



Government of **Western Australia**  
**WA Country Health Service**

# **WA Country Health Service**

## **Health Profile Summary**

### **Select conditions only**

**WACHS Planning & Evaluation Team**  
**March 2017**

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## Acronyms

ABS	Australian Bureau of Statistics
ASR	Age-standardised rate
CI	95% Confidence Interval of a rate or proportion
CSF	Clinical Service Framework
DoH	Department of Health WA
COPD	Chronic obstructive pulmonary disease
ED	Emergency Department
ENT	Ear, nose and throat infections
ERP	Estimated resident population
ESKD	End stage kidney disease
HWSS	Health and Wellbeing Surveillance System
MVA	Motor vehicle accident
PPH	Potentially preventable hospitalisations
SEIFA	Socio-Economic Indexes for Areas
SIHI	Southern Inland Health Initiative
SRR	Standardised rate ratio
UTI	Urinary tract infection
WACHS	West Australian Country Health Service

## Introduction and purpose

This health profile report provides a snapshot of key demography and health status information for residents living within the geographic area of the WA Country Health Service (WACHS). The report focusses on the key health issues facing the residents living in each of the seven WACHS health regions such as chronic disease, common reasons for hospitalisation, avoidable hospitalisations and mortality and Aboriginal health and life expectancy.

This paper is intended to support evidence-based health services planning and complement the more detailed Regional Health Profiles available on the WA Country Health Service internet [Publications page](http://www.wacountry.health.wa.gov.au/index.php?id=445). (<http://www.wacountry.health.wa.gov.au/index.php?id=445>), and the WACHS Child Health Profile, 2017.

Further detail or additional information can be requested from the Manager, WACHS Planning and Evaluation team (internal WACHS requests) or from the Manager, Epidemiology Branch, WA Department of Health (external to WACHS requests).

## Use of the term Aboriginal

Within Western Australia, the term Aboriginal is used in preference to Aboriginal and Torres Strait Islander, in recognition that Aboriginal people are the original inhabitants of Western Australia. Aboriginal and Torres Strait Islander may be referred to in the national context and Indigenous may be referred to in the international context. No disrespect is intended to our Torres Strait Islander colleagues and community.

## 1. Key health issues for WACHS residents



hospitalisation data relates to 2010-2014  
death data relates to 2009-2013

\*sexually transmitted infection  
\*\*chronic obstructive pulmonary disease  
\*\*\* ear nose and throat

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## Key Facts

### Population

- In 2015, the estimated resident population (ERP) in WACHS regions was 546,198 people (21 per cent of WA's total population) and the proportion of country residents in the WA population is projected to decrease to 19 per cent by 2026.
- Aboriginal people make up 10 per cent (56,726) of the WACHS population, ranging from 46 per cent in the Kimberley, 12 to 16 per cent in the Pilbara, Midwest and Goldfields to three per cent in the South West. Two per cent of the total population in the Perth metropolitan area are Aboriginal (37,510 people).
- WACHS' population is forecast to grow by 1.3 per cent per year from 2015 to reach 630,130 people by 2026.
- The South West population is the largest of the seven WACHS regions – almost one third of the total WACHS population. There were an estimated 175,949 people residing in the South West region in 2015 and is forecast to reach 206,600 people by 2026.
- South West had the largest population of people aged 65 and over in 2015 (27,000), almost double the next highest region, Wheatbelt (13,960 people).
- The fastest population growth is forecast for the Kimberley region at 2.2 per cent per year and is projected to reach 49,560 people by 2026. The slowest growth at 0.5 per cent per year is forecast for the Wheatbelt region which is set to reach 81,150 by 2026.

### Socio-economic indicators

- 41 per cent of WACHS residents (217,491 people), live in areas classed as the two (of five) most disadvantaged types of localities in Australia, compared with seven per cent of metropolitan residents.
- All Kimberley residents (38,801) live in areas of highest disadvantage. In the Midwest 86 per cent (50,633) of the region's population live in the two most disadvantaged areas.

