



# The Brimbank Spatial Map of Physical and Social Infrastructure (2017) Summary Report



AUSTRALIAN  
HEALTH POLICY  
COLLABORATION





*Growing Brimbank* is a long-term collaborative program between Victoria University and the City of Brimbank that aims to lift health and education outcomes in the Brimbank community.

This report provides a summary of the **Brimbank Spatial Map of Physical and Social Infrastructure – ‘The Spatial Map’ (2017)**.

The Spatial Map augments the health and social data collated in the first two foundation reports underpinning the program.<sup>1</sup> The Spatial Map uses geographic information systems (GIS) to map the distribution, availability and contribution of significant physical and social infrastructure to health and education outcomes in the community – those that can support individual capability and community capacity for health and wellbeing.

The report maps associations (correlations) between physical and social infrastructure within the Brimbank community and six health and development indicators selected from The Brimbank Atlas of Health and Education 2014. They are: self-assessed fair or poor health, obesity, diabetes, psychological distress reported as ‘high’ or ‘very high’, children developmentally vulnerable on one or more domains in the Australian Early Development Census (AEDC), and hospitalisations for ambulatory care-sensitive conditions (ACSCs).

The selected elements of physical and social infrastructure explored were those most likely to:

- promote better health and wellbeing (such as good nutrition and social inclusion) or ameliorate risks;
- hinder or reduce good health and wellbeing (such as obesogenic environments); and
- be important for Brimbank City Council’s community plan and health and wellbeing strategies.

They include:

- environmental determinants of food availability;
- physical activity;
- social inclusion;
- public transport;

- assets or features related to promotion of childhood development against the five AEDC domains (libraries, leisure centres);
- environmental features that promote wellbeing (contour variation, parklands, tree canopy);
- availability (numbers) and proximity (coverage/distribution) of a range of services and providers of food, leisure-time physical activity, learning and development, entertainment;
- community and neighbourhood supports and groups; and
- out-of-hours availability of some services.

The socio-economic make-up of the community (contextual factors) was also assessed for strength of association with each of the health indicators. As expected, this report clearly reinforces that those people living in areas of – and people experiencing – socio-economic disadvantage have greater odds of poor health outcomes, and less access to community resources or capacity to use those resources to make healthy choices.

Different types of features in the community were overlaid on the map, specific to the six selected outcomes. This generated a multi-dimensional picture of influences within the community related to health and education outcomes, and indicated opportunities for interventions to address poor health and education outcomes.

An important caveat for this work is that GIS does not provide answers as to why patterns or associations exist (causality). It does provide critical information with which to undertake further inquiry and the primary purpose of this work.

## The key findings of the spatial map report

There are ‘many different Brimbanks’ (subpopulations) described by their community infrastructure and relative to their population density, their health and education outcomes, cultural diversity and levels of socio-economic disadvantage.

<sup>1</sup> Foundation data for *Growing Brimbank* come from:

- The Brimbank Atlas of Health and Education 2014
- Physical Activity, Sport & Health in the City of Brimbank 2014
- Brimbank Spatial Map of Physical and Social Infrastructure

Areas of socio-economic disadvantage consistently showing stronger correlations with poorer outcomes were St Albans North – Kings Park and St Albans South – Sunshine North.

Relatively advantaged areas of Brimbank, such as Taylors Lakes and Keilor Downs, have greater concentration of natural and physical features (open spaces with trees, bike paths, drinking fountains and parkland area) associated with better health outcomes.

People with poor health and development outcomes tend to live in areas of low socio-economic advantage characterised by:

- more bulk billing GPs;
- more flexible learning centres (tailored programs for disadvantaged young people);
- greater numbers of;
  - takeaway food outlets (compared to access to major supermarkets and shops selling fruit, a proxy for fresh food availability);
  - packaged liquor licenses;
  - licensed clubs and poker machines; and
- fewer playgrounds, pets, indoor play centres, residential proximity to school bus stops, trees per person, conservation zones, drinking fountains and bike paths.

Clearly, some services move to where the needs are, but others do not.

Some comparisons are more informative when made to Greater Melbourne or Victoria, rather than with subpopulations in Brimbank, because either:

1. **features are so pervasive** in the community that there is not sufficient variation within Brimbank to show any relationship between the infrastructure or feature and health and development outcomes. Their distribution is shown in the maps (correlations occur in the tables).

Examples: distribution of poker machines or the number of sports facilities in Brimbank laid over the distribution of rates of female obesity, and comparisons to other areas of disadvantage in Greater Melbourne; or

2. sometimes the focus of information at Population Health Area (PHA) level (the smallest geographical area at which health and wellbeing indicators are reported) is too granular to find a correlation, which may lead to the wrong conclusion or leave us without a clear path to further enquiry.

## Positive Correlations

Better health outcomes in Brimbank are strongly associated with **greater access** to:

- conservation zones, tree canopy, playgrounds and parkland, bike and walking paths;
- Brimbank City Council facilities (libraries, maternal and child health centres, leisure centres, playgrounds and sports fields);
- presence of fresh food outlets, cultural and major supermarkets (although major supermarkets are less prevalent in St Albans);
- primary health care providers.

## Negative Correlations

Where there are higher rates of poor health and development outcomes, we see **less access** to features such as:

- public and commercial physical activity/fitness centres/gyms;
- walking to school bus stops;
- contour variation; and public toilets.

**Some PHAs and suburbs** with poor health and education outcomes **stand out** in relation to:

- fewer neighbourhood groups. **Sunshine** has relatively few groups and a high proportion of children who are assessed as developmentally vulnerable upon entry to school;
- greater proximity to packaged liquor licenses and fewer gyms. **St Albans** and **Kings Park** have these features and the highest estimated rates of obesity in women; and
- significantly fewer GP services with late opening hours per capita. This feature occurs in areas of higher rates of hospitalisation for ACSCs, such as **Keilor**.

However, people living in specific geographies do not all share the same characteristics (Preston, 2010). In Brimbank specifically, recognition of the diversity of strengths and wealth of cultural resources (as well as vulnerabilities and needs) is vital for the identification and leveraging of assets within collective impact approaches. Social infrastructure – such as the many incorporated community groups in St Albans (200) and Sunshine (115) – is a valuable asset.

# The *Growing Brimbank* program

The *Growing Brimbank* program draws on a detailed regional profile contained in the foundation reports (available at [www.vu.edu.au/australian-health-policy-collaboration](http://www.vu.edu.au/australian-health-policy-collaboration)) that provides data across a range of health, education and other social and demographic characteristics together with spatial and geographical data related to community infrastructure.

## Who should use the Spatial Map?

The Spatial Map should be used by community planners, policymakers and practitioners to:

- **access information** about capacity and assets on which to build prevention and early intervention strategies;
- **frame the opportunities** for risk mitigation, and what and where the intervention points are; and
- **inform the design** of policies and practices to address multifactorial issues related to health and education outcomes in a socially disadvantaged community.

## More about *Growing Brimbank*

The Australian Health Policy Collaboration at Victoria University and the City of Brimbank are collaborating to apply evidence-based strategies and interventions to lift health and education outcomes in the Brimbank community. The *Growing Brimbank* program commenced in 2015 and combines a place-based approach with the concept of building capability across the life course. Individuals have inherent capability to attain full social and economic participation, but these capabilities can be reduced by external economic, environmental and social risk factors as well as individual and familial risk factors.

The program's three foundation reports, described on page 6, draw together nationally available data and are designed to be replicable over time and place.

## Brimbank Profile

**Brimbank is large:** the City of Brimbank was established in 1994 after the merger of the former Cities of Keilor and Sunshine; it spans 123 km<sup>2</sup> and had an estimated population of 199,432 in June 2015. In recent years the highest growth in population occurred in 2009, declining marginally each year since. It is the second most populous municipality in metropolitan Melbourne (after Wyndham, the largest in the Western Region), and incorporates one of the largest industrial areas in Melbourne.

**Brimbank is relatively disadvantaged:** the City of Brimbank scored 925.8 on the index of relative socio-economic disadvantage (IRSD), making it one of the 10 most disadvantaged capital city local government areas (LGAs) in Australia. The most disadvantaged communities are in central and southern parts of Brimbank, and the most populous suburbs are St Albans (IRSD 839), Sunshine (894), followed by Keilor (1055). Excepting Keilor, these communities have IRSDs lower than the average for country Victoria (978).

