Armadale Health District
Population and Health Profile

South Metropolitan Public Health Unit
May 2008

Delivering a Healthy WA

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Executive summary

Population size

In 2004, Armadale Health District:

- had 161,819 residents (7.9% of the State's population). Over half (59%) of the population of the Armadale Health District lived in the City of Gosnells
- had a population density of 59 people per square kilometre
- had 4,305 Aboriginal residents, making up 2.7% of the total population - 58% of the Aboriginal population lived in Gosnells, where they accounted for 2.6% of the population.

Population growth

Over the period 1983 to 2006, the population of the Armadale Health District:

- increased by 51%, or 2.1% per year
- remained steady in relation to the State population.

Population projections

In the Armadale Health District over the period 2006 to 2016:

- the population is predicted to increase by 21% to 196,022 (while the population of the State is predicted to increase by 15% to 2.4 million)
- the fastest growth is predicted to occur in Serpentine-Jarrahdale (55%)
- the highest growth (60%) is expected in the elderly (65 years and above), while the lowest growth is expected among children.

Socio-demographic characteristics

In the 2006 Census, compared to the State, the Armadale Health District had:

- a smaller proportion of people at TAFE, CAE or university, people with a tertiary qualification, and people employed at a professional or managerial level
- a higher proportion of one parent families, unemployed people, and people employed as labourers or other manual workers.

In the Armadale Health District in 2006:

- the dependency ratio was 0.46
- 2,965 people (3.9% of the labour force) were unemployed
- the major industry of employment for Armadale Health District residents was technicians and trade workers (18%)
- Armadale SLA had the highest level of socio-economic disadvantage, with a SEIFA score of 986, while the Shire of Serpentine-Jarrahdale was the least disadvantaged with a SEIFA score of 1048.

Health and wellbeing data

The only significant differences between residents of Armadale Health District and the State for self-reported lifestyle and psychosocial risk factors, long term health conditions, overall health status, and health service utilisation were:

- a higher prevalence of obesity among males (AHD 28%; State 17%)
- a lower Physical Component Score (AHD 49; State 51)
- a higher number of mean visits to primary health care services (AHD 5.6; WA 4.5).

Immunisation and screening

In the Armadale Health District:

- the percentage of children who were fully immunised on 31 December 2007 was similar to the State

- between 2000 and 2004, there were 32 new cases of cervical cancer and 13 deaths due to cervical cancer
- over the period 2003-2004, the percentage of women aged 20 to 69 years who participated in cervical cancer screening was lower than the State (44% vs 60%).

Community health

In the financial year 2004/05, 75,630 community health service events were provided in the Armadale Health District, accounting for 21% of community health service events throughout the SMAHS.

Births

In the Armadale Health District:

- in 2005, there were 1,823 livebirths, of which 4.8% were Aboriginal
- in 2005, the age specific birth rate per 1,000 women aged 15 to 44 years was lower than that of the State (54 vs 60 per 1,000 respectively)
- in 2005, 8.1% of livebirths were to teenage mothers and 14% were to women over the age of 34 years
- over the period 2001 to 2005, the age specific birth rate for Aboriginal women was nearly double that for non-Aboriginal women (81 vs 52 per 1,000 respectively)
- Aboriginal women were nearly twice as likely to have a low birth weight baby than non-Aboriginal women (13% vs 7.1% respectively)
- the proportion of Caesarean births increased from 14% in 1983 to 31% in 2005.

Hospitalisation

In the Armadale Health District:

- the leading cause of hospital admissions (apart from other factors affecting health status) was digestive diseases (10% of total hospital admissions)
- in 2006, residents were admitted to hospital 51,293 times, accounting for 148,912 beddays at a cost of $182.1 million.
- in 2006, residents were admitted to hospital for mental disorders 1,548 times, accounting for 13,521 beddays at a cost of $6.8 million.

Mortality

In the Armadale Health District:

- over the period 2002 to 2004, life expectancy was 80.7 years for males and 85.9 years for females (compared to the SMAHS figures of 79.3 years and 84.0 years respectively)
- over the period 1997 to 2004, the age standardised mortality rates were significantly lower than those for the State
- between 1997 and 2005, there were 5,136 deaths (males 2,824; females 2,312), accounting for 5% of the State's deaths
- the top two causes of death were ischaemic health disease and cancers for both males and females.

Introduction

This report describes the demographic characteristics and health profile of residents living in the Armadale Health District of Western Australia (WA), which covers an area of 2,754 square kilometres. Armadale Health District comprises three statistical local areas (SLAs): the City of Armadale, City of Gosnells, and the Shire of Serpentine-Jarrahdale (Figure 1; Table 1).

Table 1: Statistical local areas (SLAs) and postcodes in the Armadale Health District

SLA	Postcodes
Armadale (C)	6111, 6112
Gosnells (C)	6108 - 6110
Serpentine-Jarrahdale (S)	6113, 6121 – 6126, 6201 - 6206

Data sources

This study obtained information from a variety of sources, including:

- population data from the Australian Bureau of Statistics (ABS) and the Rates Calculator[1]
- socio-demographic information from the ABS
- death data from the mortality database (Dept of Health, WA)
- hospital data from the Hospital Morbidity Data System (Dept of Health, WA)
- birth data from the Midwives' Notification System (Dept of Health, WA)
- maps from the Geographic Information Systems team (Dept of Health, WA)
- population projections from the WA Planning Commission's website.

Data issues

Estimated resident population (ERP) figures for 2006 were obtained from the ABS at the statistical local area (SLA) level. Population data for previous years was obtained from the Rates Calculator in order to get estimates of the Aboriginal[2] population.

The ABS release Aboriginal population figures at the SLA level every Census year,[3] but the intercensal ERP estimates are not stratified by Aboriginality. To overcome this limitation, the Epidemiology Branch estimates the Aboriginal population for the intercensal years. Using the ABS Census data as a baseline, Aboriginal births are added and deaths are subtracted for each year, while each cohort is aged by one year. The non-Aboriginal population estimates are then derived by subtracting the age-specific Aboriginal estimates from the ABS's ERP figures. Although this method cannot take into account migration it gives the best available estimate of the Aboriginal population.

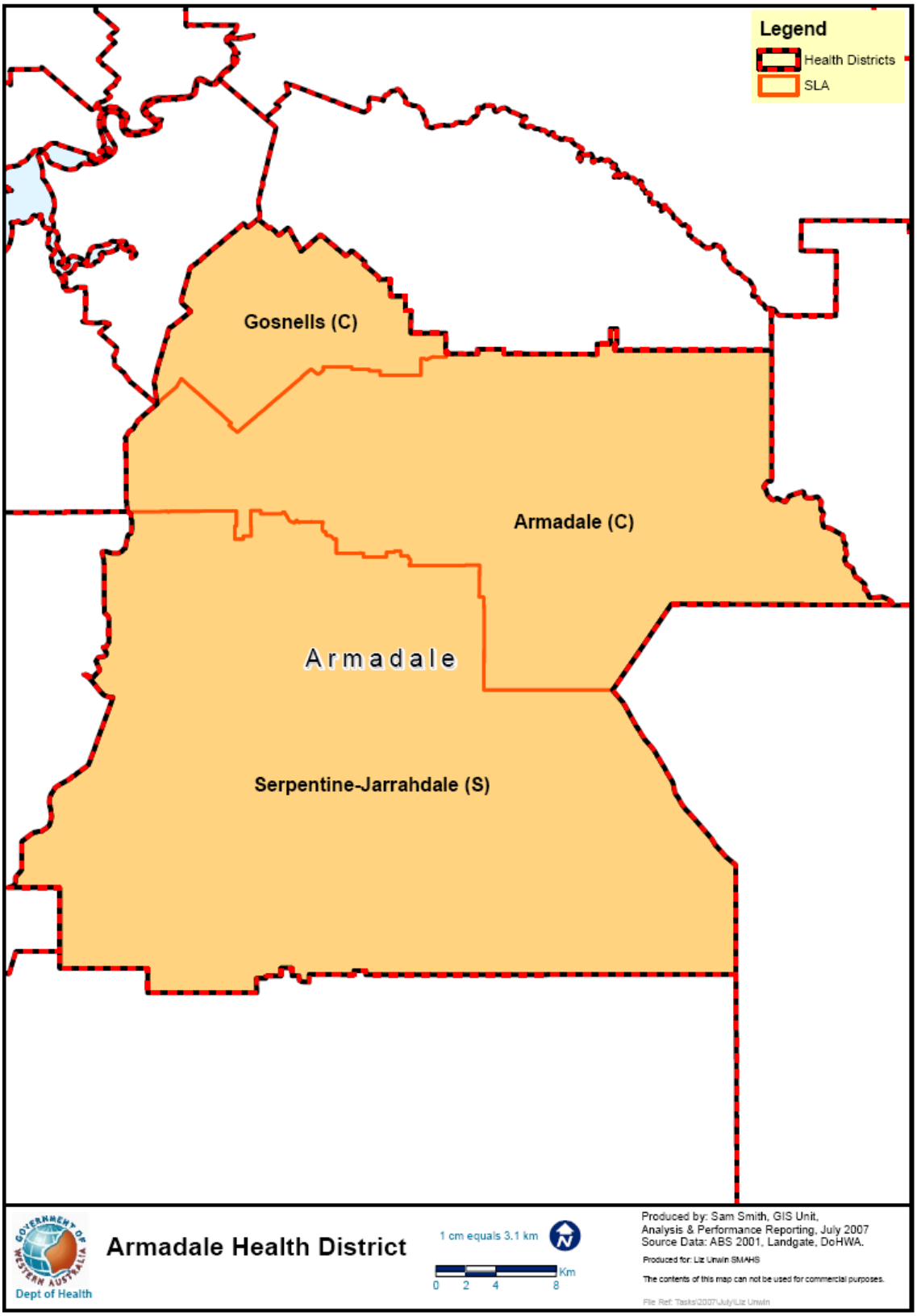
It is likely that the Aboriginal population estimates are under reported because:

- some Aboriginal people do not participate in data collection activities
- some Aboriginal people are unwilling to identify as Aboriginal
- the high mobility of some Aboriginal people means they are not included in the Census and other surveys (Trewin & Madden, 2005).

[1] The Rates Calculator is a software program which was created by Dr Jim Codde.
[2] The term 'Aboriginal' is used throughout this document to refer to all people of Aboriginal and/or Torres Strait Islander descent.
[3] A Census is conducted every five years by the ABS, most recently in August 2006.

In some cases, the information presented is based on small samples, thus reducing its reliability, and care should be taken when interpreting it.

Figure 1: Statistical local areas in the Armadale Health District



Population

The size and characteristics of a population need to be understood in order to assess its health status, or plan for the health care needs of its residents. Increases in population size are influenced by births and immigration, while deaths and emigration may reduce the size of a population. Fertility is the most influential demographic determinant, as births not only add to a current generation of children, but also provide the potential for exponential increases in the size of future generations (Draper et al., 2005). The primary source of demographic data is the Census, which provides information about the whole population.

