methods. Ensure frontline staff have the training, resources and support to embed collection into care without adding undue administrative burden (37).
- **Study** - Analyse results at patient, practice and population levels to identify patterns, gaps and opportunities for improvement. Use thresholds or benchmarks to interpret results and inform priorities (37).
- **Act** - Translate findings into care plan adjustments, service redesign or targeted interventions. Close the feedback loop by sharing outcomes with patients and staff and plan the next improvement cycle (37).

International experience shows that these cycles are most effective when PROMs data is not only collected but also actively applied in real-time to guide decisions, support care planning, and drive innovation.

The following example illustrates how one international programme has embedded these principles in practice, aligning closely with the iterative Plan–Do–Study–Act (PDSA) approach (32,37).

Box 9.3. Switzerland's OpenPROMs in the context of OECD findings (32).

The 2024 OECD PROMoting Quality of Care Snapshot Survey, covering 47 PROMs programs in 38 OECD and partner countries, found PROMs are most often used for quality improvement (96% of programs) and quality assurance (54%). Common approaches include audit and feedback (55%), public reporting (53%) and integration into clinical pathways (47%).

Switzerland's OpenPROMs demonstrates these principles are applied in practice. In this program, healthcare professionals can view individual patient results in real time, compare aggregated outcomes, and access summary reports. This active use of data ensures that PROMs are not merely collected for reporting, but feed directly into clinical decision making and service improvement, completing the feedback loop central to a learning health system.

Box 9.4. Embedding PROMs in primary care - the Australian Health Care Homes trial (48)

The National Health Care Homes trial (2016–2021) tested a bundled-payment, team-based model for people with chronic and complex health conditions. The model incorporated key features such as voluntary patient enrolment, risk stratification, shared-care planning, and multidisciplinary coordination.

Where implemented successfully, the model strengthened the role of patients and carers as core members of the care team. Patient-reported priorities informed shared-care plans and ongoing reviews. Patients reported greater access to practice staff, more timely clinical advice, increased involvement in planning their care, and improved access to allied health services and self-management support.

Key enablers included:

Workflow alignment - embedding PROM/PREM collection into chronic disease management templates and routine consultations.

Team-based care - expanding the contribution of practice nurses, medical assistants, care coordinators and allied health providers.

Practice facilitation - PHNs employed facilitators to support transformation, build team capability and maintain fidelity to the model.

Clinical relevance - selecting measures that directly inform shared decision-making and patient–clinician discussions.

Continuous feedback loops - reviewing results with patients and the care team to monitor progress and adapt plans.

Data and system enablers - investing in digital tools to streamline data collection, link PROM/PREM data with other health information, as well as payments and reporting, to support coordinated, outcome-focused care.

The trial highlighted that sustainable adoption of patient-reported measures depends on aligning them with system-level enablers, including workforce development, integrated information systems and supportive funding models.

System-level enablers: lessons from the National PHN Allied Health in Primary Care Engagement Framework

While Switzerland's OpenPROMs highlights international best practices, Australia's own system-level frameworks show how structural enablers can drive integration, workforce engagement and sustained use of person-centred measurement in primary care (33). In effective models, PROM/PREM data are incorporated directly into co-developed care plans, translating patient-reported priorities into actionable goals that are documented and adjusted over time. Integration within GP and nurse workflows can be achieved by embedding relevant questions into standard assessments and chronic disease management templates, reducing duplication and maintaining clinical relevance (35).