**Brimbank is culturally diverse:** about 42% of Brimbank's population were born overseas (of which about 7.1% are recent arrivals – more than twice the Australian average); more than half the population speaks a language other than English, and more than 150 languages are spoken. Recent migrant and refugee arrivals (since 2007) from countries in which English is not the predominant language are not a homogenous group; the most rapidly growing groups are from Asia and Africa. In Sunshine, close to one in every 11 people is a recent migrant or refugee, with the main countries of birth being Vietnam (13.4%), India (4.2%), Philippines (3.4%) and Malta (3.1%). Some cultural groups are well established, as reflected in the composition of high street small businesses and longstanding community groups (eg. the Vietnamese Women's Group).

**Brimbank has experienced rapid growth and substantial economic and social change:** substantial migration into Brimbank has occurred in phases, after WWII and again in the 1970s and 80s, but there has been relatively low investment in infrastructure to meet these challenges to ensure a thriving community. Migration out of Brimbank is also substantial: 41% of residents moved out of the City between 2006 and 2011.

The proportion of jobless families in the City of Brimbank is high – twice the Melbourne average. As a result, government support is the main source of income for almost twice as many families in the City of Brimbank as in Melbourne and Australia overall. Manufacturing is the largest employer, accounting for 12,661 local jobs in 2014/15. In 2011, 34.3% of the workforce lived and worked in Brimbank. The percentage of employed citizens in the population rose from 39.3% in 2011 to 45% in 2015 (.id Social Atlas for Brimbank at <http://atlas.id.com.au/brimbank>)

Brimbank is home to major institutions, including Sunshine Hospital and Victoria University's St Albans and Sunshine campuses.

# What does the Spatial Map tell us?

The **Brimbank Spatial Map** reviews the physical infrastructure, community and social features to augment the health and social data from:

The Brimbank Atlas of Health and Education (2014)

- baseline health, development and social data (at 2011), characteristics of people in their areas of residence, and the indicators of disadvantage;
- their profound impact on learning, development, health and wellbeing; and
- variations in indicators of access and outcomes within Brimbank, and compared to other communities.

Physical Activity, Sport and Health in the City of Brimbank (2014)

- Victorian Sport and Recreation facility and infrastructure data for seven major sports;
- health data, including indicators of population levels of physical activity; and
- an overview of access to, and participation in, both organised and recreational leisure-time physical activity, and connection to health and education outcomes within the Brimbank population.

Use of GIS helps us:

- measure variation between PHAs;
- understand how health and wellbeing are dependent on the availability of and access to resources and services;
- identify those population groups with poor access to resources;
- understand the relevance of infrastructure to individual capabilities and community capacity; and
- highlight the fundamental role of community resources in reducing inequality.

The Spatial Map reports correlations (the strength of relationships) between health and education outcomes and the location of assets in Brimbank's PHAs, highlighting:

- patterns and inter-relationships associated with socio-economic disadvantage on the IRSD;
- how community infrastructure may prevent or ameliorate risks for some residents and not others;

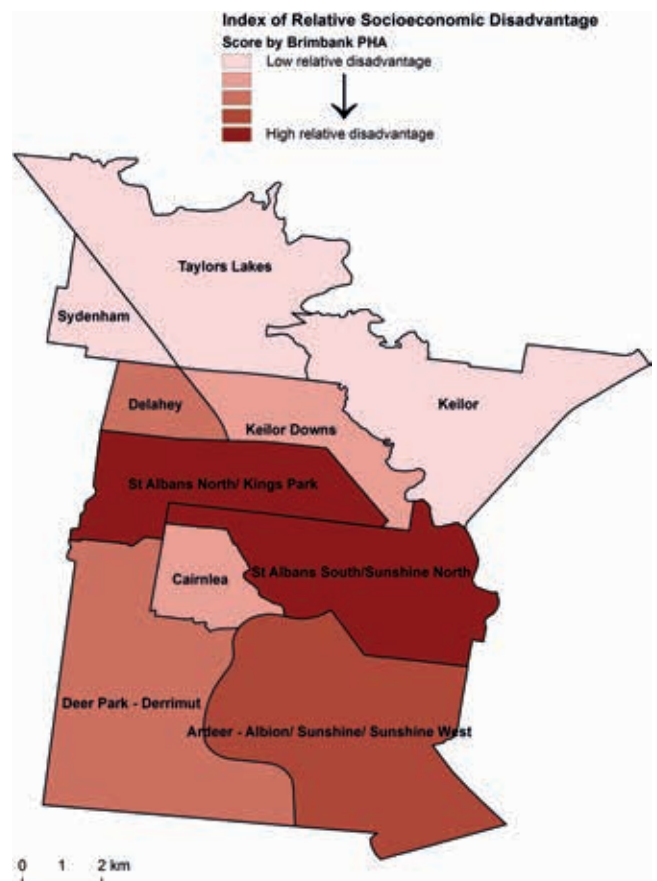
- information for further exploration of causation.

The information is presented as text, tables and overlaying maps, and correlations with:

- infrastructure;
- health and wellbeing indicators;
- contextual indicators;
- education and child development; and
- demographics.

The findings describe both generalised patterns and patterns specific to:

- self-assessed fair or poor health;
- obesity;
- diabetes;
- psychological distress reported as 'high' or 'very high';
- children developmentally vulnerable on one or more domains of the AEDC;
- hospitalisations for ACSCs.



# Contribution of Spatial Mapping to *Growing Brimbank*

## Importance of community assets

Physical and social features within communities – such as health and community services, green canopy, recreation areas, childcare centres, food and alcohol outlets, sporting facilities and public transport – are significant influences on local individual and population health, development and wellbeing.

Spatial mapping allows us to purposefully recognise the importance of place and environment in determining what contributes to risks for poorer health and education outcomes, and to what extent, and the fundamental role of community assets in reducing inequity in disadvantaged communities.

## How we used GIS

GIS was used to augment the *Growing Brimbank* health and social data by overlaying the concentration of physical and social features on the geographical distribution of risk factors for health and development. This tells us:

- **where** patterns of presence or absence of particular physical and social infrastructure assets occur in association with risks to health and education; and
- the **strength or extent** of those associations (correlations).

GIS provides critical information with which to undertake further inquiry and determine **why** patterns or associations exist (**causality**).

For the purposes of this report correlations over 0.71 were flagged as significant. Correlations between 0.6 and 0.7 were read as 'moderate' and 0.8 to 0.9 as 'highly' correlated.

## Blending or overlaying maps

By blending features, such as fast food outlets, parks and public transport, we have been able to describe:

- how many particular feature types are found in an area (**coverage**);
- how close, on average, residents are to various features (**proximity**); and
- the **variation between areas** in association with the indicators of health and wellbeing.

Overlaying distribution maps **builds the picture** in ways that helps us describe the 'many different Brimbanks' and to see how the availability and access of assets can work better in some subpopulations than others to reduce inequality.

When features are presented together we 'see the full picture' in Brimbank.

## Example

Estimated rates of female obesity are highest in the PHAs of St Albans and Kings Park.

This is also where we see:

1. Higher relative socio-economic disadvantage on the IRSD
2. Patterns of significantly greater proximity to:
  - chain takeaway stores and packaged liquor licenses (positive correlation);
  - fewer major supermarkets (negative correlation);
  - fewer trees, parkland and playgrounds; and
  - fewer gyms for women (negative correlations).

These associations suggest the existence of obesogenic environments in certain PHAs, which require more analysis to plan support for better community health and wellbeing.