Population size and density

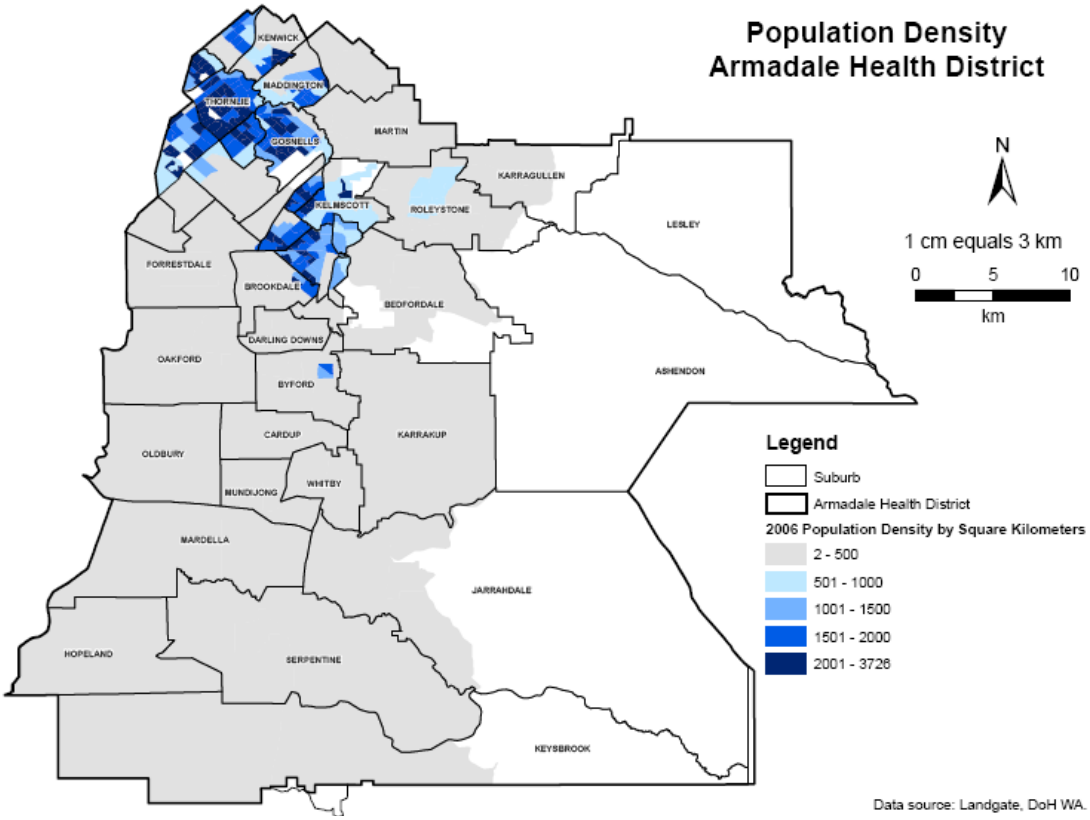
In 2006, the total population of the Armadale Health District was 161,819, which represented 7.9% of the State's population (ABS, 2007). The City of Gosnells had the largest population (59% or 95,680 people), followed by the City of Armadale (33% or 52,747), and the Shire of Serpentine-Jarrahdale (8.3% or 13,392) (Table 2).

Table 2: Population estimates by age group, sex and SLA, Armadale Health District and WA, 2006

	0-4	5-14	15-24	25-44	45-64	65+	Total
Armadale							
Males	1,803	4,021	4,070	6,969	6,823	2,729	26,415
Females	1,754	3,786	3,921	6,854	6,936	3,081	26,332
Persons	3,557	7,807	7,991	13,823	13,759	5,810	52,747
Gosnells							
Males	3,507	7,155	7,668	14,503	11,564	4,041	48,438
Females	3,392	6,666	7,018	13,984	11,388	4,794	47,242
Persons	6,899	13,821	14,686	28,487	22,952	8,835	95,680
Serpentine-Jarrahdale							
Males	423	1,182	854	1,920	1,966	600	6,945
Females	387	1,082	802	1,864	1,748	564	6,447
Persons	810	2,264	1,656	3,784	3,714	1,164	13,392
Armadale HD							
Males	5,733	12,358	12,592	23,392	20,353	7,370	81,798
Females	5,533	11,534	11,741	22,702	20,072	8,439	80,021
Persons	11,266	23,892	24,333	46,094	40,425	15,809	161,819
WA							
Males	67,276	144,512	153,227	302,171	261,596	110,871	1,039,653
Females	63,280	134,940	142,681	293,928	254,009	130,554	1,019,392
Persons	130,556	279,452	295,908	596,099	515,605	241,425	2,059,045

The population density of the Armadale Health District is 59 people per square kilometre. This is greater than the State average of 0.8 people per km2 but less than the metropolitan average of 320 people per km2. Small pockets of high population density are mainly found in the north western part of the health district, while in the south and east the population is sparse (Figure 2).

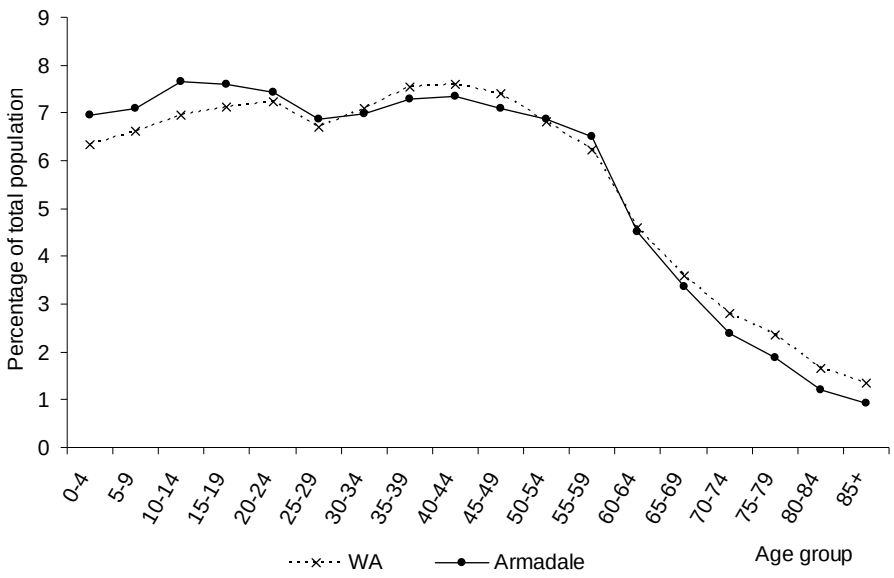
Figure 2: Population density in the Armadale Health District, 2006



Age distribution of the population

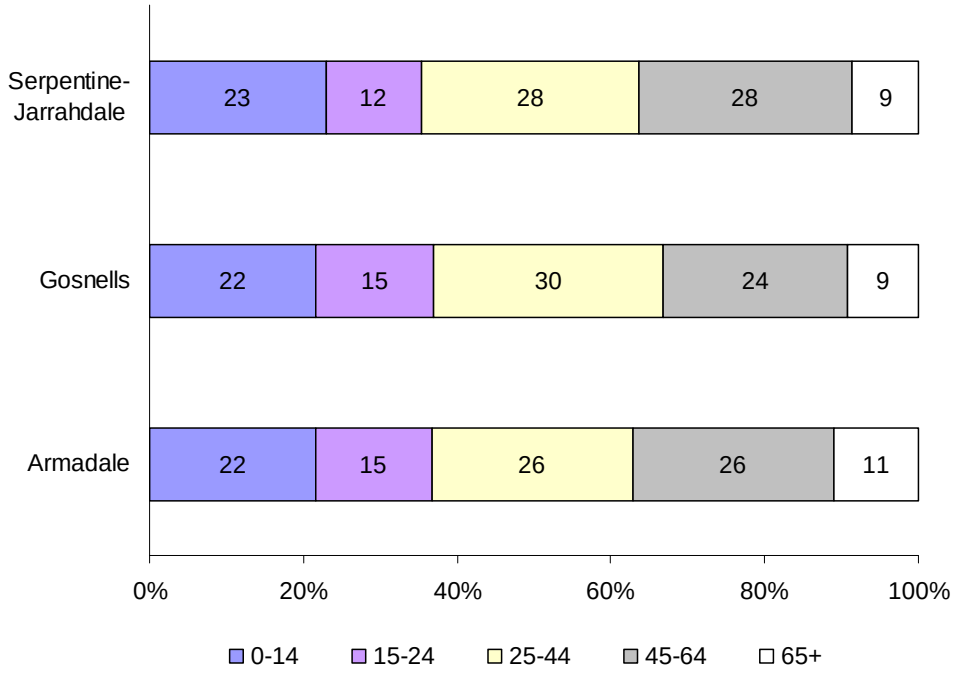
The age structure of the population of the Armadale Health District is similar to the State, with a slightly higher percentage of younger people and a slightly lower percentage of older people (Figure 3).

Figure 3: Percentage of the total population by five-year age groups, Armadale Health District and WA, 2006



The Shire of Serpentine-Jarrahdale has the highest proportion of children aged 0 to 14 years and adults aged 45 to 64 years, but the lowest proportion of young people aged 15 to 24 years. The City of Gosnells has the highest proportion of adults aged 25 to 44 years and the lowest proportion of people aged 45 to 64 years. The City of Armadale has the lowest proportion of adults aged 25 to 44 years and the highest proportion of elderly people aged 65 years and over (Figure 4, Table 2).

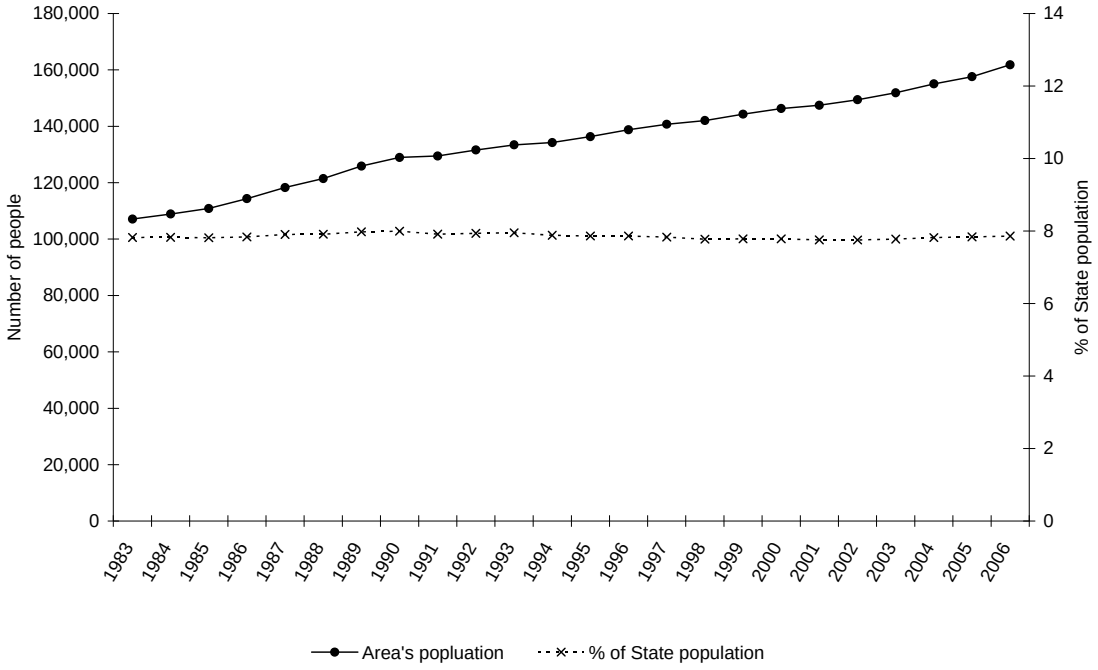
Figure 4: Percentage of the total SLA population by age group and SLA, Armadale Health District, 2006



Population growth

Over the 24-year period 1983 to 2006, the population of the Armadale Health District increased from 107,079 to 161,819. This is an increase of 54,740 people (51%) over the period, or 2,281 people (2.1%) per year. The population of the Armadale Health District has remained steady in relation to the State population, representing about 8% of the State population (Figure 5, Table 2).

Figure 5: Population growth in the Armadale Health District, by number of people and percentage of State population, 1983 - 2006



The Aboriginal population

In 2006 there were 4,305 Aboriginal people living in the Armadale Health District, making up 2.7% of the total population. Most of the Aboriginal people (58%) lived in Gosnells, where they accounted for 2.6% of the population (Table 3, Figure 6).

The Aboriginal population is younger than the non-Aboriginal population. In 2006, 59% of the Aboriginal population in the Armadale Health District were aged less than 25 years, 26% were aged 25 to 44 years, and 15% were aged more than 44 years. In contrast, the proportions for the non-Aboriginal population were 36%, 29% and 35 respectively (Figure 7).