National PHN collaboration and the integration of patient reported measures

The National PHN Allied Health in Primary Care Engagement Framework provides a practical example of how coordinated system-level structures can enable consistent/long-term adoption of PROMs/PREMs in collaboration. It provides a practical example of how system-level structures can enable the adoption and sustained use of patient-reported measures (PROMs/PREMs) in primary care (49). The National PHN Allied Health in Primary Care Engagement Framework outlines several structural and cultural enablers directly applicable to PROM/PREM integration**.**

- **Data, quality and digital maturity:** Establishing nationally agreed data standards, integrating outcome measures into primary care digital systems (e.g., My Health Record), and enabling real-time use of results in consultations. The framework also promotes linking PROM/PREM data to other health datasets, demonstrating value through standardised datasets, and supporting the uptake of digital tools by practices (49).
- **Practice engagement:** Building general practice and allied health capability to collect, interpret, and act on patient-reported data. This includes targeted training, technology enablement and facilitation to help practices meet quality standards and embed measurement into routine care (49).
- **Integration and models of care:** Embedding measurement within multidisciplinary care pathways so PROM/PREM results inform shared decision making, prevention and coordinated care. Commissioning levers can promote outcome-based models, standardised referral pathways, and integrated HealthPathways (49).
- **Governance and culture:** Positioning PROMs/PREMs as a core element of quality and equity by embedding allied health perspectives into PHN governance and shifting the focus from illness-centred to wellbeing-oriented care (49).

Some PHNs have already operationalised these principles – for example, integrating allied health into chronic disease management pathways with outcome tracking, or commissioning pilots where PROM data inform case conferencing and care planning. These initiatives demonstrate how strategic, system-level enablers can translate into sustainable and practical use of person-centred measurement in primary care (49).

References

1. Braithwaite J, Hibbert P, Blakely B, Plumb J, Hannaford N, Long JC, et al. Health system frameworks and performance indicators in eight countries: A comparative international analysis. SAGE Open Med. 2017 Jan 4;5:2050312116686516.
2. Inacio MC, Ryan O, Gray LC, Caughey GE. Monitoring cross-setting care and outcomes among older people in aged care: a national framework is needed. Aust Health Rev [Internet]. 2025 Apr 3 [cited 2025 Jun 30];49(2). Available from: https://www.publish.csiro.au/ah/AH24294
3. Wu J, Xue E, Huang S, Fu Y, Chen D, Shao J, et al. Facilitators and Barriers of Integrated Care for Older Adults with Multimorbidity: A Descriptive Qualitative Study. Clin Interv Aging. 2023 Nov 29;18:1973–83.
4. WHO. Primary health care measurement framework and indicators: monitoring health systems through a primary health care lens [Internet]. 2022. Available from: https://iris.who.int/bitstream/handle/10665/352205/9789240044210-engpdf?sequence=1
5. Decade of healthy ageing: baseline report [Internet]. [cited 2025 Jul 4]. Available from: https://www.who.int/publications/i/item/9789240017900