### Key health needs and issues

- In 2011, the top five causes of disease burden accounted for more than two thirds of the total burden of disease in WA and were cancer, mental and substance use, cardiovascular diseases, musculoskeletal condition and injuries.
- The data demonstrates that the health of country people is significantly poorer than the health of metropolitan people.
- WACHS residents are more likely than the metropolitan residents to have potentially preventable hospitalisations (PPH) (1.2 times the State rate), suffer an avoidable death (1.3 times the State rate) and have reduced cancer survival rates in remote areas (up to 1.7 times greater than Perth residents).
- WA Aboriginal people have significantly higher rates of PPH (4.2 times) notifiable disease (4.2 times) and avoidable deaths (4.6 times) than non-Aboriginal rates.

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- Aboriginal people have substantially poorer health outcomes across most health conditions than non-Aboriginal people, particularly in the Kimberley, Pilbara and Midwest regions.
- Kimberley residents have the greatest health needs for both whole population and Aboriginal population, and the region has one of the fastest growing older populations, though smaller numbers than WACHS southern regions.
- Kimberley residents have the highest rates for alcohol related hospitalisations (3.3 times the State rate) and deaths (2.7 times the State). This region's tobacco related hospitalisations are 2.3 times the State rate and the tobacco-related death rate is 1.8 times the WA rate.
- The hospitalisation rate for dialysis for Kimberley males is 4.2 times higher and for women it is 12.6 times higher than the State rate.
- Wheatbelt and Kimberley residents have the highest rates of avoidable deaths for external causes of morbidity and mortality, 2.5 times and 2.1 times the State rate respectively.
- Both Goldfields and Wheatbelt residents have 1.5 times more alcohol related deaths compared with the WA state rate. Wheatbelt residents also suffer significantly more fatalities due to transport accidents (4.1 times the State rate).
- Motor vehicle accidents (MVAs) lead to significantly more hospitalisations and deaths for WACHS residents compared with metropolitan areas. The WACHS MVA death rate is 2.2 times the State rate and Wheatbelt has significantly more deaths due to MVAs than any other region.