Table 3: Estimated resident Aboriginal population by SLA, Armadale Health District, 2006

	Total population	Aboriginal population	Aboriginal % of HD	Aboriginal % of SLA
Armadale (C)	52,747	1,695	39.4%	3.2%
Gosnells (C)	95,680	2,474	57.5%	2.6%
Serpentine-Jarrahdale (S)	13,392	136	3.2%	1.0%
Armadale Health District	161,819	4,305	100.0%	2.7%

***Source**: Epidemiology Branch, DoH, WA.*

Figure 6: Location of Aboriginal people by proportion of the population, Armadale Health District, 2005

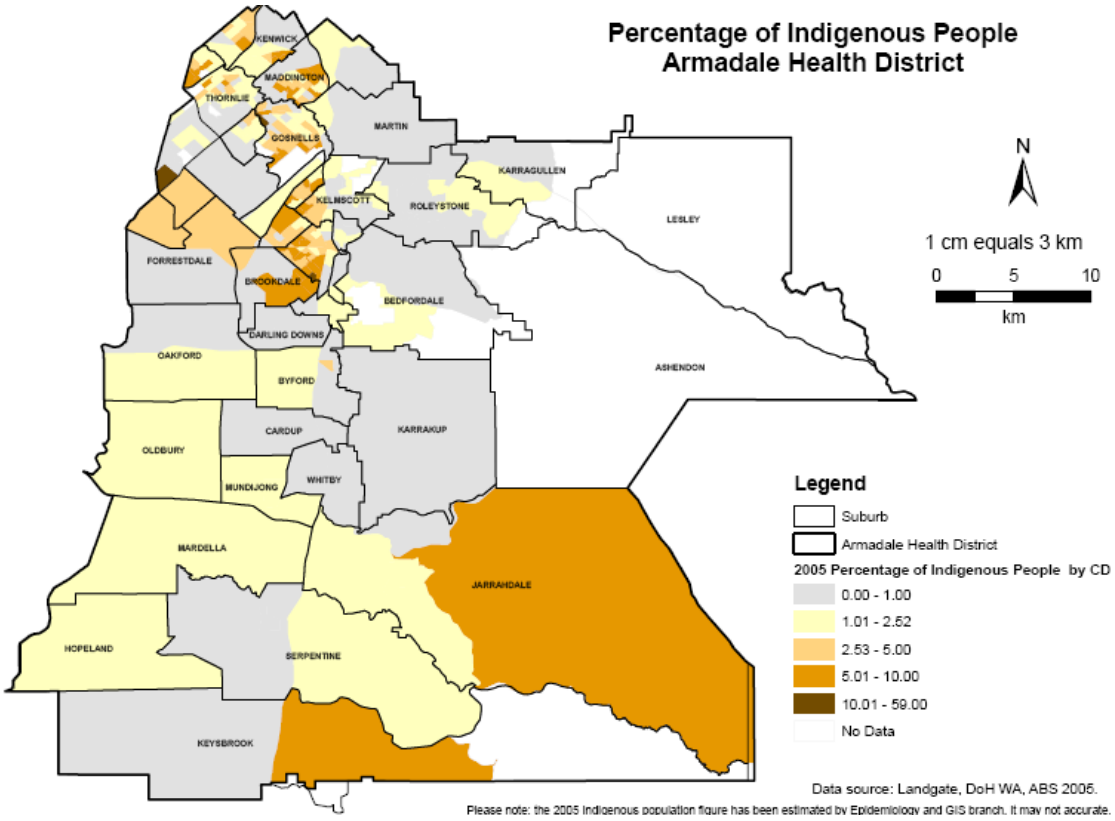
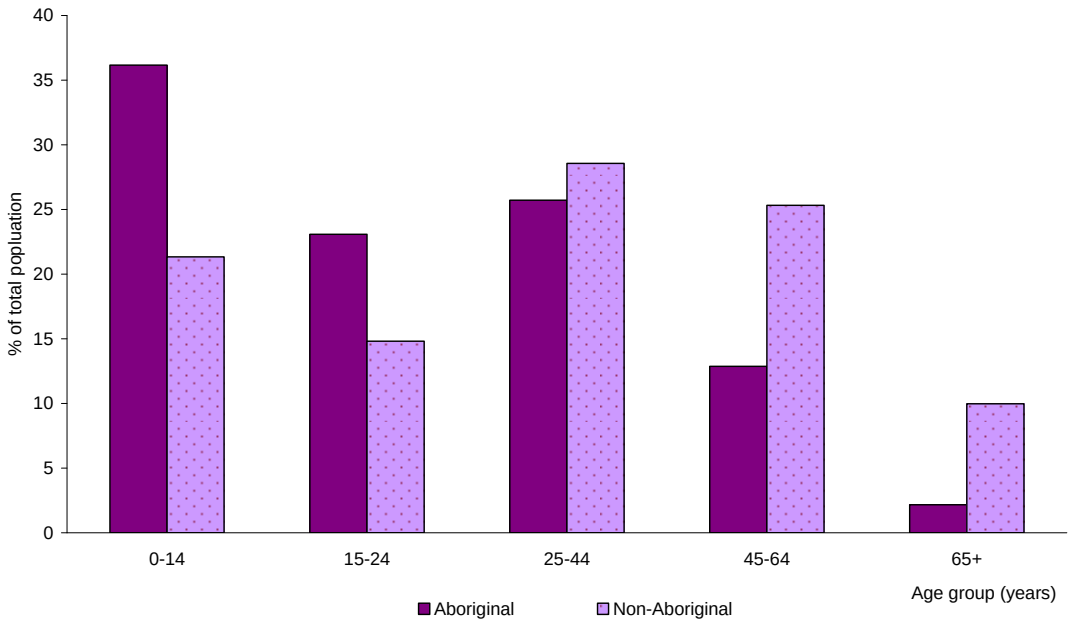


Figure 7: Percentage of the population by age group and Aboriginality, Armadale Health District, 2006



Population projections

The population of the Armadale Health District is expected to increase to 196,022 in 2016, an increase of 21% from 2006 figures (Armadale 33%; Gosnells 10%; Serpentine-Jarrahdale 55%). In comparison, the population of WA is expected to increase by 15% to 2.4 million (Table 4) (WA Planning Commission, 2005).

Table 4: Population projections for 2016 and 2031, Armadale Health District and WA

	2006 pop	2016 pop	% increase	2031 pop	% increase
Armadale SLA	52,747	70,115	32.9	87,856	66.6
Gosnells SLA	95,680	105,209	10.0	116,675	21.9
Serpentine-Jarrahdale	13,392	20,698	54.6	30,104	124.8
Armadale Health District	161,819	196,022	21.1	234,635	45.0
WA	2,059,045	2,376,400	15.4	2,800,700	36.0

***Sources**: Western Australia Tomorrow, WAPC 2005; ABS 2005.*

By 2031, the Armadale Health District is expected to increase to 234,635 people, an increase of 45% from 2006 figures (Armadale 67%; Gosnells 22%; Serpentine-Jarrahdale 125%). In the same period, the total population of WA is expected to increase by 36% to 2.8 million people (Table 4) (WA Planning Commission, 2005).

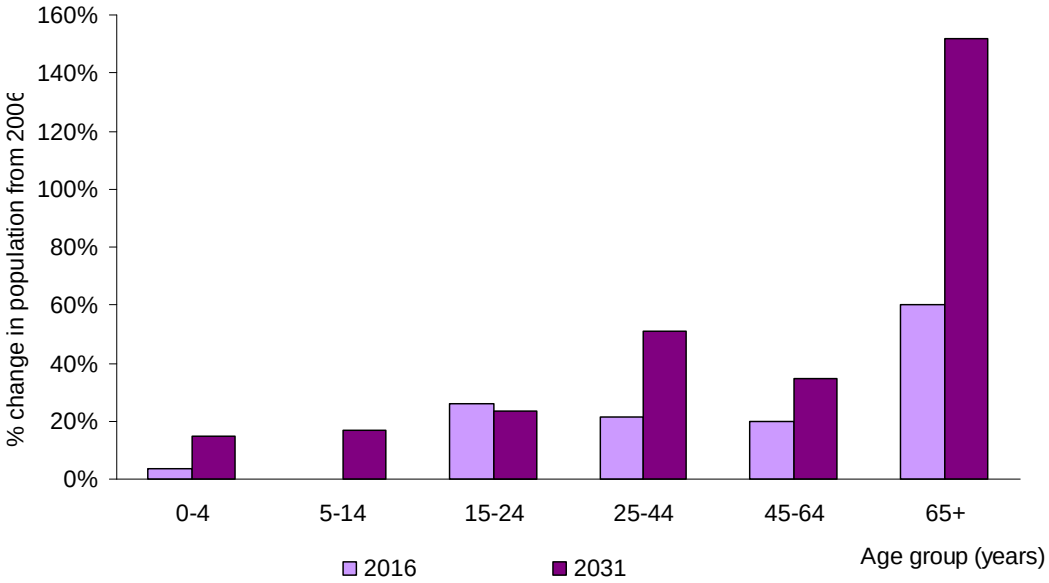
The age profile of the growth in the Armadale Health District shows that the population is ageing. The highest growth is expected in the 65 years and over age group (60% by 2016 and 152% by 2031), and the lowest growth is expected among children (0% by 2016 for 5 to 14 year olds; 15% by 2031 for 0 to 4 year olds) (Table 5; Figure 8).

Table 5: Population size and percentage changes by age group from 2006 to 2016 and 2031, Armadale Health District

Age group	2006 pop	2016 pop	% change	2031 pop	% change
0-4	11,266	11,674	3.6%	12,903	14.5%
5-14	23,892	23,912	0.1%	27,920	16.9%
15-24	24,333	30,707	26.2%	29,997	23.3%
25-44	46,094	56,030	21.6%	69,483	50.7%
45-64	40,425	48,414	19.8%	54,515	34.9%
65+	15,809	25,285	59.9%	39,817	151.9%

***Sources**: Western Australia Tomorrow, WAPC 2005; ABS 2005.*

Figure 8: Predicted population growth from 2006 to 2016 and 2031, Armadale Health District

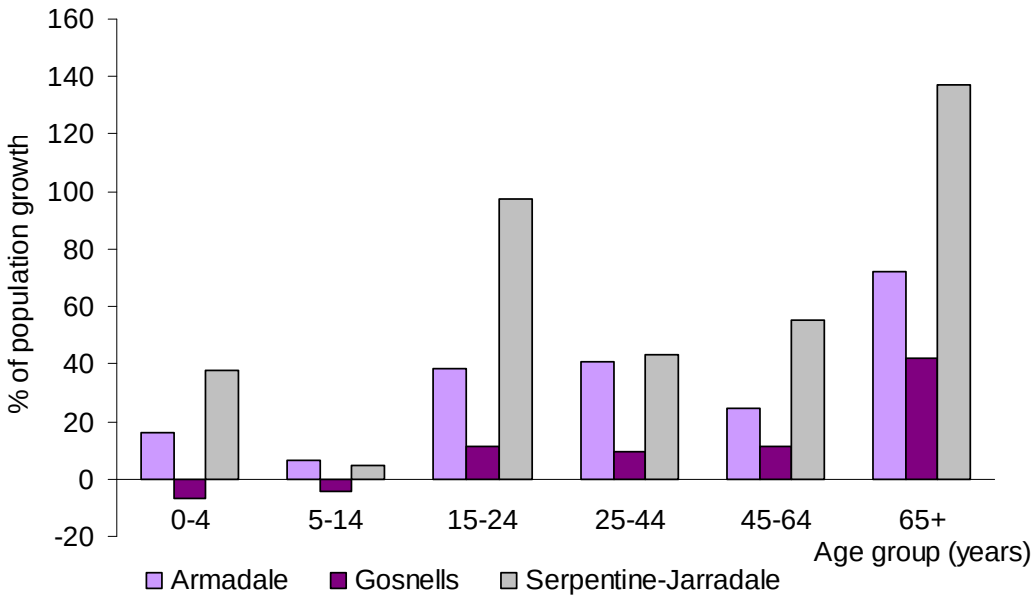


Analysis at the SLA level showed distinct variations in the age profile of the population projections to 2016. The most growth is expected in Serpentine-Jarrahdale SLA, with growth predicted across all age groups, especially among those aged 65 years and over (137%) (Figure 9).

Gosnells SLA is expected to show a fall in the number of people aged 0 to 14 years. The highest growth in Gosnells SLA is expected among those aged 65 years and over (42%) (Figure 9).

Armadale SLA is expected to show growth across all age groups, especially among those aged 65 years and over (72%) (Figure 9).

Figure 9: Predicted population growth from 2006 to 2016 in the SLAs of the Armadale Health District



Socio-demographic information

The data presented in Table 6 are based on the place of residence on Census night 2006. In total, there were 1,952,755 people in WA on Census night. Of these 1,516,409 (78%) were in the metropolitan area and 436,346 (22%) in country areas. There were 155,003 people (7.9% of the population of WA) in the Armadale Health District.