## Example

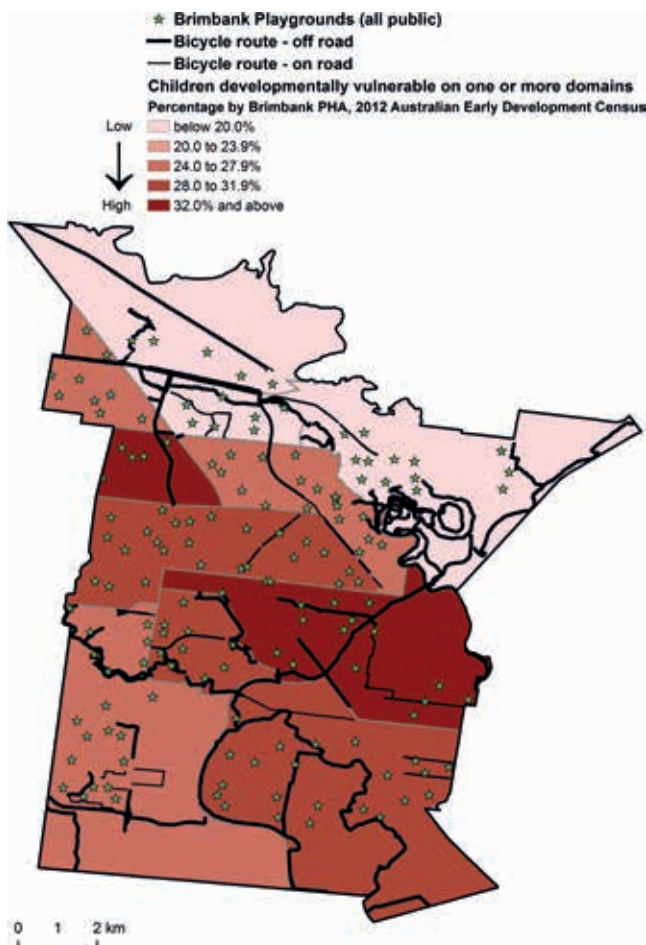
28% of children in Brimbank are assessed as developmentally vulnerable, and higher rates exist in some PHAs of Brimbank with higher levels of socio-economic disadvantage on the IRSD.

These areas are explored in relation to:

- availability of and access to preschools, public playgrounds, and indoor play centres;
- location of maternal & child health centres;
- location of libraries;
- public transport and bike paths;
- arterial roads that affect access to services (eg. GPs with late opening hours); and
- proximity of schools to the many packaged liquor licences and fast food outlets,

in order to provide a picture of the patterns of the resources available in those areas that could contribute positively or negatively to children's development.

Main Report [Map 4.6.12](#)



See maps below

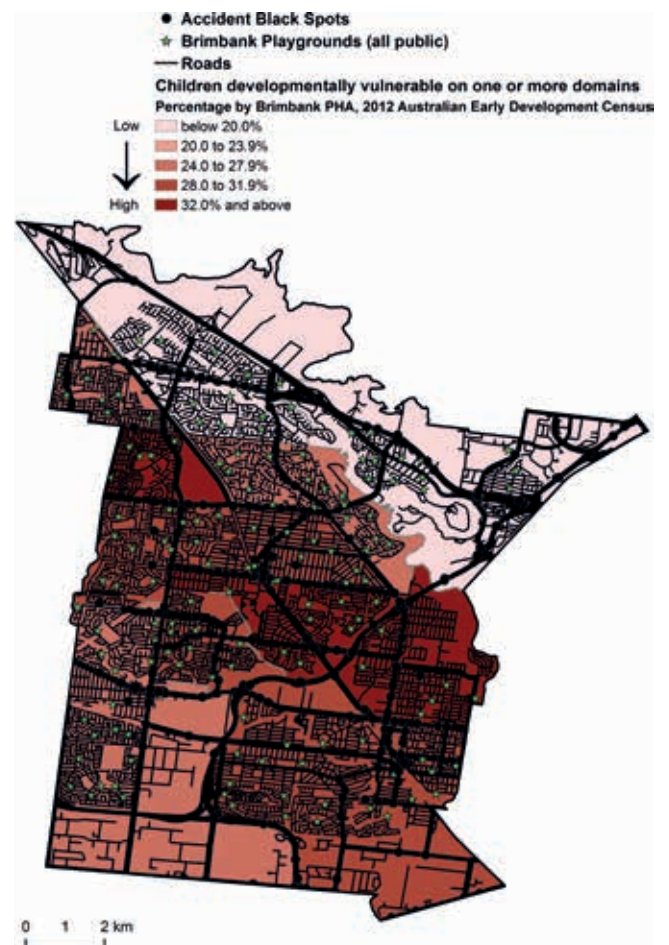
A map in the main report identified the highest rates of children who are developmentally vulnerable on one or more domains to be in St Albans and Sunshine North/Delahey. We overlaid that map with the coverage and proximity of access to physical activity environments (known to contribute to healthy outcomes); (see page 13; main report [Map 4.6.6](#)).

We explored how difficult it was to get to the playgrounds and parks, by overlaying off- and on-road bicycle routes in [Map 4.6.12](#).

To explore access to infrastructure further, we created the composite [Map 4.6.11](#) by overlaying [Map 4.6.2](#) (rates of childhood vulnerability) and [Map 4.6.12](#) (roads, bike trails and playgrounds) together with public roads and accident blackspots.

This gave us map 4.6.11:

Main Report [Map 4.6.11](#)



# The findings

(These should be read in conjunction with the supplementary summary tables, Appendix 1.)

## Poor or fair self-assessed health status

One in five people in Brimbank rate their self-assessed health (SAH) as being fair or poor, 38% above the Australian rate (The Atlas, 2014). St Albans North – Kings Park and St Albans South – Sunshine North have rates elevated by 26% and 18% respectively above the Brimbank rate.

### What have we learnt from GIS?

SAH is associated with health indicators such as diabetes, female obesity, and psychological distress, and with health risks such as male smoking and harmful alcohol use.

There are strong correlations between SAH and the contextual indicators of social disadvantage:

- children living in jobless families;
- mothers with low educational attainment;
- adult unemployment;
- people aged 15 years and over living with a disability;
- no internet connection at home;
- low-income households under financial stress; and
- low-income households with children developmentally vulnerable in one or more domains of the AEDC.

SAH is correlated with the following infrastructure at Brimbank LGA level:

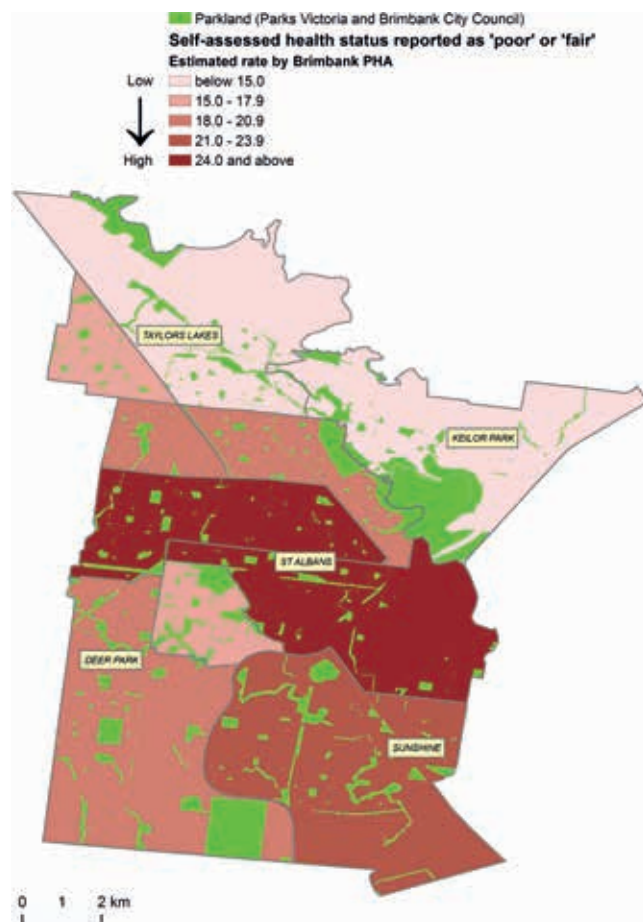
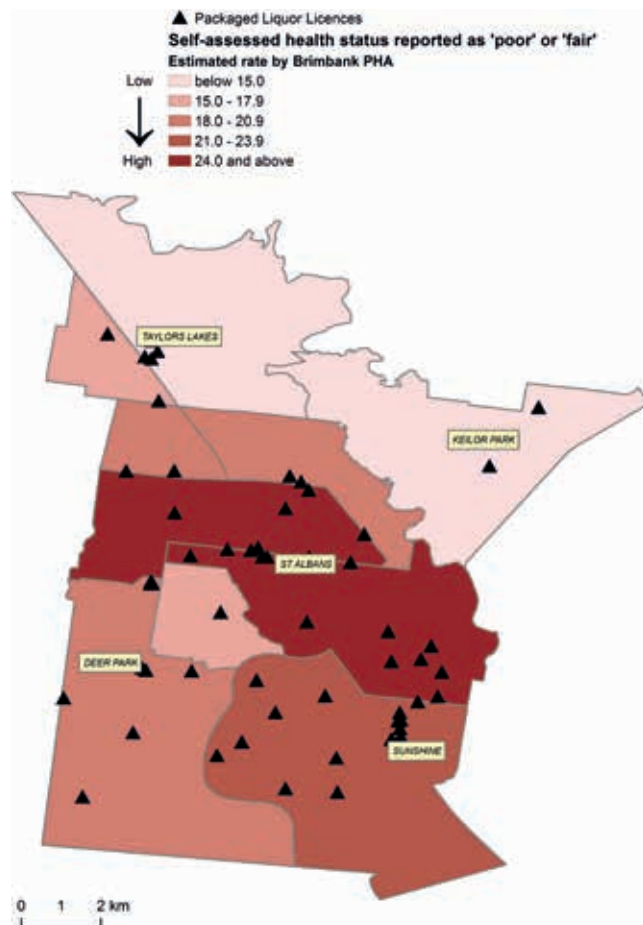
- consistently high presence of
  - packaged liquor licenses (see first map)
  - bulk-billing GPs (indicating demand);
- less parkland (second map) and contour variation, fewer trees, and fewer locations for formal exercise – fitness businesses and gyms per person; and
- lower incomes and higher population densities.