6. Australian Government Department of Health. Future focused primary health care: Australia's Primary Health Care 10 Year Plan 2022-2032.
7. Final report: care, dignity and respect. Adelaide: Royal Commission into Aged Care Quality and Safety; 2021.
8. Dawda P, True A, Dickinson H, Janamian T, Johnson T. Value-based primary care in Australia: how far have we travelled? Med J Aust. 2022;216(S10):S24–7.
9. Foong HY, Siette J, Jorgensen M. Quality indicators for home- and community-based aged care: A critical literature review to inform policy directions. Australas J Ageing. 2022 Sep;41(3):383–95.
10. Australian Commission on Safety and Quality in Health Care. Patient-Reported Measures [Internet]. 2023 [cited 2025 Jun 16]. Available from: https://www.safetyandquality.gov.au/our-work/partnering-consumers/person-centred-care/person-centred-care-network/patient-reported-measures
11. Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care, second edition [Internet]. [cited 2025 Jul 18]. Available from: https://iris.who.int/bitstream/handle/10665/380175/9789240103726-eng.pdf?sequence=1
12. Vision for general practice and a sustainable healthcare system. Revised. East Melbourne, Victoria: Royal Australian College of General Practitioners; 2019.
13. Access and Quality of Care for Older Adults in 10 Countries [Internet]. 2025 [cited 2025 Jul 21]. Available from: https://www.commonwealthfund.org/publications/surveys/2025/apr/access-quality-care-older-adults-10-countries-2024-survey
14. Standards-for-general-pracice-5th-edition.pdf [Internet]. [cited 2025 Jul 29]. Available from: https://www.racgp.org.au/getattachment/ece472a7-9a15-4441-b8e5-be892d4ffd77/Standards-for-general-practices-5th-edition.aspx
15. Berwick DM, Nolan TW, Whittington J. The Triple Aim: Care, Health, And Cost. Health Aff (Millwood). 2008 May;27(3):759–69.
16. Itchhaporia D. The Evolution of the Quintuple Aim. J Am Coll Cardiol. 2021 Nov 30;78(22):2262–4.
17. Unrepresented Older Adults: A Critical Review and Future Agenda in the Context of the Quintuple Aim - ProQuest [Internet]. [cited 2025 Jul 30]. Available from: https://www.proquest.com/docview/2931221041?pq-origsite=gscholar&fromopenview=true&sourcetype=Scholarly%20Journals
18. Part 1: The Quintuple Aim of healthcare | Insights into the RACGP Standards 6th edition - AGPAL - General Practice Accreditation [Internet]. https://www.agpal.com.au/. 2024 [cited 2025 Jul 28]. Available from: https://www.agpal.com.au/news/building-better-practices-insights-into-the-racgp-standards-6th-edition/
19. Tyndall M. The Quintuple Aim: What Is It and Why Does it Matter? [Internet]. CHESS Health Solutions. 2023 [cited 2025 Jul 28]. Available from: https://www.chesshealthsolutions.com/2023/08/01/the-quintuple-aim-what-is-it-and-why-does-it-matter/
20. Rangachari P. The Untapped Potential of the Quadruple Aim of Primary Care to Foster a Culture of Health. Int J Gen Med. 2023 Jun 3;16:2237–43.
21. Value based healthcare [Internet]. [cited 2025 Jul 22]. Available from: https://www.health.nsw.gov.au:443/Value
22. Lumos [Internet]. [cited 2025 Jul 22]. Available from: https://www.health.nsw.gov.au:443/lumos/Pages/default.aspx
23. Mulley J. What drives primary care providers to adopt innovative care delivery models in New South Wales, Australia? [Internet]. UNSW Sydney; 2025 [cited 2025 Jul 22]. Available from: http://hdl.handle.net/1959.4/104768
24. decade-proposal-final-apr2020-en.pdf [Internet]. [cited 2025 Jul 2]. Available from: https://cdn.who.int/media/docs/default-source/decade-of-healthy-ageing/decade-proposal-final-apr2020-en.pdf?sfvrsn=b4b75ebc_28&download=true
25. Bright J, Wake K, Witkowski ML, Psacharopoulos D, Heywood J, Ingvar M, et al. Outcomes That Matter to Patients: ICHOM as a Catalyst for Value-Based Care. NEJM Catal. 2025 Mar 19;6(4):CAT.24.0483.
26. NSW Health Report template with image [Internet]. [cited 2025 Aug 12]. Available from: https://www.health.nsw.gov.au/Value/Publications/vbhc-research.pdf
27. Ipsen B, Sheppard J. Transitioning to Value-Based Healthcare: A Closer Look at Australia's Progress.
28. Burns DJP, Arora J, Okunade O, Beltrame JF, Bernardez-Pereira S, Crespo-Leiro MG, et al. International Consortium for Health Outcomes Measurement (ICHOM): Standardized Patient-Centered Outcomes Measurement Set for Heart Failure Patients. Jacc Heart Fail. 2020 Mar;8(3):212–22.
29. Gangannagaripalli J, Albagli A, Myers SN, Whittaker S, Joseph A, Clarke A, et al. A Standard Set of Value-Based Patient-Centered Outcomes and Measures of Overall Health in Adults. Patient - Patient-Centered Outcomes Res. 2022 May 1;15(3):341–51.
30. van den Berg M, Kendir C. PaRIS Field Trial Report: Technical report on the international PaRIS survey of people living with chronic conditions [Internet]. Organisation for Economic Co-Operation and Development (OECD);

2024 Jun [cited 2025 Jul 22]. (OECD Health Working Papers). Available from: https://www.oecd-ilibrary.org/social-issues-migration-health/paris-field-trial-report_e5725c75-en