Table 6: Census results for the Armadale Health District, State, country and metropolitan areas, 2006

Summary Census data	Armadale Health District		Metro	Country	State
	Counts	%	%	%	%
Home on Census night	148,956	96.1	95.4	92.4	94.7
Living at same address 5 years ago	72,873	47.0	45.6	41.7	44.7
Female	77,494	50.0	50.6	48.8	50.2
Aboriginal	3,953	2.6	1.5	8.3	3.0
Born overseas	46,216	29.8	30.8	14.3	27.1
Don't speak English at home	15,903	10.3	13.3	5.4	11.6
0-14 years old	34,272	22.1	19.5	23.0	20.3
65+ years old	15,490	10.0	12.4	10.8	12.0
At pre-school	2,270	1.5	1.3	1.6	1.4
At primary school	14,523	9.4	8.4	9.8	8.7
At secondary school	9,686	6.2	6.0	5.7	6.0
At TAFE, CAE or Uni	6,990	4.5	6.6	3.1	5.8
Separated or divorced (a)	14,577	12.1	11.6	11.7	11.6
Families with annual income <$18,550 (b)	2,114	5.0	4.6	5.8	4.9
Households with annual income <$18,550 (c)	6,419	11.9	13.3	13.9	13.4
One-parent families (b)	7,050	16.7	15.1	13.8	14.8
Unemployed (d)	2,965	3.9	1.8	1.9	1.9
Left school aged < 15 years old (a)	14,032	11.6	10.3	13.6	11.0
Persons with tertiary qualification (a)	42,084	34.9	41.0	33.7	39.4
Occupation as professional/manager (e)	15,135	20.6	31.5	29.8	31.1
Occupation as labourer / other manual worker (e)	57,010	77.7	67.0	68.3	67.3
Travel to work on public transport (e)	3,460	4.7	5.8	2.3	5.0

Notes: *(a) persons aged 15 years or more*
(c) of total families
(d) of all households
(e) and part of the labour force
(f) labour force minus unemployed.

The differences between the population of the Armadale Health District and the State are, the Armadale Health District has:

- a smaller proportion of people at TAFE, CAE or university, people with a tertiary qualification, and people employed at a professional or managerial level
- a higher proportion of one parent families, unemployed people, and people employed as labourers or other manual workers.

Socio-economic information

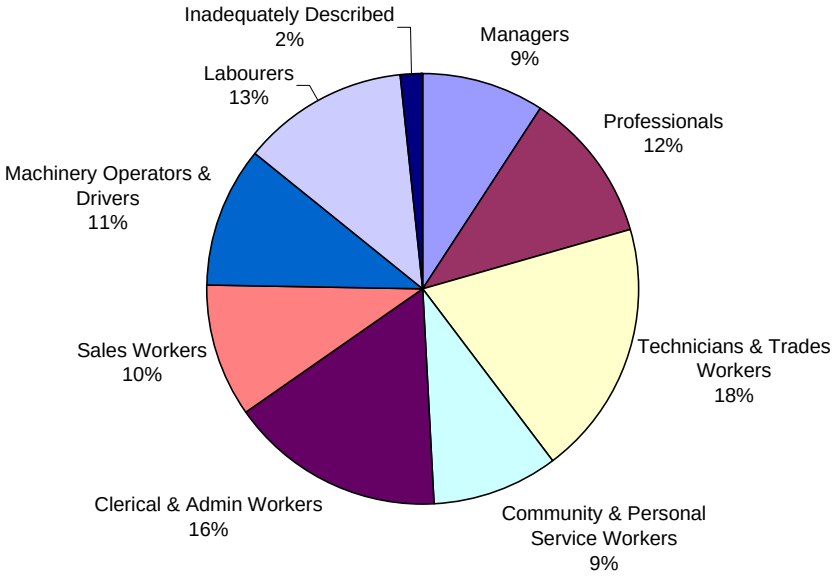
Labour force

In 2006 the dependency ratio[4] for the Armadale Health District was 0.46. This is similar to the dependency ratio for the State, indicating that the area has a similar proportion of non-working people to the State.

The major industries of employment for residents in the Armadale Health District are technicians & trade workers (18%), clerical & administrative workers (16%), labourers (13%) and professionals (12%) (Figure 10).

In 2006, there were 76,322 people in the labour force[5] in the Armadale Health District and 3.9% (2,965) were seeking work (Figures 11 & 12).

Figure 10: Industries of employment for residents of the Armadale Health District, 2006



[4] The dependency ratio is the number of people aged younger than 15 years or 65 years and above, divided by those aged 15 to 64 (working age). For more details see the glossary.
[5] The labour force comprises employed and unemployed persons (see glossary).

Figure 11: Labour force statistics by SLA, Armadale Health District, 2006

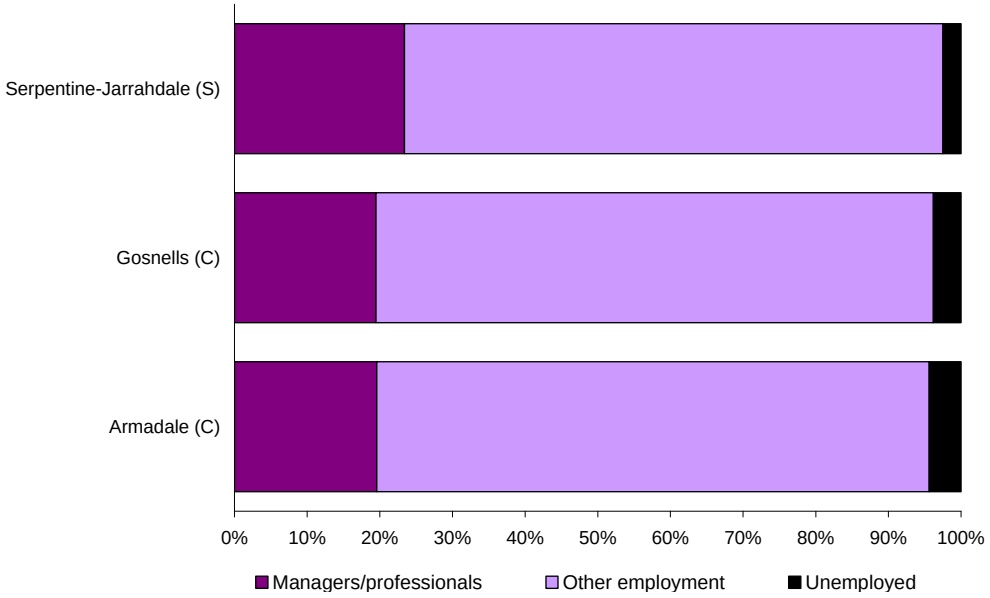
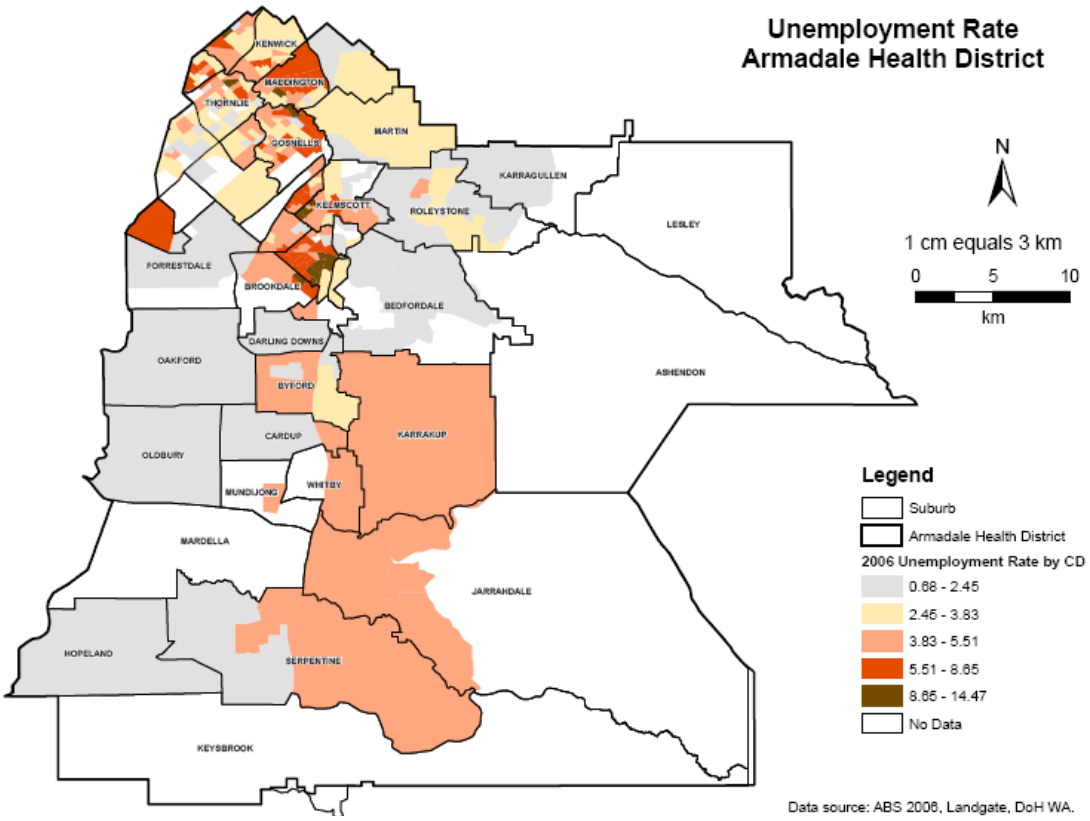


Figure 12: Location of unemployed people (aged 15 years and over), Armadale Health District, 2006



Socio-economic disadvantage

The index of relative socio-economic disadvantage (SEIFA) is a summary measure used to describe the socioeconomic variation within the Australian population. It is derived from attributes such as low income, low educational attainment, high unemployment and a high number of unskilled workers. Scores are based on a national average of 1000 and areas with the lowest scores are the most disadvantaged.

Based on 2006 Census data, the City of Armadale was more disadvantaged than the national average, with a SEIFA score of 986. The City of Gosnells had a SEIFA score of 1004 and the Shire of Serpentine-Jarrahdale was the least disadvantaged with a SEIFA score of 1048 (Figures 13 & 14).

Figure 13: Level of socio-economic disadvantage by SLA, Armadale Health District, 2006