All of the above can be viewed as a restatement of the connection between SAH and socio-economic status. Poor people live in less attractive places, and the built environment can both reflect and reinforce health and wellbeing. Contextual indicators are mostly consistent for each of the six health and development outcomes reported here.

St Albans North – Kings Park- St Albans South – Sunshine North PHAs had the lowest access to most assets, but greater access to venues with liquor licences.

Some notable assets are:

- The \$20.3m recently spent upgrading playgrounds, parks and walking/bike paths along the Kororoit Creek; and
- 689 incorporated community groups (200 in St Albans) provide social infrastructure to their community, 44% of which are associated with particular culturally and linguistically diverse (CALD) groups.



## Obesity

Obesity is a national public health problem, and varies by location, socio-economic status and gender.

In Brimbank, obesity is estimated to affect:

- close to one third of women (compared to 26% in Melbourne), with significant geographic variation across the LGA (highest in St Albans North – Kings Park, lowest in Keilor PHA); and
- 26% of men (compared to 24% in Melbourne).

### What have we learnt from GIS?

Female obesity is associated with health indicators such as SAH, diabetes and psychological distress, harmful use of alcohol, and male smoking.

Men's rates of obesity are associated with SAH and people living with a disability under 65 years.

**Contextually**, the strongest correlations of obesity are with indicators of social disadvantage, as expected. They are the same indicators of poverty as for SAH, the only difference being the inclusion of early school leavers and people working as labourers.

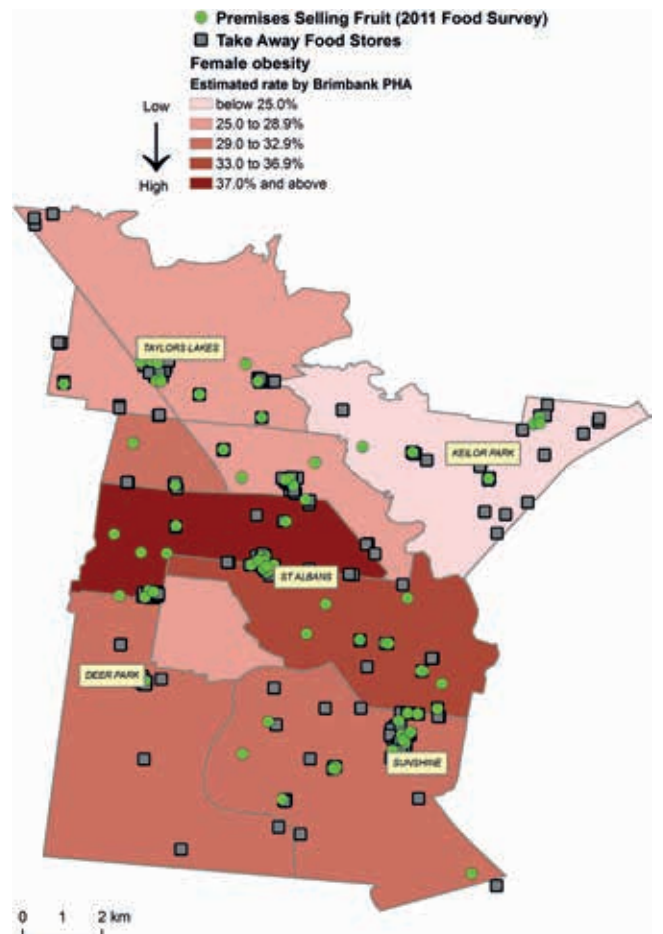
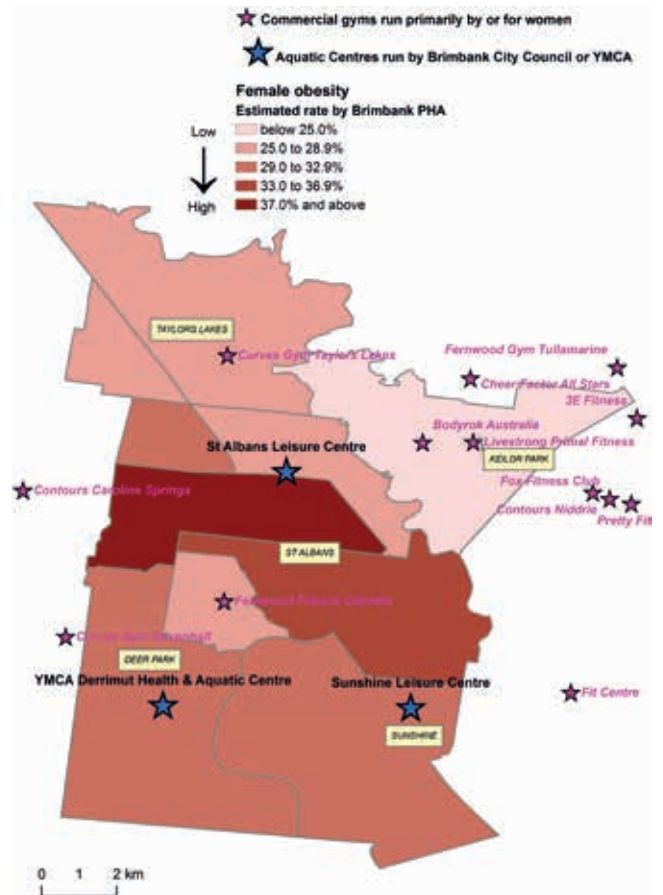
In terms of **infrastructure**, areas with high estimated rates of female obesity, such as St Albans North – Kings Park, have:

- fewer commercially operated gyms, and in particular gyms run by or for women. Municipal facilities, such as the St Albans Leisure Centre, are therefore crucial resources for people who cannot afford private centres (see map opposite); and
- lower density of trees, less public open space, and fewer playgrounds per person.

These correlations are a reflection of outcomes in areas of socio-economic disadvantage.

Food access and good nutrition are important aspects of preventing obesity. However, there are no obvious correlations between obesity and food and nutrition in Brimbank. This may be explained by the ubiquity of some features, which means that no correlations are recorded. Nevertheless, useful information on distribution and access was available through the maps; an example is shown at right. Note that:

- major supermarkets and shops selling fruit (a proxy for fresh food availability) are located widely across the municipality;
- some clusters of residential addresses in Brimbank are over 2 km from a major supermarket; and
- take-away food outlets are more prevalent than shops selling fruit. Few areas in Brimbank are far from a takeaway outlet.



## Diabetes

The estimated diabetes rate within Brimbank, at 8.8 per 100 people, is 63% higher than the national average.

The correlation between obesity and diabetes is significant and well known. Physical and social infrastructure can affect the prevalence of both.

### What have we learnt from GIS?

The health indicators with the strongest correlations with diabetes are obesity and self-assessed poor or fair health, harmful alcohol use, and male smoking.

Diabetes rates in Brimbank differ from **obesity rates** in that:

- the data are not gender-specific; and
- several PHAs have significantly higher rates, as shown in the map opposite.