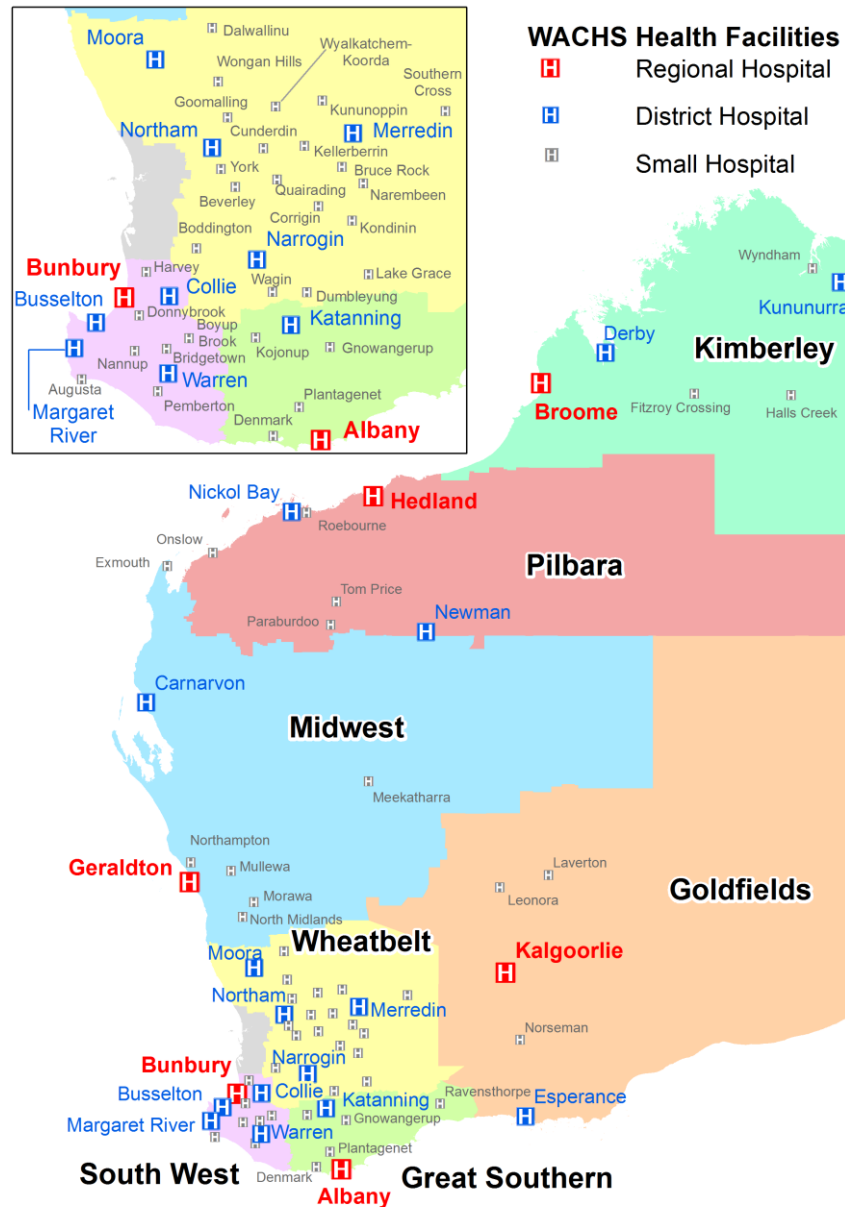
## Risky health behaviours and factors

- **WACHS** residents had significantly higher prevalence rates for smoking and drinking at high risk levels for long-term harm compared with the State rates. Within WACHS, smoking among Aboriginal people was significantly higher than non-Aboriginal people.
- The 10 year trend from 2005 to 2015 shows that the obesity gap between country and metropolitan residents is widening. In 2015, 35 per cent of WACHS residents were obese compared with 25 per cent of the metropolitan residents.
- WACHS adult residents aged 16 and over, reported significantly greater prevalence of arthritis (20%) compared with State wide (19%) and in the Perth metropolitan (19%) area.
- In 2014-15, 21 per cent households of Aboriginal people in WA lived in houses of unacceptable standard. Also, one in four (26.8 per cent) of Aboriginal adults 15 years and over had experienced physical or threatened physical violence in last 12 month

## 2. The WA Country Health Service Area

One in five Western Australians live in the country. It is estimated that in 2015 WACHS served a population of 546,198 people<sup>1</sup> who lived across a vast geographic area covering 2.55 million square kilometres. This makes WACHS the largest country health service in Australia and one of the biggest in the world. WACHS delivers a range of complex health services in its 71 hospitals – six larger Regional hospitals, 15 medium sized District hospitals, and 50 small hospitals<sup>1</sup>) and 27 nursing posts.

**Figure 1: A map of the WA Country Health Service and its seven regions**



Source: WACHS Planning and Evaluation Unit, 2016

<sup>1</sup> Refer Clinical Services Framework 2014 – 2024. Includes 2 small hospitals that may become Primary Health Centres over the next couple of years (Pingelly and Cunderdin) as a part of the Southern Inland Health Initiative and 1 Health Centre (Kalbarri) as it has overnight beds.

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## Population

In 2015, the Australian Bureau of Statistics' (ABS) Estimated Resident Population (ERP) for WACHS was 546,198 (21 per cent of the WA population)<sup>i</sup>. Almost one-third population is residing in South West followed by Wheatbelt (14%). Kimberley has the lowest population (7%) amongst all WACHS regions.

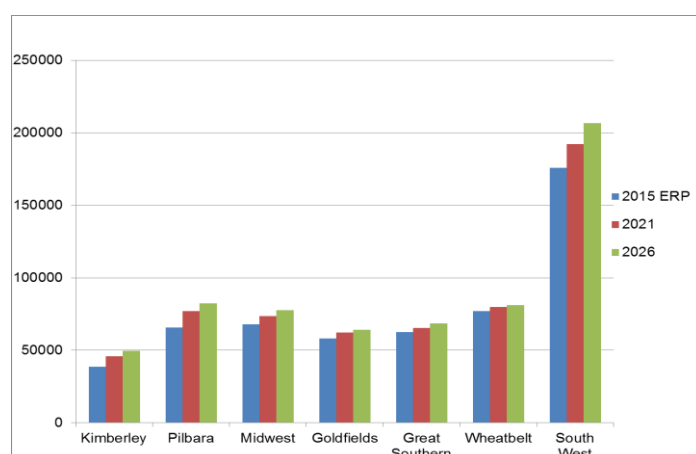
**Table 1: WACHS population in 2015 (by Health Regions and Age Groups).**