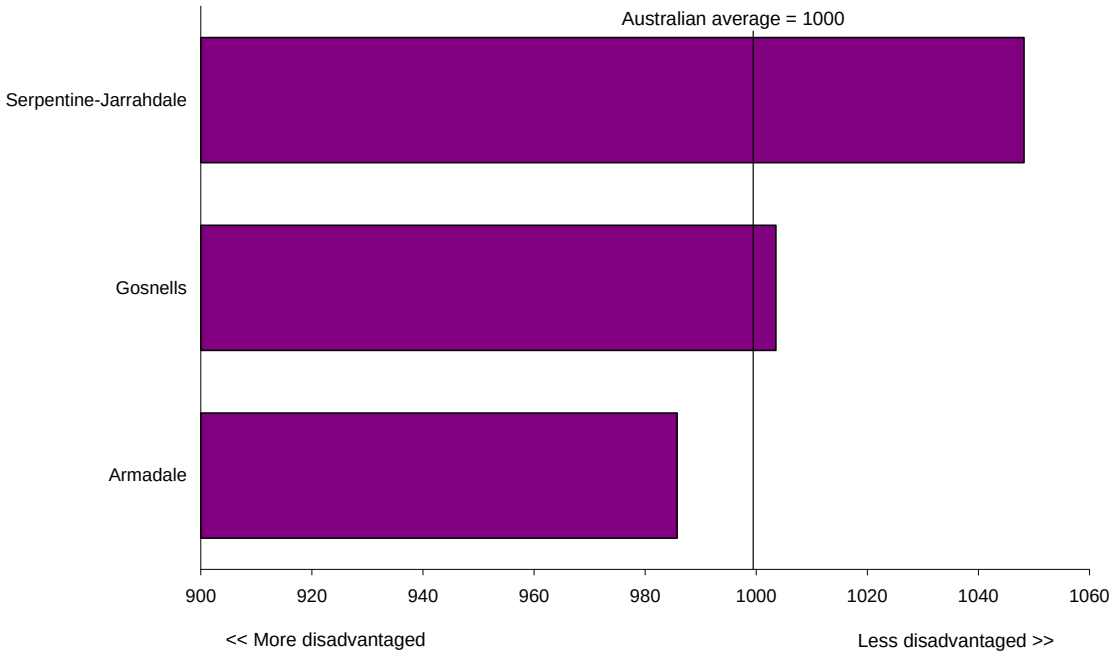
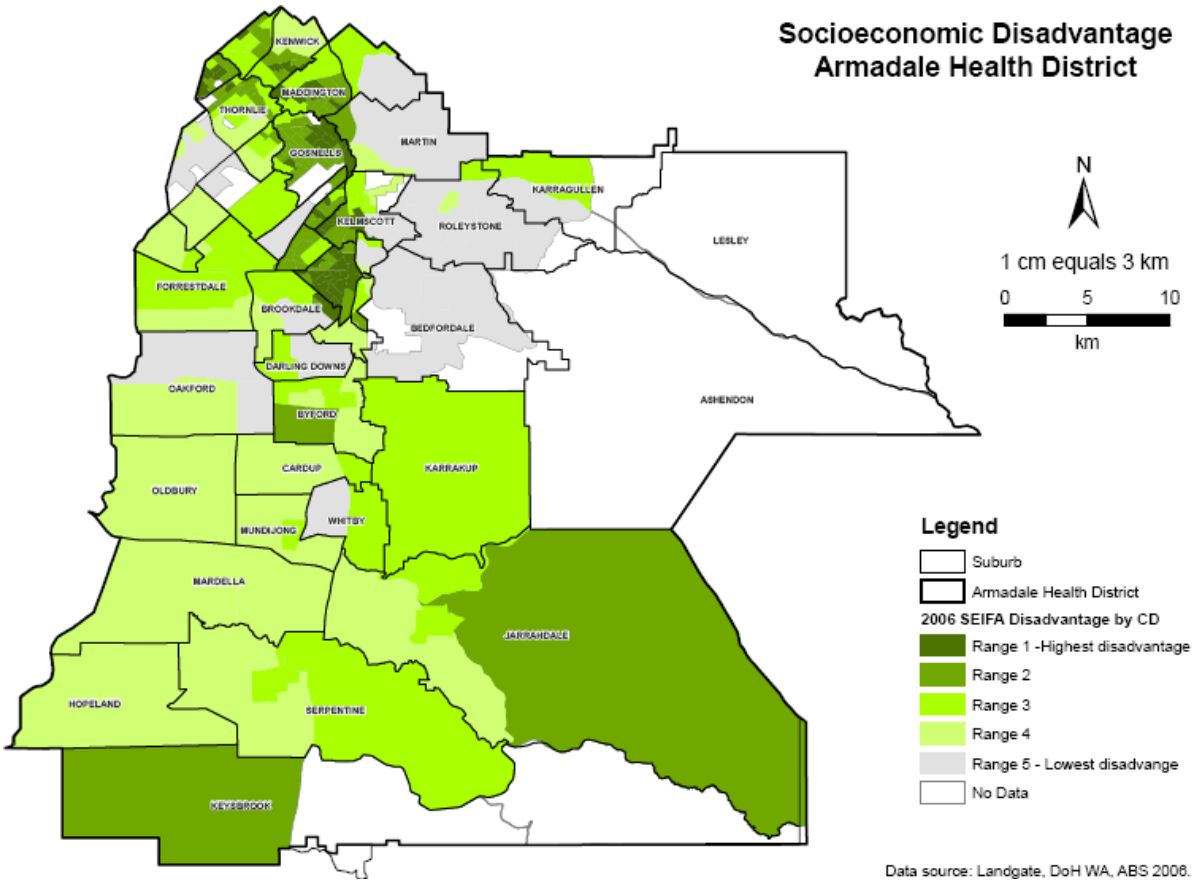


Figure 14: Location of socio-economic disadvantage, Armadale Health District, 2006



Self-reported measures of health and wellbeing

Since it began in 2002, the WA Health and Wellbeing Surveillance System has surveyed over 6,000 Western Australians each year to monitor population health status over time. The information collected includes indicators such as health risk behaviours, chronic diseases, health service utilisation and the level of psychological distress.

In the Armadale Health District a total of 421 adults (aged 16 years and older) were surveyed over the period January 2006 to September 2007. Their responses for key indicators are compared with the State responses in the following sections, and any statistically significant differences are highlighted.[6]

Lifestyle and psycho-social risk factors

The main lifestyle risk factors today are smoking, excessive alcohol consumption, poor nutrition and insufficient physical activity. These behavioural risk factors contribute to physiological risk factors, such as high blood pressure, high cholesterol and obesity.

Numerous studies have shown a relationship between high body mass index and increased mortality and morbidity, and the prevalence of overweight and obesity has almost doubled amongst Australian adults over the last two decades (Dept of Health & Ageing, 2008). Surveys relying on self-reporting tend to underestimate the true prevalence of obesity as people are inclined to overestimate their height and underestimate their weight (Draper et al., 2005).

Males and persons in the Armadale Health District had significantly higher prevalences of obesity compared to their counterparts Statewide (Table 7).

Table 7: Lifestyle and psychosocial risk factors for adults by sex, Armadale Health District and WA, January 2006 to September 2007

Risk factor	Armadale Health District (%)			WA (%)		
	Males	Females	Persons	Males	Females	Persons
Currently smokes	20.7	19.0	19.7	17.5	15.0	16.3
Eats insufficient fruit	64.0	50.3	56.0	56.0	45.8	50.9
Eats insufficient vegetables	89.7	83.6	86.1	85.5	82.2	83.9
Risky/high risk drinking for long term harm	5.8	4.4	5.1	7.8	5.8	6.9
Risky/high risk drinking for short term harm	11.5	13.7	12.6	14.1	13.4	13.8
Insufficient physical activity (16-64 years)	64.2	54.4	58.4	51.5	54.8	53.1
Current high blood pressure (25+years)	22.1	18.0	19.6	18.2	18.7	18.4
Current high cholesterol (25+years)	21.6	15.3	18.0	20.2	18.4	19.3
Overweight	34.3	31.1	32.4	43.4	25.9	34.8
Obese	**28.2**	22.0	**24.6**	17.3	17.6	17.4
High/very high psychological distress	9.3	11.8	10.8	6.9	9.8	8.3
Low sense of control over life	2.0	6.3	4.6	3.6	4.4	4.0

***Source**: WA Health and Wellbeing Surveillance System, Epidemiology Branch, DoH, WA*

[6] The age and sex structure of the sample for the Armadale Health District was weighted to match the age and sex structure of the WA population, so the estimated mean for Armadale could be directly compared to that for the State. Differences between the two mean estimates are due to factors other than differences in the age and sex structure of the two populations.

Long term health conditions

Long term or chronic health conditions are a major concern, particularly because of the ageing population. These conditions develop over a long period of time and can often be modified by changes in lifestyle.

Population surveys can provide an indication of the prevalence of long term health conditions. Respondents to the survey were asked whether their doctor had ever diagnosed them with certain health conditions.

There were no significant differences between residents of the Armadale Health District and the State in the reported prevalences of the health conditions listed in Table 8.

Table 8: Self-reported doctor-diagnosed health conditions among adults by sex, Armadale Health District and WA, January 2006 to September 2007

Risk factor	Armadale Health District (%)			WA (%)		
	Males	Females	Persons	Males	Females	Persons
Diabetes (16+ years)	7.6	6.6	7.0	5.6	6.0	5.8
Heart disease (25+ years)	9.9	3.7	6.2	8.9	5.5	7.2
Cancer (25+ years)	7.7	8.1	8.0	7.2	7.4	7.3
Current asthma (16+ years)	6.5	15.3	11.7	8.2	11.9	10.1
Current respiratory problem (16+ years)	2.0	1.8	1.9	2.2	1.9	2.0
Stroke (25+ years)	2.3	1.3	1.7	2.7	1.7	2.2
Arthritis (25+ years)	24.2	29.6	27.4	20.3	28.7	24.5
Osteoporosis (25+ years)	2.0	7.9	5.5	2.7	8.4	5.5
Injury (16+ years)	24.3	15.7	19.3	28.4	18.2	23.3
Current mental health problem (16+ years)	8.8	13.3	11.4	8.9	16.1	12.5

***Source**: WA Health and Wellbeing Surveillance System, Epidemiology Branch, DoH, WA*

Overall health status

The health status of Western Australians can be assessed using the SF8 measure,[7] which assesses the effects of physical and mental health on how people felt they were functioning during the four weeks prior to being surveyed. The responses to the eight questions of the SF8 are combined into two summary scores, the Physical Component Score (PCS) and the Mental Component Score (MCS).[8] The PCS is a measure of how health may affect physical functioning, while the MCS measures the effect of health on social and emotional functioning.

The PCS and MCS can be used to describe the general mental and physical health status of a population and they also correlate well to measures of social determinants of health. As such, they are useful population health surveys.

The mean PCS was significantly lower for Armadale Health District residents when compared to the State (Table 9).

[7] The SF8 is a special version of the Medical Outcomes Short Form instrument that was developed by the RAND as part of the Medical Outcomes Study (MOS) and designed for use with large populations.
[8] The scores are standardised with a mean of 50 and a standard deviation of 10. Most scores will be close to 50, but scores higher or lower than 50 indicate being higher or lower than average for the population.

Table 9: Self-reported health status among adults (16 years and over) by sex, Armadale Health District and WA, January 2006 to September 2007

	Armadale Health District			WA		
	Males	**Females**	**Persons**	**Males**	**Females**	**Persons**
Mental component score	51.0	50.7	50.8	52.3	50.3	51.3
Physical component score	49.3	49.5	**49.4**	50.9	50.5	50.7

***Source**: WA Health and Wellbeing Surveillance System, Epidemiology Branch, DoH, WA*

Health service utilisation

Respondents were asked about their utilisation of different types of health services during the previous year. Armadale Health District residents had a significantly higher number of mean visits to primary health care services (5.6) compared to the State (4.5) (Table 10).

Table 10: Self-reported health service utilisation (16 years and over) by type of service, Armadale Health District and WA, January 2006 to September 2007

	Armadale Health District			WA		
	Males	**Females**	**Persons**	**Males**	**Females**	**Persons**
% of population using health care services						
Primary health care	87.9	88.7	88.4	84.2	91.0	87.7
Dental health care	43.0	49.7	47.0	48.8	52.7	50.8
Mental health care	1.0	4.9	3.3	3.8	6.7	5.3
Allied health care	39.2	48.3	44.6	44.6	52.7	48.7
Hospital based health care	25.6	31.6	29.2	24.8	28.2	26.5
Alternative health care	6.3	8.1	7.4	6.5	13.1	9.8
Mean visits to a health care service						
Primary health care	4.2	6.5	**5.6**	3.6	5.4	4.5
Dental health care	0.9	1.2	1.1	1.0	1.2	1.1
Mental health care	0.1	0.6	0.4	0.2	0.5	0.4
Allied health care	1.6	2.6	2.2	2.0	3.3	2.7
Hospital based health care	0.5	0.8	0.7	0.5	0.6	0.5
Alternative health care	0.4	1.0	0.7	0.4	0.8	0.6

***Source**: WA Health and Wellbeing Surveillance System, Department of Health*
***Note:** Primary care includes GPs, medical specialists and community health.*

Selected public health measures

In addition to information collected by surveys, data routinely collected by State and Commonwealth Health Departments and other public agencies can provide valuable information about the health of a population. Much attention is given to acute care treatment, often due to its high cost, but participation in public health programs that aim to prevent or reduce illness and injury is also important. Summary statistics for some key indicators are presented in Table 11 and some of the programs are explored in more detail later.

Table 11: Summary statistics for selected public health measures, Armadale Health District

	Crude Number	Crude Rate	SRR/SMR	LCI	UCI
Notifiable diseases (2002-2006) (Rate per 1,000 population)					
Enteric	893	1.3	*0.62	0.58	0.66
Vector Borne	181	0.2	*0.49	0.42	0.57
STIs	1,282	1.7	*0.53	0.51	0.57
Hospitalisation due to accidental falls (1997-2006) (Rate per 1,000 population)					
All	4,985	3.3	*0.91	0.89	0.94
Aboriginal	162	4.1	*0.70	0.60	0.82
Non-Aboriginal	4,823	3.3	*0.93	0.90	0.96
Suicide (15-24 years) (1997-2005)					
Male	18	0.2	0.72	0.39	1.09
Female	5	0.1	0.87	0.19	1.79
Cancer incidence (2002-2006) (Rate per 1,000 population)					
Males					
Colorectal	218	56.0	1.07	0.93	1.22
Lung	222	57.0	**1.23	1.07	1.40
Prostate	443	113.7	*0.90	0.82	0.99
Breast	3	0.8	1.02	0.08	2.38
Melanoma	166	42.6	*0.74	0.64	0.87
Females					
Colectoral	140	36.3	0.89	0.75	1.05
Lung	113	29.3	1.08	0.90	1.30
Breast	417	108.0	0.98	0.89	1.08
Melanoma	136	35.2	0.88	0.75	1.05

LCI = Lower confidence interval; UCI = Upper confidence interval
SRR = Standardised rate ratio; SMR = Standardised mortality ratio
The 2001 Australian population was used as the standard population when calculating the SRR and SMR
* indicates the rate is significantly lower compared to the State rate
** indicates the rate is significantly higher compared to the State rate

Armadale Health District residents had lower rates of notifiable diseases and hospital admissions due to accidental falls compared to the State. Male residents also had lower rates of prostate cancer and melanomas compared to their counterparts Statewide.