Contextual indicators of diabetes, similar to those for obesity, are related to socio-economic disadvantage (eg. jobless families, some populations from CALD backgrounds).

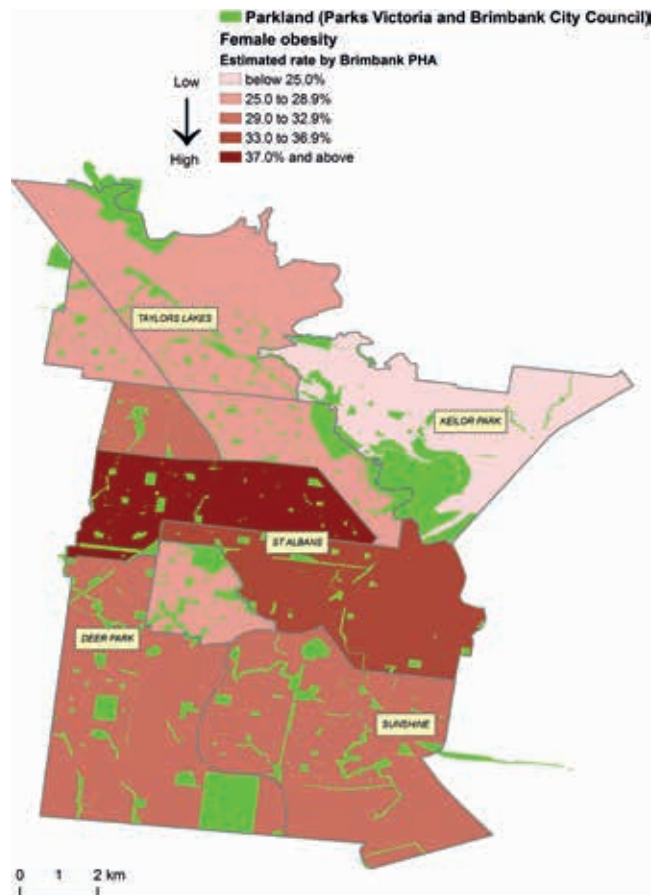
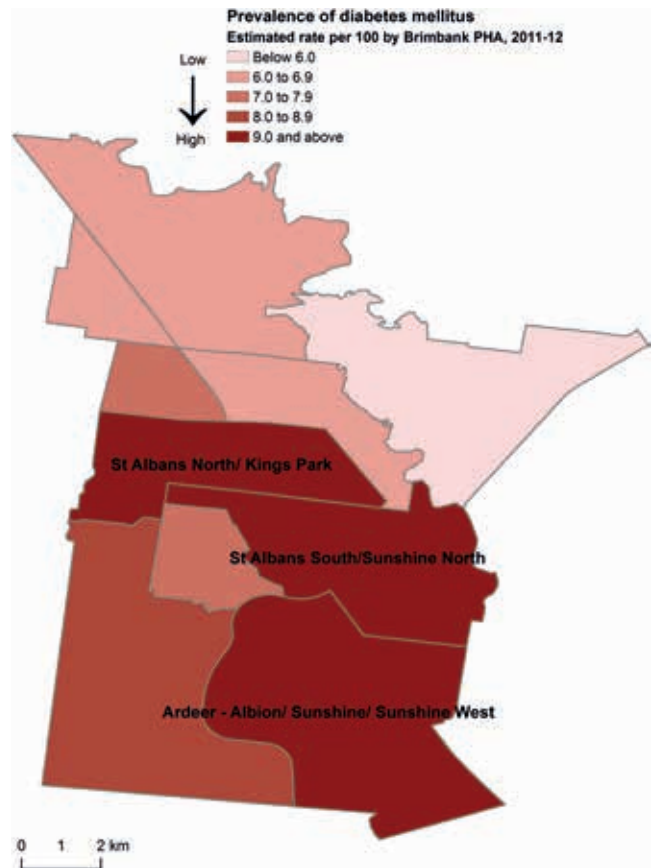
In terms of **infrastructure**, there are strong correlations between high prevalence of diabetes and:

- more cultural supermarkets; and
- more state primary schools per person.

Weaker correlations that are nonetheless instructive in their geographical distribution are:

- greater proximity of residence of people with diabetes to state primary schools;
- more packaged liquor licenses;
- more accident black spots;
- more flexible learning centres per person;
- fewer trees (open space) per person;
- lower percentages of parkland (see map opposite); and
- less contour variation.

Takeaway stores are so prevalent in Brimbank that they do not return significant correlations with diabetes at PHA level.



## Psychological distress

Rates of psychological distress in Brimbank are high or very high. They are:

- higher for women than men in Brimbank, and 16% above the national average; and
- the men's rate is 37% higher than the national average.

### What have we learnt from GIS?

Patterns of psychological distress in Brimbank are associated with:

- other **health indicators** of self-assessed poor or fair health, diabetes and obesity; and
- **contextual indicators** of social disadvantage, notably with particularly early school leavers of both genders.

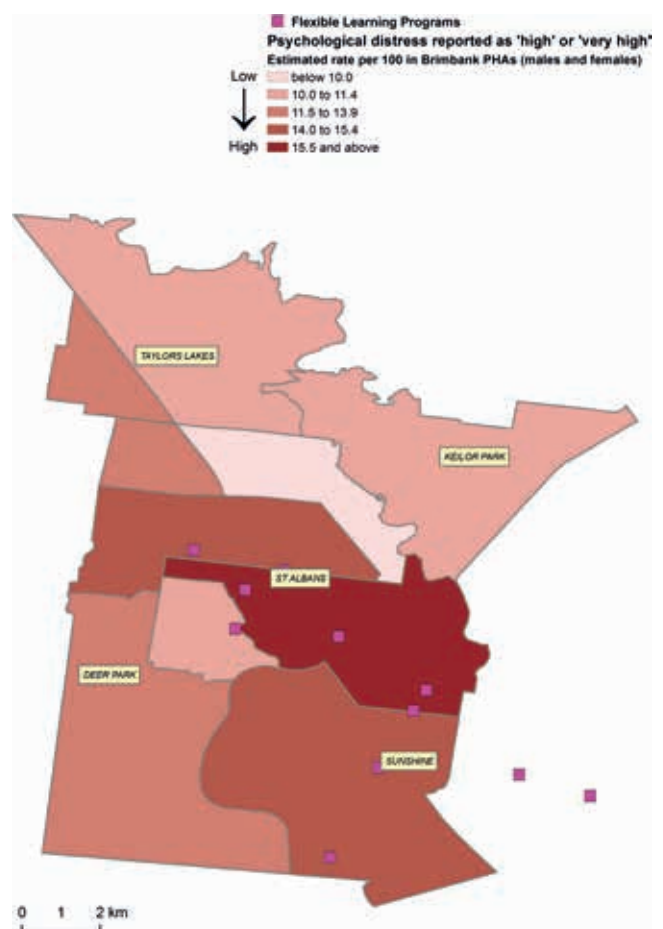
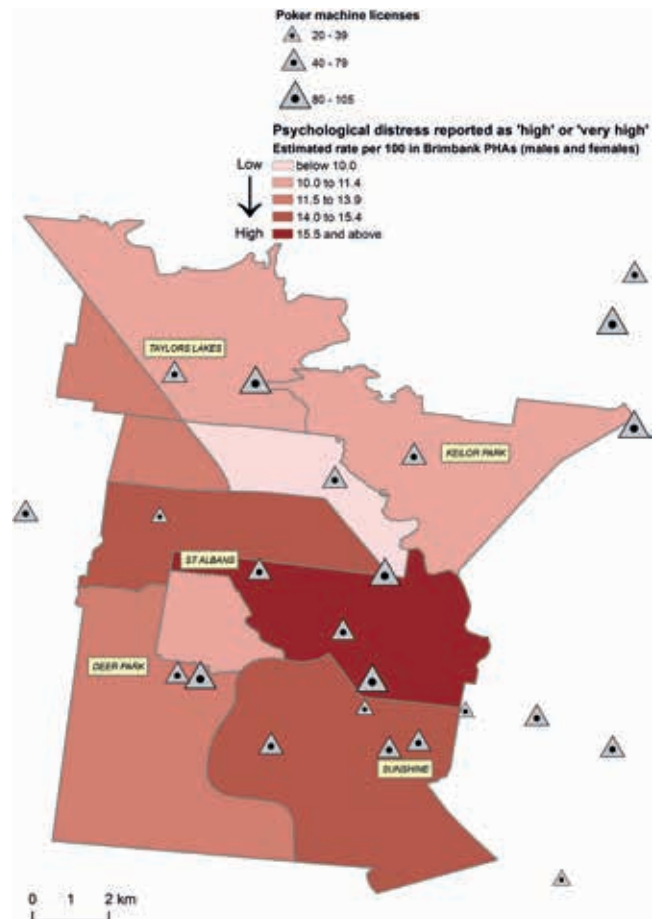
The geographical distribution of people with psychological distress was most notable in St Albans – South/Sunshine North and Ardeer and Albion – Sunshine West.