Health Region	Age Groups					Overall
	0-14	15-44	45-64	65-79	80+	
Goldfields	12,415 (11%)	26,859 (12%)	13,928 (10%)	4,050 (7%)	1,017 (2%)	58,269 (11%)
Great Southern	12,418 (11%)	21,207 (10%)	17,153 (12%)	8,787 (16%)	2,867 (5%)	62,432 (11%)
Kimberley	8,956 (8%)	18,854 (9%)	8,816 (6%)	1,730 (3%)	0,445 (1%)	38,801 (7%)
Midwest	13,830 (13%)	26,197 (12%)	18,301 (13%)	7,331 (13%)	2,219 (4%)	67,878 (12%)
Pilbara	11,432 (10%)	36,751 (17%)	15,945 (11%)	1,507 (3%)	0,224 (0%)	65,859 (12%)
South West	36,541 (33%)	65,553 (30%)	46,855 (33%)	20,780 (38%)	6,220 (11%)	175,949 (32%)
Wheatbelt	15,024 (14%)	25,359 (11%)	22,667 (16%)	10,844 (20%)	3,116 (6%)	77,010 (14%)
<b>WACHS</b>	<b>110,616</b>	<b>220,780</b>	<b>143,665</b>	<b>55,029</b>	<b>16,108</b>	<b>546,198</b>

South West has the largest (38%) proportion of people above 65 years of age, almost double to the next highest region, Wheatbelt (20%). Of all those aged 65 and over, around 23 per cent (6,220 people) are aged 80 and over in South West and 22 per cent (3,116) in Wheatbelt, who may require more health care services.

The WA Department of Planning's population projections, WA Tomorrow 2015, Band C (mid growth) projections, estimate the population to grow by one per cent per annum on average, and the WACHS population to reach 630,130 by 2026. This represents a total growth of 15 per cent for WACHS from 2015 to 2026.

**Figure 2: Current and projected population in WACHS health regions**



Source: 2015 ERP = Australian Bureau of Statistics (ABS) Estimated Resident Population (ERP) 2015  
Population projections are from WA Department of Planning's WA Tomorrow, 2015.

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By comparison, the Perth metropolitan area is projected to grow at almost twice the WACHS rate at an average rate of two per cent per year from 2015 to 2026. The total metropolitan growth from 2015 to 2026 is estimated to be 28 per cent and the metropolitan population is forecast to increase from 2,044,061 in 2015 to 2,623,430 in 2026. If this occurs, the proportion of country residents of WA population will decrease to 19 per cent by 2026.

**Table 2: Current and projected population in WACHS regions**

	2015 ERP	2021	2026	Average annual growth 2015-2026	TOTAL growth 2015 - 2026	% of total WA population 2015	% of total WA population 2026
Kimberley	38,801	45,730	49,560	2.2%	28%	1%	2%
Pilbara	65,859	77,140	82,490	2.1%	25%	3%	3%
Midwest	67,878	73,710	77,640	1.2%	14%	3%	2%
Goldfields	58,269	62,340	64,090	0.9%	10%	2%	2%
Great Southern	62,432	65,250	68,600	0.9%	10%	2%	2%
Wheatbelt	77,010	79,800	81,150	0.5%	5%	3%	2%
South West	175,949	192,180	206,600	1.5%	17%	7%	6%
WACHS total	546,198	596,150	630,130	1.3%	15%	21%	19%
Perth Metropolitan	2,044,061	2,360,510	2,623,430	2.3%	28%	79%	81%
WA State	2,590,259	2,956,660	3,253,560	2.1%	26%	100%	100%

Source: Population projections are from Department of Planning's 'WA Tomorrow', 2015, Band C.

- The region with the largest population numbers is the **South West** which had just under 176,000 in 2015. The South West numbers are over twice as great as the next highest region – the Wheatbelt - which had 77,010 in 2015.
- The fastest growing WACHS regions are forecast to be the **Kimberley and Pilbara** but the economic conditions in the last two years appear to be having an anecdotally reported effect on reducing the population across WA, particularly in the north of the state. This cannot be confirmed until the first results of the 2016 Census are known (likely late 2017 or early 2018).
- The most conservative population growth of the seven WACHS regions is projected for the **Wheatbelt**; its population is projected to grow by 0.5 percent per year from 77,010 in 2015 to 81,150 people in 2026.