31. Akpan A, Roberts C, Bandeen-Roche K, Batty B, Bausewein C, Bell D, et al. Standard set of health outcome measures for older persons. BMC Geriatr. 2018 Dec;18(1):36.
32. OECD [Internet]. 2025 [cited 2025 Jul 17]. PROMoting quality of care through patient reported outcome measures (PROMs). Available from: https://www.oecd.org/en/publications/promoting-quality-of-care-through-patient-reported-outcome-measures-proms_c17bb968-en.html
33. OECD. Does Healthcare Deliver?: Results from the Patient-Reported Indicator Surveys (PaRIS) [Internet]. OECD Publishing; 2025 [cited 2025 Jul 24]. Available from: https://www.oecd.org/en/publications/does-healthcare-deliver_c8af05a5-en.html
34. Australian Commission on Safety and Quality in Health Care - PaRIS Survey: Australian National Report - 2025. 2025;
35. Bull C, Callander EJ. Current PROM and PREM use in health system performance measurement: Still a way to go. Patient Exp J. 2022 Apr 27;9(1):12–8.
36. Krogsgaard MR, Brodersen J, Christensen KB, Siersma V, Kreiner S, Jensen J, et al. What is a PROM and why do we need it? Scand J Med Sci Sports. 2021;31(5):967–71.
37. Benson T. Why it is hard to use PROMs and PREMs in routine health and care. BMJ Open Qual [Internet]. 2023 Dec 21 [cited 2025 Jul 25];12(4). Available from: https://bmjopenquality.bmj.com/content/12/4/e002516
38. Bull C, Byrnes J, Hettiarachchi R, Downes M. A systematic review of the validity and reliability of patient-reported experience measures. Health Serv Res. 2019;54(5):1023–35.
39. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 Jul 16]. Australia's health performance framework - Australia's health performance framework. Available from: https://www.aihw.gov.au/reports-data/ahpf/australias-health-performance-framework
40. Identifying Approaches Used in the Analysis and Reporting of Health-system Performance that Have Been Effective at Driving Continuous Improvement and Accountability.
41. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2025 Aug 12]. Learn more about the framework. Available from: https://www.aihw.gov.au/reports-data/australias-health-performance/learn-more-about-the-framework
42. The Australian Health Performance Framework.
43. Primary Health Networks (PHN) Program performance and quality framework [Internet]. [cited 2025 Jul 16]. Available from: https://www.health.gov.au/sites/default/files/documents/2021/04/primary-health-networks-phn-performance-and-quality-framework.pdf
44. Introducing Competition and Informed User Choice into Human Services: Reforms to Human Services: Productivity Commission Inquiry report No. 85, dated 27 October 2017. Canberra, ACT: Department of the Senate; 2018.
45. EuroQol Group. EuroQol--a new facility for the measurement of health-related quality of life. Health Policy Amst Neth. 1990 Dec;16(3):199–208.
46. Patient Feedback Survey for GP Accreditation | Insync [Internet]. 2019 [cited 2025 Aug 12]. Available from: https://insync.com.au/customer-experience/patient-experience/patient-feedback-for-gp-accreditation/
47. Ricci-Cabello I, Avery AJ, Reeves D, Kadam UT, Valderas JM. Measuring Patient Safety in Primary Care: The Development and Validation of the 'Patient Reported Experiences and Outcomes of Safety in Primary Care' (PREOS-PC). Ann Fam Med. 2016 May;14(3):253–61.
48. True A, Janamian T, Dawda P, Johnson T, Smith G. Lessons from the implementation of the Health Care Homes program. Med J Aust. 2022 Jun;216(Suppl 10):S19–21.
49. The-National-PHN-Allied-Health-in-Primary-Care-Engagement-Framework.pdf [Internet]. [cited 2025 Aug 6]. Available from: https://hneccphn.imgix.net/assets/src/uploads/resources/The-National-PHN-Allied-Health-in-Primary-Care-Engagement-Framework.pdf

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