In terms of **infrastructure**, high psychological distress is strongly correlated with:

- high density of cultural supermarkets;
- high rates of packaged liquor licenses per person; and
- high rates of state primary schools per person, but less strongly correlated with aspects of the environment and topography:
- fewer walking school bus stops; and
- less contour variation and parkland, and fewer trees.

There is no statistically significant correlation between poker machines and psychological distress, but this may be due to their ubiquity or prevalence in some parts of the LGA (see the map at right showing poker machine distribution).

The second map (opposite) shows an overlay of flexible learning programs in St Albans – South/Sunshine North and Ardeer and Albion/Sunshine West. The concentration is in the areas of greatest need – the PHAs recording the highest rates of psychological distress.



## Childhood Developmental Vulnerability

The highest concentration of developmentally vulnerable children (overall 28% in Brimbank, 2012) is in the Delahey PHA (25% above the Brimbank average), followed by St Albans – South/Sunshine.

Childhood developmental vulnerability was most strongly correlated with:

- **health indicators** – poor or fair self-assessed health; and
- **contextual indicators of social disadvantage** – children living in jobless families; mothers with low educational attainment; parental unemployment; people working as labourers; no internet connection at home; and low-income households under financial stress.

### What have we learnt from GIS?

Infrastructure associated with developing play, socialisation, physical health and wellbeing, language and cognition, communication and emotional maturity (AEDC domains) were explored.

Government and not-for-profit services and facilities of relevance to children are distributed throughout Brimbank and show no correlations with children who are developmentally vulnerable. These include libraries, maternal child health services, state primary schools, kindergartens, neighbourhood playgrounds, toy libraries, playgroups, sports fields, municipal aquatic centres, and neighbourhood centres.

While government and not-for-profit services are distributed on the basis of population, commercially run services (eg. indoor play centres and private swim schools) tend not to be located in areas with higher levels of health and education vulnerability and lower economic circumstances.

Children assessed as developmentally vulnerable in Brimbank live in areas with **significantly**:

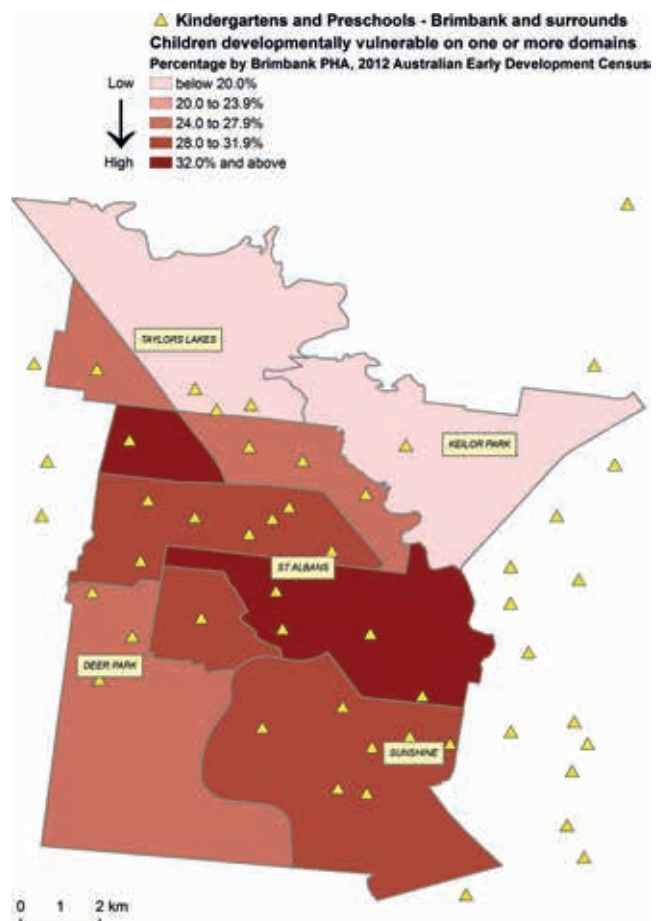
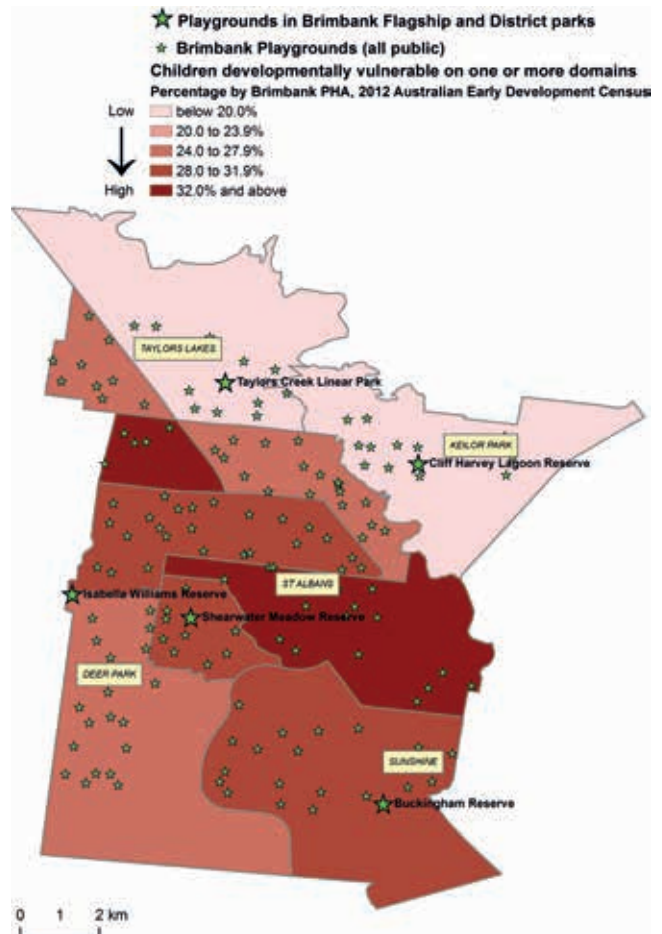
- greater proximity to packaged liquor licenses;
- more bulk billing GPs – proximity to residences;
- less conservation zone – total sqm per person;
- lower percentages of parkland;
- fewer trees per person;
- less bike paths on road – total metres per person; less contour variation; and
- fewer public toilets.

Rates of children assessed as developmentally vulnerable are **moderately associated** with:

- fewer pets, playgrounds and drinking fountains per person;
- fewer licensed restaurants and cafes;
- fewer walking school bus stops per person; and
- fewer chain takeaway food outlets.

Whilst there is no correlation between proximity of kindergartens and pre-schools and higher rates of childhood developmental vulnerability, the distribution and location of

kindergartens and pre-schools in Brimbank PHAs highlight the importance of access (see the map below).



## Hospitalisations for ambulatory care-sensitive conditions

ACSC hospitalisation rates are high in Brimbank compared to Victoria and Melbourne, and have different distribution patterns for children and adults.

- Children (aged 0 to 14 years) in Brimbank have an ACSC hospitalisation rate 19% higher than the Victorian average, and 30% above the Melbourne average for asthma and dental caries.
- The rate for children is highest in Keilor PHA (40% above the Victorian average), where there is relative socio-economic advantage and a lower proportion of children (see map opposite).
- Adults in Brimbank have an ACSC hospitalisation rate 8% above the Victorian rate for chronic conditions (cardio-respiratory, diabetes, asthma).
- The adult rate is highest in Keilor, followed by northwest Sydenham, Delahey, and Taylor's Lakes.