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## Aboriginal Population

In 2015, approximately four (4) per cent of the WA population was Aboriginal (93,323). An estimated 60 per cent of these people resided in the WACHS health regions (55,712 people), accounting for 10 per cent of the total country population (Table 3). There were an estimated 37,611 Aboriginal people living in the metropolitan area which was two percent of the metropolitan population.

**Table 3: Aboriginal v non-Aboriginal population by region, 2015**

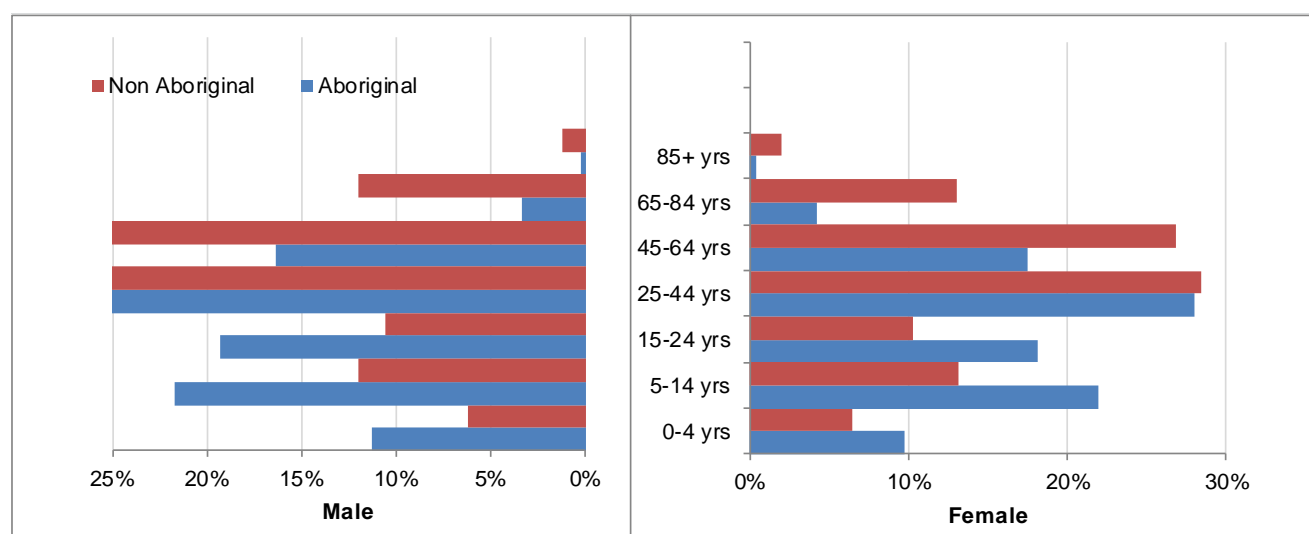
	ERP 2015	est. number Aboriginal	% Aboriginal of total population	Non-Aboriginal
Kimberley	38,801	17,577	45%	21,224
Pilbara	65,859	10,076	15%	55,783
Midwest	67,878	8,824	13%	59,054
Goldfields	58,269	6,934	12%	51,335
Wheatbelt	77,010	4,467	6%	72,543
South West	175,949	4,575	3%	171,374
Great Southern	62,432	2,809	5%	59,623
<b>WACHS Total</b>	<b>546,198</b>	<b>55,712</b>	<b>10%</b>	<b>490,486</b>
<b>Metropolitan area total</b>	<b>2,044,061</b>	<b>37,611</b>	<b>2%</b>	<b>2,006,450</b>
<b>WA Total</b>	<b>2,590,259</b>	<b>93,323</b>	<b>4%</b>	<b>2,496,936</b>

Source: Total Population ABS Provisional ERP 2015.

Note: Aboriginal population proportions are from ABS ERP 2013 (based on 2011 ABS Census) as Aboriginal proportions and numbers are not yet available in ABS 2015. Aboriginal people are quite mobile, therefore using proportions from two years earlier, may not reflect the true size and structure of regional Aboriginal populations, and the figures displayed must be read as estimates only. More accurate proportions may be available once Census 2016 is released.