However, male residents of the Armadale Health District had higher rates of lung cancer compared to males in WA.

For the other public health measures detailed in the table, the results for Armadale Health District residents were not significantly different to the results for the State.

Childhood immunisation

Vaccination against diseases is an integral part of communicable disease control. In Australia, many previously common childhood diseases have been eliminated or virtually eliminated as a result of successful immunisation programs.

The importance of continually monitoring immunisation coverage is highlighted by studies that have reported a link between decreasing uptake rates, and increasing notifications of vaccine preventable diseases (Alberman & Pharoah, 1997). Generally, vaccine coverage needs to exceed 90% in order to achieve and maintain the level of herd (or community) immunity necessary to interrupt the ongoing transmission of vaccine-preventable diseases (Lister et al., 1999).

In Australia, children are assessed as fully immunised in relation to the current National Health and Medical Research Council's Standard Childhood Vaccination Schedule (NHMRC, 2003). This is designed to protect children from pertussis (whooping cough), diphtheria, tetanus, poliomyelitis, measles, mumps, rubella, hepatitis B, Haemophilus influenza type B (Hib) infection, and pneumococcal and meningococcal disease.

The data presented below includes all valid vaccinations reported to the Australian Childhood Immunisation Register (ACIR)[9] by participating immunisation providers. Thus the accuracy depends upon provider participation and reporting to the ACIR.

The percentage of children in the Armadale Health District who were fully immunised on 31 December 2007 was similar to the State. Of the SLAs in the Armadale Health District, Serpentine-Jarrahdale had slightly higher percentages of children fully vaccinated in all the age cohorts (Table 12).

Table 12: Percentage of children fully immunised by age group and SLA, Armadale Health District and WA, December 2007

	% of children in each age group fully immunised		
	12-<15 months	**24-<27 months**	**60-<63 months**
WA	89	92	84
Armadale Health District	87	93	84
Armadale SLA	85	91	83
Gosnells SLA	88	93	84
Serpentine-Jarrahdale SLA	90	95	85

Source: *Australian Childhood Immunisation Register.*

Cervical screening

Each year in WA approximately 90 new cases of cervical cancer are diagnosed and 30 women die from the disease. The Western Australian Cervical Cancer Prevention Program promotes cervical cancer awareness to increase the proportion of women aged 20 to 69 years who undergo screening. Regular two-yearly Pap smears can prevent up to

[9] The ACIR monitors vaccination coverage in Australia.

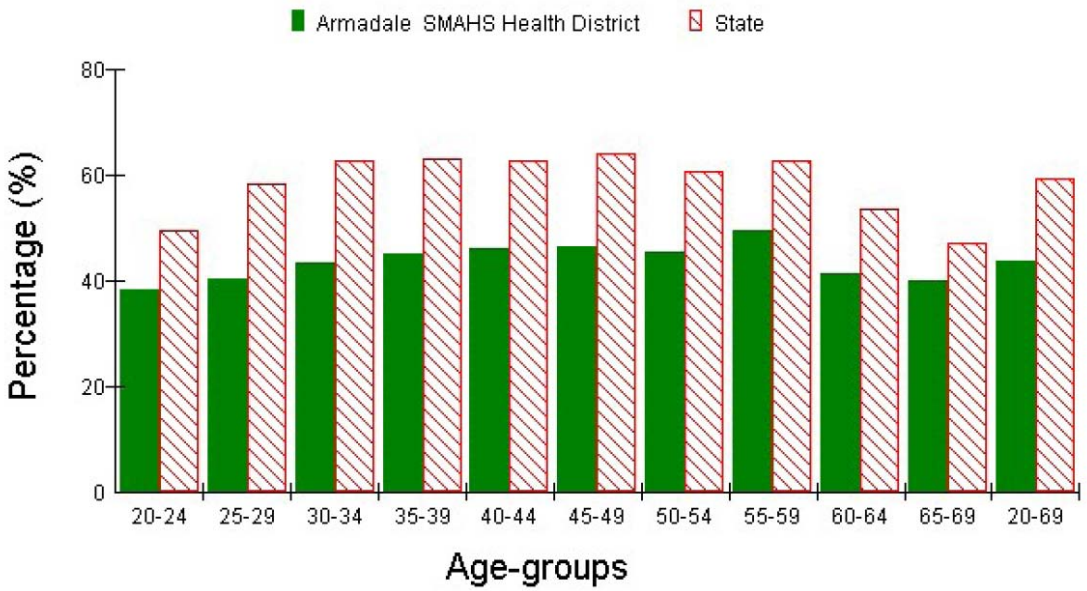
90% of the most common type of cervical cancer through early detection of pre-cancerous changes and treatment (Draper et al., 2005).

In the Armadale Health District between 2000 and 2004, there were 32 new cases of cervical cancer (8.1 per 100,000 women) and 13 deaths. These figures were similar to those expected based on State rates.

Over the period 2003-04, the percentage of women in the Armadale Health District aged between 20 to 69 years[10] who participated in cervical screening (44%) was lower than for the State as a whole (60%). The highest percentage of women who had at least one Pap smear during this period were aged between 55 to 59 years (AHD 50%; State 63%) and the lowest percentage were aged 20 to 24 years (AHD 38%; State 50%) (Figure 15).

Between 2000-01 and 2003-04, the overall cervical screening participation rate in the Armadale Health District decreased slightly from 48% to 44%.

Figure 15: Estimated percentage of women who had at least one Pap smear during the two-year period 2003-2004, Armadale Health District and WA



Source: *Cervical Cytology Register of WA, DoH.*
Note: *only women with an intact uterus are included.*

[10] Only women with an intact uterus are included.

Community health

In the financial year 2004/05, 75,630 community health service events[11] were provided in the Armadale Health District.[12] These accounted for 21% of community health service events throughout the SMAHS.

Of the community health service events in the Armadale Health District:

- 91% were provided to individuals and 9% to groups.
- 6% were provided to Aboriginal people, 89% to non-Aboriginal people and 5% to mixed groups[13] (similar to the SMAHS distribution of 7%, 90% and 3% respectively).

Over half of the service events in the Armadale Health District were for 'Assessment' (22,652 or 30%) or 'Screening' (15,713 or 21%). These proportions were slightly higher than those for the SMAHS (26% and 16% respectively) (Table 13).

Table 13: Service products provided by Community Health Services, Armadale Health District and SMAHS, 2004/05

Service	Armadale		SMAHS	
	No. of services	%	No. of services	%
Screening	15,713	21%	56,021	16%
Assessment	22,652	30%	94,125	26%
Treatment and management	15,467	20%	100,163	28%
Client/community support	7,047	9%	47,154	13%
Health promotion/ education	14,635	19%	51,629	14%
Immunisation	116	0%	11,966	3%
Total	*75,630*	*100%*	*361,058*	*100%*

Source: HCARe community health data.

The top three community health issues in the Armadale Health District in the financial year 2004/05 were 'Developmental issues', which accounted for 17,297 service events (23%), followed by 'Social health issues' (12,022 service events or 16%), and 'Endrocrine/nutritional/metabolic/immunity' (9,563 service events or 13%). These three community health issues accounted for 38,882 service events (51%) in the Armadale Health District, and 44% of service events in the SMAHS.

[11] Data are reported for each service event within an occasion of service (OOS). On average there are 1.2 service events to one OOS, although each OOS can have up to three service events. For example, if a person sees a Community Health Nurse for issues related to post natal depression, nutrition, and parenting, these are counted as three service events, but only one OOS.

[12] Data are reported by the location of the service provider, therefore clients from outside the Armadale Health District could be included.

[13] A mixed group refers to any mixture of people who can't be allocated to a particular group, for example people with differing age groups, postcodes, ethnicity, sex, etc. Usually group OOS are for health education purposes, for example pre-natal classes, diabetes education.

Births

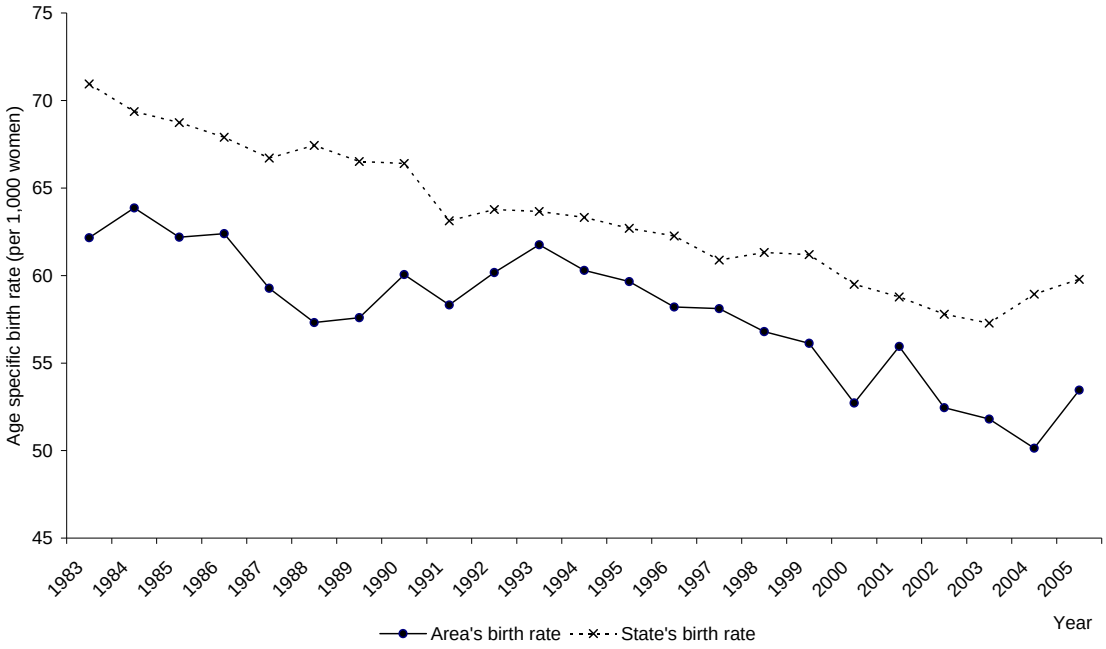
The majority of pregnancies and births in Australia do not result in mortality or severe illness. However, pregnancy, childbirth and infancy remain a time of vulnerability for mothers and their children. Many factors that affect the health of children have their origin in the womb, for example, smoking during pregnancy, excessive alcohol intake and maternal nutrition. Illness in an infant's first few days of life and maternal health problems can impact on a child's future health as well as their immediate wellbeing and development (AIHW, 2002).

In 2005, there were 1,823 livebirths to women who live in the Armadale Health District. Of these 4.8% were Aboriginal.

Age specific birth rates

Over the last two decades the age specific birth rate for women aged 15 to 44 years in the Armadale Health District has been lower than the State rate. In 2005, the age specific birth rates were 53.5 per 1,000 women in the Armadale Health District and 59.8 per 1,000 Statewide (Figure 16).