### What have we learnt from GIS?

There are no significant associations between ACSC hospitalisation rates and other health and wellbeing indicators.

Contextually, ACSC hospitalisations are not correlated with indicators of socio-economic disadvantage. For example, the relatively advantaged areas of Keilor and Taylor's Lakes have high rates of such hospitalisations. The pattern for all the other health outcomes studied is a strong association with socio-economic disadvantage.

It is important to note that this trend in relatively advantaged areas is a striking anomaly. It will be the focus of further enquiry.

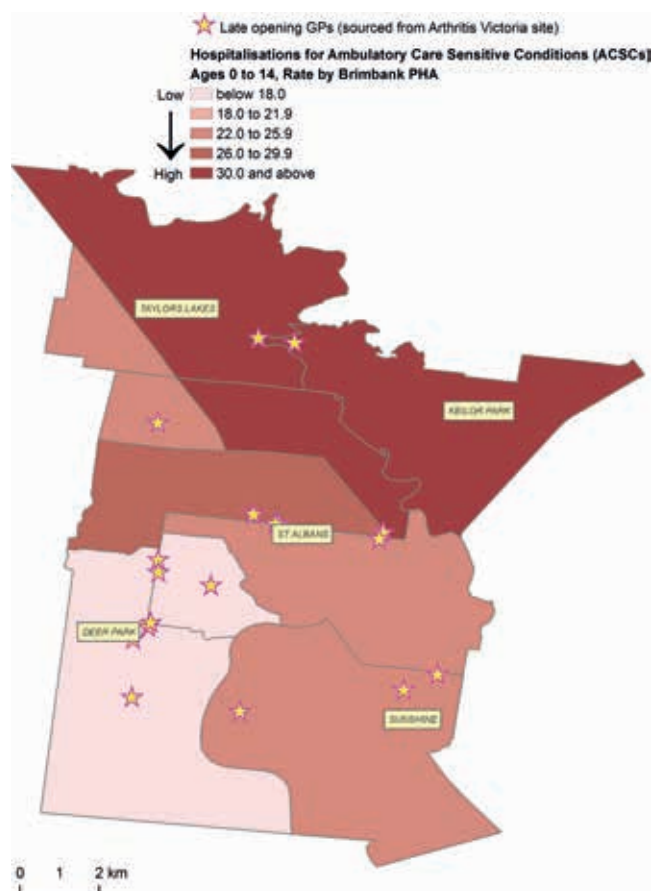
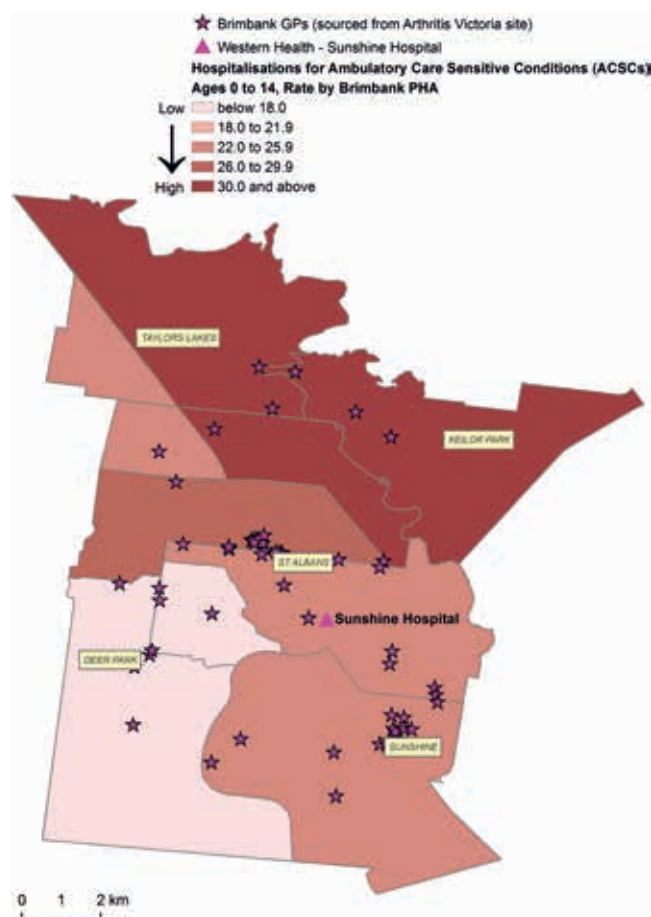
In terms of physical and social infrastructure, ACSC hospitalisations in children are associated with:

- more pets – per person;
- more contour variation;
- more bus stops in proximity to residences; and
- fewer packaged liquor licenses.

For adults, high rates of ACSC hospitalisations are associated with:

- fewer packaged liquor licenses – per person;
- fewer licensed clubs – per person;
- less industrial zone – percentage area;
- fewer primary schools – per person; and
- fewer accident black spots in proximity to residences.

The GPs and hospitals in the area were mapped; for both adults and children the association with late-opening GPs was weak to moderate (see the two maps opposite).



## Who should use this report?

The Spatial Map enables individuals and communities (in the City of Brimbank and other regions), and policymakers and practitioners, to:

- access information about capacity and assets on which to build risk prevention and early intervention strategies and adopt a strengths-based approach to change;
- frame how and when we can achieve increased individual capability and community capacity to make healthy choices and efficiently access services for a secure and prosperous future;
- support integrated planning across health, urban design and community development; and
- inform the design of policies, practices and cost-effective investments to improve health and education outcomes for individuals and communities.

## Next Steps

### Reviewing the data

Our expert working groups, in partnership with community provider groups and the City of Brimbank, will:

- determine which issues covered are pertinent to their planning;
- identify questions arising from the data for further investigation and analysis; and
- use the data to inform planning cycles, particularly those of the Brimbank City Council and relevant primary health networks.

### Analysis

Using the data from the three reports specific to the City of Brimbank, further enquiry will ascertain why the combination of:

- local infrastructure;
- subpopulation characteristics; and
- geographical distribution and prevalence of health and development risks contribute to inequity in disadvantaged communities and the poor health, development and wellbeing outcomes reported.

The Spatial Map is a living document and will incorporate additional and updated data collections over time.

## Further information

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# Supplementary Summary Tables

In the full report (the Spatial Map of Physical and Social Infrastructure):

- correlations of magnitude 0.75 or more are considered strong positive or negative associations; and
- where features are ubiquitous, and therefore show no correlation, maps of density and location are included to demonstrate the association.

## Reading correlations

A correlation is the strength of an association between two variables – in this case, a health outcome and an asset.

- A positive correlation between two variables means they vary at a similar rate and in the same direction; that is, the more of an asset exists, the more likely the health outcome.
- A negative correlation implies that the less of an asset there is, the more likely the health outcome.

SELF-ASSESSED HEALTH STATUS REPORTED AS 'FAIR TO POOR' (Brimbank Atlas of Health and Education 2014)
In 2011–12, 1 in 5 people assessed themselves as having poor to fair health status (33% above the Australian rate).
In the PHAs in Brimbank with higher estimated rates of self-assessed poor or fair health, the prevalences of diabetes, male smoking, female obesity, harmful alcohol use, and psychological distress were high and associated with the following physical and social infrastructure (assets or deficits).
<b>Positive correlations: attributes more prevalent in Brimbank PHAs with high rates of self-assessed poor or fair health</b>
Cultural supermarkets – per person (.868**)
Packaged liquor licenses – proximity to residences (.792**)
State primary schools – proximity to residences (.776**)
Bulk billing GPs – proximity to residences (.738*)
<b>Negative correlations: attributes less prevalent in Brimbank PHAs associated with high rates of self-assessed poor or fair health</b>
Trees [open space] – per person (-.822**)
Percentage of parkland (-.741*)
Trees [street] – per person (-.720*)
Contour variation (-.715*)
Fitness businesses [all] – per person (-.711*)
Conservation zones – total square metres (sqm) per person (-.697*)
Crown and special land – total sqm per person (-.670*)
Gyms – per person (-.638*)

## OBESITY (Brimbank Atlas of Health and Education 2014)

In 2011–12, 1 in 3 women (32.6%) aged over 18 years was estimated to be overweight or obese (national rate, 27.6%) with the highest rate in St Albans at 41.6%. One in 4 males was estimated to be overweight or obese.

In the PHAs in Brimbank with higher estimated rates of female obesity, there were higher estimated rates of self-assessed poor or fair health, diabetes, male smoking, harmful alcohol use and psychological distress, and socio-economic disadvantage.

In the PHAs in Brimbank with higher estimated rates of male obesity, there were more people with self-assessed poor or fair health and more people aged under 65 years living with a disability.

Obesity was associated with the following physical and social infrastructure (assets or deficits):

### Positive correlations: attributes more prevalent in Brimbank PHAs with high rates of obesity

#### For females

Cultural supermarkets – per person (.817\*\*)

State primary schools – per person (.687\*)

Packaged liquor licenses – proximity to residences (.638\*)

NB: for males there were no positive correlations

### Negative correlations: attributes less prevalent in Brimbank PHAs associated with high rates of self-assessed poor or fair health

#### For females

Trees [open space] – per person (-.799\*\*)

Percentage of parkland (-.746\*)

Trees [street] – per person (-.707\*)

Fitness businesses [all] – per person (-.700\*)

Contour variation (-.697\*)

Playgrounds [all public] – per person (-.675\*)

Gyms – per person (-.661\*)

Women's gyms – per person (-.656\*)

Playgrounds [flagship] – per person (-.642\*)

Drinking fountains – per person (-.637\*)

#### For males

Bike paths, off road – proximity to residences (-.744\*)

Streams and rivers – proximity to residences (-.729\*)

NB Takeaway food outlets, fresh food outlets and sports facilities do not show any significant correlations with obesity at Brimbank PHA level, possibly due to the high numbers of these outlets throughout the community, as shown in maps 4.2.6–4.2.8 in the report.

<b>DIABETES (Brimbank Atlas of Health and Education 2014)</b>
In 2011–12, the estimated prevalence of diabetes in Brimbank was 8.8 per 100 population – 63% above the national figure (5.4 per 100). In some PHAs, estimated diabetes prevalence is twice the national average.
In the PHAs in Brimbank with higher estimated rates of diabetes there are higher estimated rates of self-assessed poor or fair health, male smoking, psychological distress, female obesity, and harmful alcohol use, associated with the following physical and social infrastructure (assets or deficits)
<b>Positive correlations: attributes more prevalent in Brimbank PHAs with high rates of diabetes</b>
Cultural supermarkets – per person (.902**) State primary schools – per person (.838**) State primary schools – proximity to residences (.679*) Packaged liquor licenses – proximity to residences (.678*) Accident black spots – proximity to residences (.643*) Flexible learning centres – per person (.642*)
<b>Negative correlations: attributes less prevalent in Brimbank PHAs associated with high rates of diabetes</b>
Trees [open space] – per person (-.691*) Percentage of parkland (-.638*) Contour variation (-.634*)

NB While several physical and social infrastructure associations are presented, few stand out as being unique to diabetes. In particular, takeaway stores are so prevalent in Brimbank that they do not return significant correlations at PHA level.

Geographic variation was also noted between PHAs in Brimbank (see Map 4.3.1 in main report). The two highest rates are in the PHAs of St Albans – North / Kings Park, and St Albans – South / Sunshine North (both 11.2 people per 100 population).

<b>PSYCHOLOGICAL DISTRESS (Brimbank Atlas of Health and Education 2014).</b>
In 2011–12 in Brimbank, psychological distress rates were higher for women than for men (and 16% above the national average overall)
However, men in Brimbank have a 37% higher rate of psychological distress than men in Australia as a whole.
In the PHAs in Brimbank with higher estimated rates of high or very high psychological distress, there are higher estimated rates of male smoking, female obesity and diabetes, and harmful alcohol use, associated with the following physical and social infrastructure (assets or deficits)
<b>Positive correlations: attributes more prevalent in Brimbank PHAs with high rates of psychological distress</b>
Cultural supermarkets – per person (.883**) State primary schools – per person (.839**) Packaged liquor licenses – per person (.780**) Packaged liquor licenses – proximity to residences (.710*) State primary schools – proximity to residences (.681*)
<b>Negative correlations: attributes less prevalent in Brimbank PHAs associated with high rates of psychological distress</b>
Walking school bus stops – per person (-.769**) Contour variation (-.714*) Percentage of parkland (-.703*) Trees [open space] – per person (-.663*) Women’s gyms – proximity to residences (-.645*)

NB There is no correlation with poker machines, possibly because of their ubiquity in Brimbank. Map 4.4.3 in the main report shows their distribution.

## CHILDHOOD DEVELOPMENTAL VULNERABILITY

The Brimbank Atlas of Health and Education 2014 presented AEDC results as:

- those on track in physical health and wellbeing (79.1% versus 81.2% nationally); and
- those developmentally vulnerable in one or more domain (27.7% in 1st year of school versus the national average of 22%)

In the PHAs in Brimbank with higher estimated rates of childhood developmental vulnerability there are also higher estimated rates of self-assessed poor or fair health, male smokers, psychological distress, harmful alcohol use, and diabetes, and strong associations with the following physical and social infrastructure (assets or deficits)

### Positive correlations: attributes more prevalent in Brimbank PHAs with high rates of psychological distress

Packaged liquor licenses – proximity to residences (.947\*\*)  
State primary schools – proximity to residences (.927\*\*)  
Bulk billing GPs – proximity to residences (.871\*\*)

### Negative correlations: attributes less prevalent in Brimbank PHAs associated with high rates of psychological distress

Conservation zones – total sqm per person (-.905\*\*)  
Percentage of parkland (-.867\*\*)  
Conservation zones – per person (-.846\*\*)  
Trees [open space] – per person (-.826\*\*)  
Fitness businesses [all] – per person (-.822\*\*)  
Bike track on road – total m per person (-.818\*\*)  
Trees [on street and open space] – per person (-.812\*\*)  
Licensed restaurants and cafes – per person (-.791\*\*)  
Public toilets – per person (-.790\*\*)  
Contour variation (-.777\*\*)  
Gyms – per person (-.749\*)  
Trees [street] – per person (-.723\*)  
Indoor play centres – proximity to residences (-.718\*)  
Drinking fountains – per person (-.696\*)  
Pets – per person (-.675\*)  
Bike track off road – total m per person (-.666\*)  
Hotels – per person (-.662\*)  
Women's gyms – per person (-.662\*)  
Playgrounds [flagship] – per person (-.658\*)  
Takeaway food outlets [all] – per person (-.643\*)  
Cafes – per person (-.641\*)  
Takeaway food outlets [chain] – per person (-.635\*)  
Walking school bus stops – per person (-.632\*)

## HOSPITALISATIONS FOR AMBULATORY CARE-SENSITIVE CONDITIONS (ACSCs)

(Brimbank Atlas of Health and Education 2014)

In 2011–12, in Brimbank, for children aged 0-14 years the rates of hospitalisation for ACSCs were 24.1%, 19% higher than the Victorian average and 30% above the Melbourne average. For adults the rate was 30.3%, 8% above the Victorian average, and the distribution was markedly different from that seen for children.

In the PHAs in Brimbank hospitalisation rates for ACSCs are high for both children and adults, but show unusual patterns, not repeated elsewhere in this Spatial Map report.

Socio-economic disadvantage is not correlated with ACSC hospitalisations in Brimbank and for children there are no significant associations with any other health and wellbeing indicators. ACSC hospitalisation rates are associated with the following physical and social infrastructure (assets or deficits).

### Positive correlations: attributes more prevalent in Brimbank PHAs with high rates of psychological distress

#### For children:

Pets – per person (.850\*\*)

Contour variation (.779\*\*)

Bus stops – proximity to residences (.747\*)

Dog off leash areas – per person (.685\*)

Conservation zones – total sqm per person (.632\*)

#### For adults:

No significant results

### Negative correlations: attributes less prevalent in Brimbank PHAs associated with high rates of psychological distress

#### For children:

Packaged liquor licenses – proximity to residences (-.655\*)

#### For adults:

Packaged liquor licenses – per person (-.738\*)

Licensed clubs – per person (-.701\*)

Industrial zone – percentage area (-.701\*)

Primary schools – per person (-.696\*)

Accident black spots – proximity to residences (-.662\*)

Residential density (ratio of population to addresses) (-.643\*)

State primary schools – per person (-.634\*)

Late opening GPs – per person (-.157)

Late opening GPs – proximity to residence (-.246)



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