Figure 16: Age specific birth rates for women aged 15 to 44 years in the Armadale Health District and WA, 1983-2005



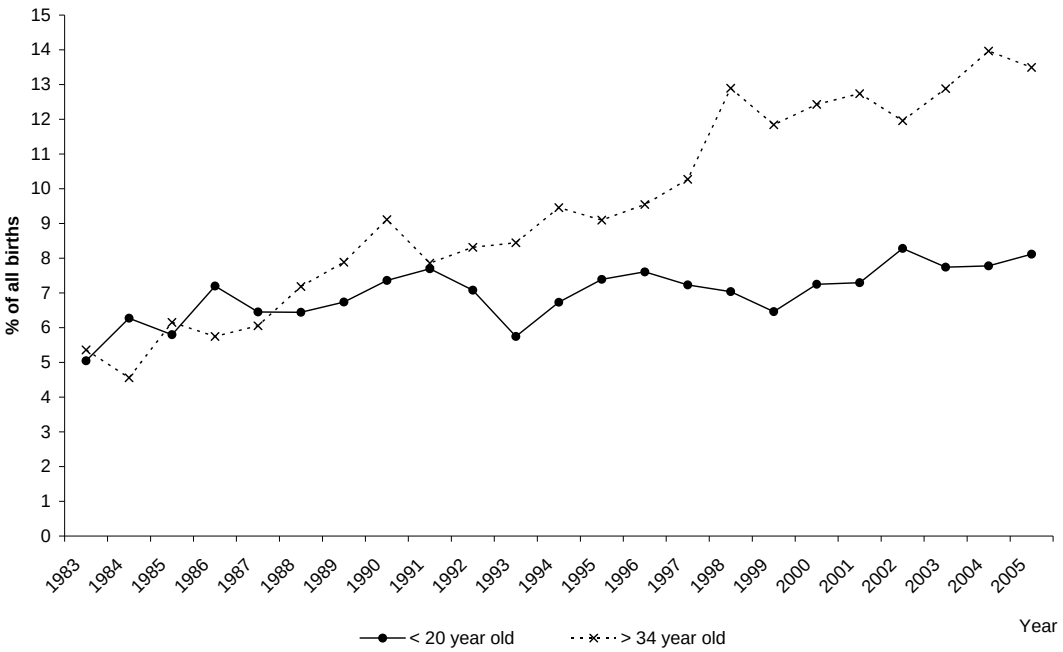
Maternal age

Maternal age can impact on the development of the foetus. Pregnant teenagers appear to be at an increased risk of poor maternal weight gain, hypertensive disorders and low birthweight infants. Pregnant women over the age of 34 years have an increased risk of chromosomal aneuploidies and are more likely to have a chronic disease, such as chronic hypertension or diabetes mellitus, to complicate pregnancies (Ozalp et al, 2003).

The median age of women giving birth has been increasing because of trends in delayed partnering and childbearing and, following divorce, repartnering and subsequent family formation. In 2003, the median age of women giving birth in WA reached 30 years for the first time (nationally, this milestone was reached in 2001) (Draper et al., 2005).

Over the period 1983 to 2005 in the Armadale Health District, teenage birth rates and birth rates for women aged 35 years and over increased. In 2005 in the Armadale Health District, 8.1% of livebirths (148 births) were to teenaged mothers, and 13.5% were to women over the age of 34 years (246 births) (Figure 17).

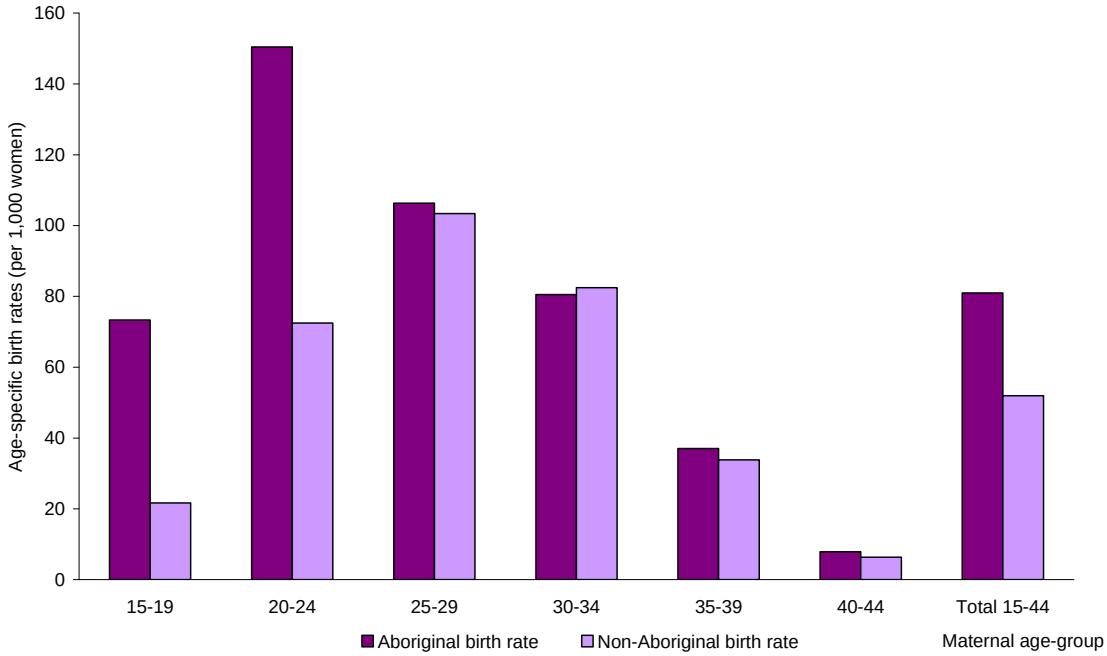
Figure 17: Percentage of livebirths by maternal age, Armadale Health District and WA, 1983-2005



Aboriginal births

Aboriginal women have more babies and have their babies at a younger age than non-Aboriginal women. Over the period 2001 to 2005, the age specific birth rate of Aboriginal women aged 15 to 44 years in the Armadale Health District was 1.6 times that of non-Aboriginal women (81 and 52 births per 1,000 women respectively). The birth rate among Aboriginal women was higher than non-Aboriginal women in all age groups except among women aged 30 to 34 years (Figure 18).

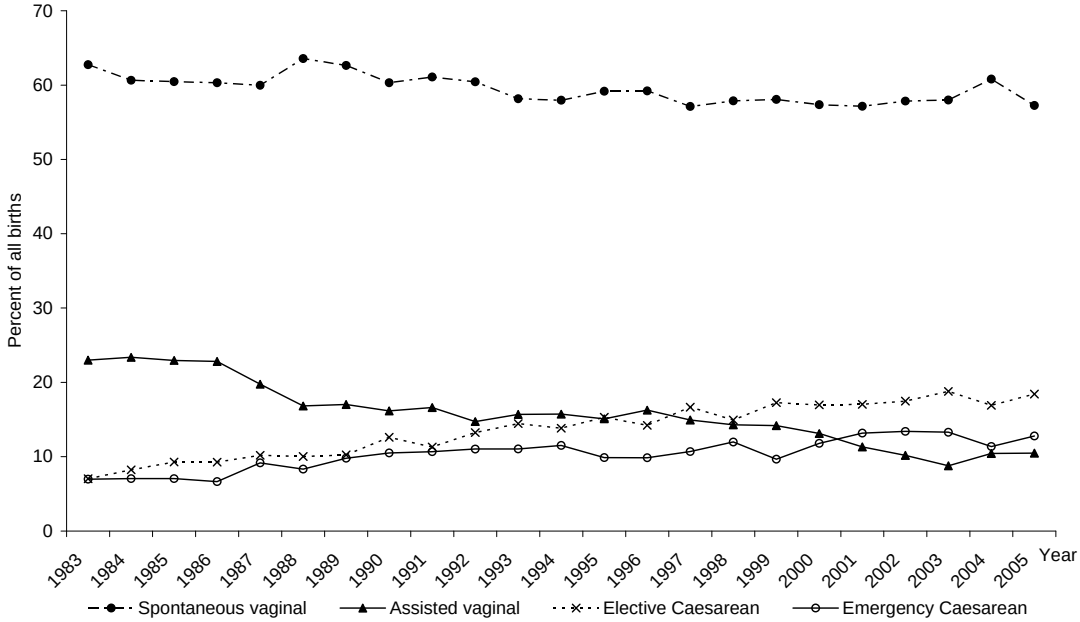
Figure 18: Age specific birth rates by Aboriginality, Armadale Health District, 2001-2005



Method of delivery

Over the last two decades, in the Armadale Health District, the proportion of vaginal births has fallen and the proportion of Caesarean births has increased. In 2005, 68% of livebirths in the Armadale Health District were vaginal births (57% spontaneous; 11% assisted), and 31% of births were Caesareans (18% elective; 13% emergency). This is compared to 86% vaginal births (63% spontaneous; 23% assisted) and 14% Caesarean births (7% elective; 7% emergency) in 1983 (Figure 19).

Figure 19: Percentage of livebirths by delivery method, Armadale Health District, 1983-2005



Low birth weight babies

Birthweight is the best indicator of early mortality, as infant mortality increases with falling birthweight (Alberman & Pharoah, 1997). Low birthweight (LBW) babies are more likely to suffer from physical and neurological complications than normal weight infants. These complications are potentially fatal, but mortality has been reduced by improvements in neonatal intensive care and monitoring of intrauterine growth and foetal distress during labour. However, LBW babies who survive may show more morbidity and disability in future years (Hobbs & Janrozik, 1997; Fryers, 1997). LBW results from premature birth or intrauterine growth retardation, for which the risk factors include young maternal age, low pre-pregnancy weight, nulliparity and nutritional status of the mother.

The average percentage of LBW babies over the five-year period 2001 to 2005 was 7.0% in the Armadale Health District and 7.4% Statewide. Aboriginal women have a higher proportion of LBW babies than their non-Aboriginal counterparts. The percentage of LBW babies to Aboriginal women over the period was 14.0% in the Armadale Health District and 15.3% Statewide, whereas for non-Aboriginal women the percentages were 7.1% and 6.4% respectively.

Still births

In the Armadale Health District over the period 2001 to 2005, there were 65 stillbirths, an average of 13 stillbirths a year.

Still birth rates[14] for Aboriginal people were about double the rates for non-Aboriginal people, but still birth rates for both non-Aboriginal and Aboriginal people in the Armadale Health District were similar to the State (Table 14).

Table 14: Still birth rates by Aboriginality, Armadale Health District and WA, 2001-2005

	Armadale HD	WA
Non-Aboriginal	7.1	6.7
Aboriginal	13.0	13.6

Source: *Midwives' Notification System.*

[14] Stillbirth rates are calculated per 1,000 total births (live births plus stillbirths).

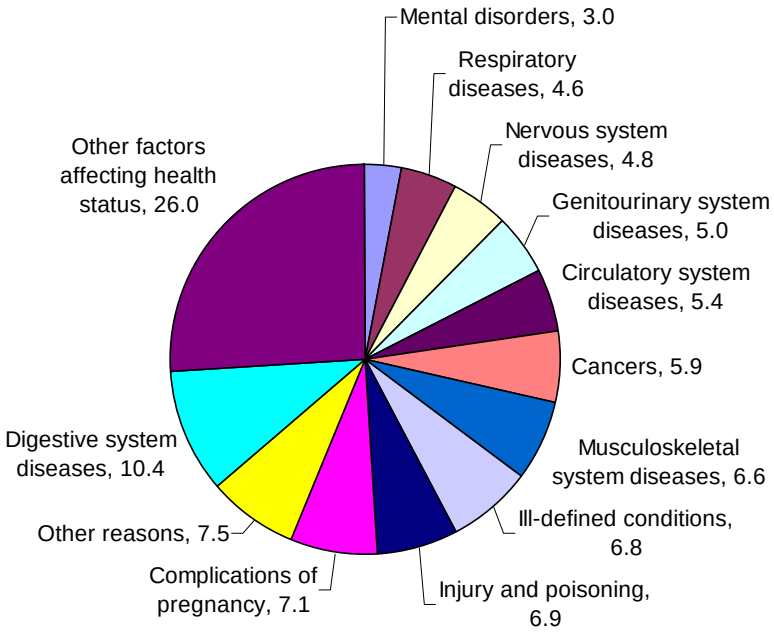
Morbidity

Main causes of hospitalisation

Generally, the main causes of hospital admissions differ from the main causes of death. Cancers and circulatory disease, which are major causes of death, are responsible for a relatively small proportion of hospital admissions.

Among Armadale Health District residents in 2005, the most common reason for admission to hospital was *other factors affecting health status*, which accounted for 26% of total admissions. This classification includes high activity treatments such as chemotherapy and dialysis. The next most common causes of hospital admissions were: digestive system diseases (e.g. liver diseases, hernias and appendicitis) (10%); other reasons (7.5%); and complications of pregnancy (7.1%). Together these comprised more than 50% of all admissions to hospital (Figure 20).

Figure 20: Percentage of hospital admissions by reason for admission, Armadale Health District, 2006



In 2006, there were 51,293 hospital admissions of Armadale Health District residents. The average length of stay was 2.9 days, using 148,912 beddays at a total cost of $182.1 million. Perinatal conditions were responsible for the longest average length of stay (ALOS) (10.1 days) and musculoskeletal diseases accounted for the highest cost ($19.1 million) after other factors affecting health status ($19.9 million) (Table 15).

There were 1,548 hospital admissions of Armadale Health District residents for mental disorders. The ALOS for these patients was 8.7 days, using 13,521 beddays at a total cost of $6.8 million. Neurotic, personality and other nonpsychotic mental disorders accounted for the most admissions (637) while affective disorders accounted for the highest cost ($2.4 million) (Table 16).

Table 15: Number of admissions, beddays, average length of stay and approximate cost by ICD chapter, Armadale Health District, 2006

Condition	Number of admissions	Beddays	Average LOS	Cost ($)[15]
Infectious and parasitic diseases	362	1,659	4.6	1,856,304
Cancer	3,006	11,273	3.8	17,264,481
Endocrine and nutritional conditions	1,270	4,465	3.5	6,071,677
Blood diseases	612	1,178	1.9	1,462,736
Mental disorders	1,548	13,521	8.7	6,778,519
Nervous system diseases	2,439	4,574	1.9	6,817,659
Circulatory diseases	2,765	11,066	4.0	18,257,325
Respiratory diseases	2,373	7,993	3.4	10,352,944
Digestive diseases	5,320	11,274	2.1	16,682,018
Genitourinary diseases	2,578	5,455	2.1	8,443,113
Complication due to pregnancy	3,621	11,482	3.2	15,049,661
Skin diseases	1,002	2,880	2.9	3,283,415
Musculoskeletal diseases	3,394	10,010	2.9	19,117,933
Congenital anomalies	269	887	3.3	1,659,358
Perinatal conditions	342	3,453	10.1	3,441,332
Ill-defined conditions	3,506	5,976	1.7	7,373,859
Injury and poisoning conditions	3,533	11,949	3.4	18,292,792
Other factors affecting health status	13,353	29,817	2.2	19,903,855
TOTAL	51,293	148,912	2.9	182,108,982

***Source**: HMDS data from Epidemiology Branch, .DoH WA.*

Table 16: Number of admissions, beddays, average length of stay and approximate cost for mental health disorders, by condition, Armadale Health District, 2006

Condition	Number of admissions	Beddays	Average LOS	Cost ($)[15]
Organic psychotic conditions	124	920	7.4	667,054
Schizophernic disorders	168	3,622	21.6	1,401,921
Affective disorders	556	5,014	9.0	2,418,923
Paranoid states	15	242	16.1	87,972
Other psychoses	46	657	14.3	262,887
Neurotic, personality & other nonpsychotic mental disorders	637	3,006	4.7	1,933,857
Mental retardation	2	60	30.0	5,904
TOTAL	*1,548*	*13,521*	*8.7*	*6,778,519*

***Source**: HMDS data from Epidemiology Branch, .DoH WA.*

[15] Costs are based on AR-DRG 4.2 and National Public costweights as published by the Commonwealth Dept of Health and Ageing (2004).

Mortality

Several different measures are used to evaluate and compare mortality in populations, for example, number of deaths, mortality rates, and life expectancy. Monitoring changes in the long-term pattern of mortality highlights changes in the health status of the population that may need investigating, thus informing the medical profession and those working in health policy and planning (Draper et al., 2005).

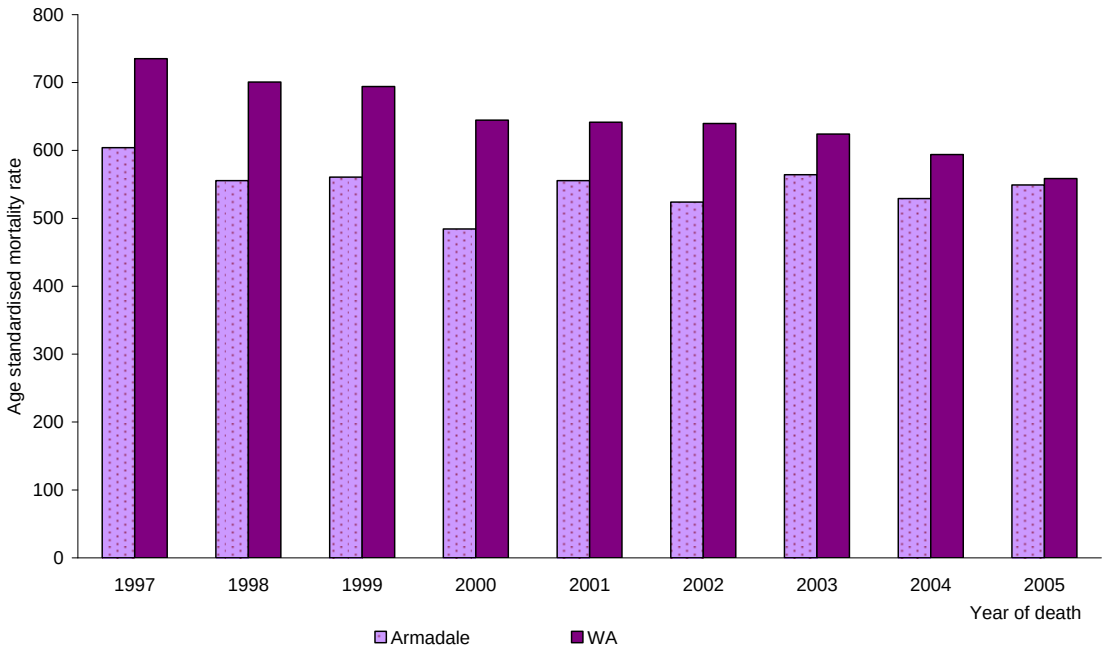
Life expectancy

Over the period 2002 to 2004, the life expectancy for males and females living in the Armadale Health District was 80.7 years and 85.9 years respectively. These figures are higher than the life expectancy estimates for the SMAHS (79.3 for males and 84.0 for females), and compare favourably with the period 1992 to 1994 when life expectancy for residents of the Armadale Health District was 78.1 and 85.3 years respectively.

Trends in mortality

Over the period 1997 to 2004, the age standardised mortality rates for Armadale Health District residents were significantly lower than those for the State. In 2005, the rates were similar. In WA, mortality rates fell significantly from 735 deaths per 100,000 person years in 1997 to 559 in 2005, while in the Armadale Health District there was no significant change in age standardised mortality rates over the period (Figure 21).

Figure 21: Age standardised mortality rates by year, Armadale Health District and WA, 1997-2005



Between 1997 and 2005,[16] there were 5,136 deaths in the Armadale Health District (males 2,824; females 2,312), accounting for 5% of the State's deaths. On average, 48%

[16] Based on year of death.

of deaths in the Armadale Health District occurred in Gosnells SLA, 45% in Armadale SLA and 6.6% in Serpentine-Jarrahdale SLA (Table 17).

Table 17: Number and percentage of deaths by year and SLA, Armadale Health District, 1997-2005

Year of death	Armadale		Gosnells		Serpentine-Jarrahdale		Armadale Health District
	No. of deaths	% AHD deaths	No. of deaths	% AHD deaths	No. of deaths	% AHD deaths	
1997	261	48.2	241	44.5	39	7.2	541
1998	234	45.7	246	48.0	32	6.3	512
1999	243	45.8	255	48.0	33	6.2	531
2000	218	44.0	248	50.0	30	6.0	496
2001	246	42.0	305	52.0	35	6.0	586
2002	253	44.5	267	46.9	49	8.6	569
2003	290	45.7	297	46.8	47	7.4	634
2004	282	45.3	310	49.8	30	4.8	622
2005	303	47.0	299	46.4	43	6.7	645
Total	2,330	45.4	2,468	48.1	338	6.6	5,136

Major causes of death

Overall, the leading causes of death in WA are ischaemic heart disease, various cancers, stroke and other forms of heart disease. Conditions that fall into these groups generally make up the top six or seven causes of death for both males and females, although other causes of mortality may be significant in rural communities that have high proportions of Aboriginal people or where other risk factors are involved.

The top ten causes of death over the period 2000 to 2004 accounted for 65% of all male deaths and 64% of all female deaths. The top two causes of death were the same for both male and female residents of the Armadale Health District: ischaemic heart disease, and all other cancers. For males the third most common cause of death was lung cancer, whereas for females it was cerebrovascular disease (Table 18).

Table 18: Top ten causes of death by sex, Armadale Health District, 2000-2004

Sex / condition	No. of deaths	Sex / condition	No. of deaths
Males		**Females**	
1. Ischaemic heart disease	280	1. Ischaemic heart disease	224
2. All other cancers	235	2. All other cancers	148
3. Lung cancer	127	3. Cerebrovascular disease	104
4. Cerebrovascular disease	88	4. Lung cancer	67
5. Suicide & self inflicted injuries	62	5. Breast cancer	66
6. COPD & allied conditions	53	6. Other forms of heart disease	57
7. Colorectal cancer	52	7. COPD & allied conditions	43
8. Prostate cancer	51	8. Colorectal cancer	40
9. Other forms of heart disease	51	9. Diabetes	38
10. Diabetes	49	10. Uterine/ovarian cancers	36

Source: *Epidemiology website report, Profile of health and wellbeing.*

Glossary

Age-specific rate: Age-specific rates are based on five-year age groups and are calculated by dividing the number of cases by the population of the same sex and age group.

Age-standardised rate: Weighted average of age-specific rates according to a standard distribution of age to eliminate the effect of different age distributions and thus facilitate valid comparison of groups with differing age compositions. In this report the 2001 Australian population has been used as the standard.

*Collection district (CD)***:** Collection districts are the smallest geographical areas defined by the ABS. For the 2001 Census there were an average of about 225 dwellings in each CD. In rural areas the number of dwellings per CD declines as population density decreases.

Dependency ratio: The dependency ratio indicates the proportion of people of non-working age in the community who are dependent on the number of people of working age (15–64 years). The ratio can be broken down into two components of dependence. The child dependency ratio is a ratio of children younger than 15 years dependent on the population of working age. The aged dependency ratio is the ratio of people aged 65 years or older dependent on the population of working age.

Employment status: Employed persons are those aged 15 years and over who, during the reference week, worked for one hour or more for pay, or worked for one hour or more without pay in a family business, or who had a job but were not at work because of leave or other reasons. Unemployed persons are those aged 15 years and over who were not employed in the reference week and had actively looked for work, or were available for work, or were waiting to start a new job or be called back to a job from which they had been stood down for less than 4 weeks.

Incidence: The number of instances of illness commencing, or of persons falling ill, during a given period in a specified population. Sometimes used to denote incidence rate.

Incidence rate: The number of instances of illness commencing, or of persons falling ill, during a given period in a specified population divided by the population at risk.

International Classification of Diseases (ICD): this manual is the World Health Organisation's internationally accepted classification of death and disease. The tenth revision, Australian modification (ICD-10-CM) is currently in use.

Labour force: The labour force comprises employed and unemployed persons (see Employment status), others are described as not in the labour force.

Life expectancy: Predicted number of years of life remaining to a person if the present pattern of mortality does not change. It is a statistical abstraction based on current age-specific death rates. Life expectancy is a measure of current mortality rather than a predictor of future lifespan since age-specific death rates can change over time.

Livebirth: The complete expulsion or extraction from its mother of a product of conception, irrespective of duration of pregnancy, which after separation shows signs of life.

Low birthweight: Birth of a baby weighing less than 2,500 grams.

Nulliparity: Is the state of not having given birth.

Rate ratio: The ratio of two rates – used to indicate the relative differential between two populations for a particular disease or condition.

Separation rate: The number of hospital separations per 1,000 in the population.

Standardised mortality ratio (SMR): The ratio of the number of deaths occurring among residents of a geographic area to the expected number of deaths based on the age specific rates of a standard population. A ratio of 1 means that the death rate is the same as that of the standard population, and a value of 2 indicates a rate twice that of the standard population.

Standardised rate ratio (SRR): The ratio of the number of cases occurring to residents of a geographic area to the expected number of cases based on the age specific rates of a standard population. A ratio of 1 means that the rate is the same as that of the standard population, and a value of 2 indicates a rate twice that of the standard population.

Statistical local area (SLA): An area defined by the ABS that consists of one or more collection districts. Statistical local areas can be based on local government areas (LGAs), or parts thereof, or any unincorporated area. In aggregate, they cover the whole of Australia, without gaps or overlaps. In the Peel Health District, the SLAs are the same geographic areas as the LGAs of the same name.

Statistical significance: An indication from a statistical test that an observed difference or association may be significant or 'real' because it is unlikely to be due to chance. A statistical result is usually said to be significant if it would occur by chance no more than 5% of the time.

Stillbirth: Birth of a foetus weighing at least 400 grams (or where birthweight is unavailable, of at least 20 weeks gestation), which shows no signs of life.

Stillbirth rate: Number of foetal deaths per 1,000 total births (stillbirths plus livebirths).

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