- Overall, 10 per cent of the WACHS population is Aboriginal people compared with only two (2) per cent in Perth metropolitan area and four (4) per cent for the whole of WA.
- The Kimberley had the largest Aboriginal population and proportion of all WACHS regions, with an estimated 17,577 Aboriginal people or 45 per cent of the region's total population followed by the Pilbara then the Midwest regions.
- The region with the smallest actual number of Aboriginal people is the Great Southern with only an estimated 2,809 people, or five per cent of the region's population.
- The lowest proportion of Aboriginal people resides in the South West region, where only three per cent of the total population, or an estimated 4,575 people, identify as Aboriginal.

**Figure 3: WACHS population by age groups by Aboriginality**



Source: Aboriginal population figures are estimates from the Epidemiology Branch based on 2011 Census with births and deaths considered to achieve the 2015 population figures.

- Figure 3 shows that the Aboriginal population is significantly younger compared to the non-Aboriginal population. Hence in the northern regions with larger Aboriginal populations, particularly in the Kimberley, the regions' total populations are much younger than the WACHS and State populations.
- The Kimberley, for example, has a higher percentage of children aged 0-14 years and adults aged 20-44 years and a lower proportion of people aged 50 years and over. Detailed information of each region's age-structure can be found in the WACHS Regional Health Profiles in the Publication page:

<http://www.wacountry.health.wa.gov.au/index.php?id=445>

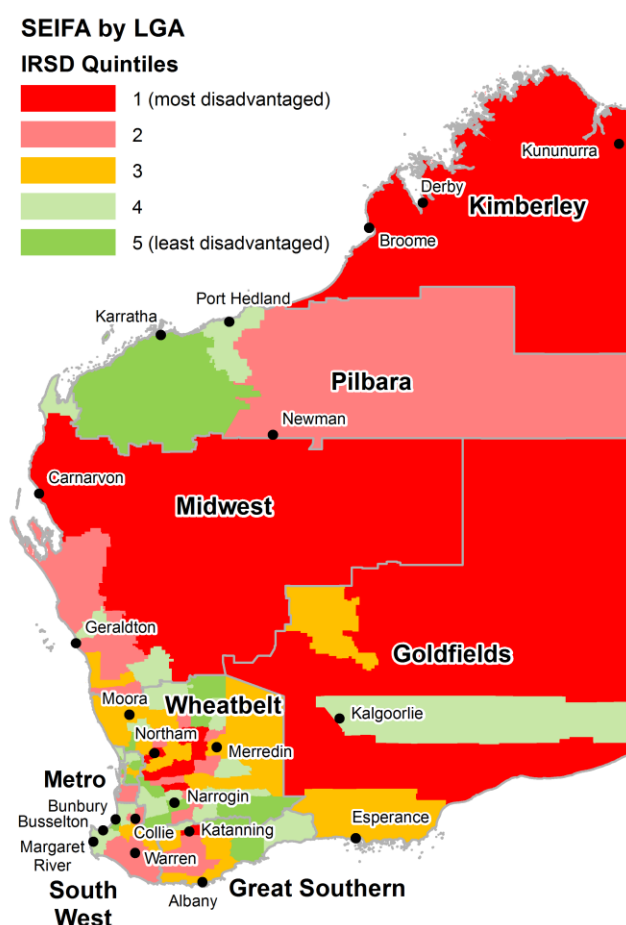
## 3. Economic, demographic and social factors

Relative socio-economic disadvantage scores were calculated from responses to the ABS Census 2011. Scores less than 1000 indicate socio-economic disadvantage.

Inequalities in health appear in the form of a social gradient, so that in general, the higher a person's socio-economic position, the healthier they are<sup>iii</sup>. Lifestyle risk factors that are related to poor socio-economic circumstances include smoking, alcohol use, poor diet, minimal exercise and high body mass index<sup>iii</sup>. Based on the 2011 ABS Census, all seven WACHS health regions have areas with low Socio-Economic Indexes for Areas (SEIFA<sup>iv</sup>) scores.

The map of WACHS regions below shows areas within the WACHS regions colour coded by SEIFA's Index of Relative Socio-economic Disadvantage (ISRDI). The ISRDI divides the population into five equal groups where 1 is the most disadvantaged people and where they live, and 5 is the least disadvantaged people and where they live) by SEIFA score. These five area types are called quintiles. The most disadvantaged quintile is shown in dark red and is where the most disadvantaged people reside and these areas tend to correlate with where health issues are the greatest.

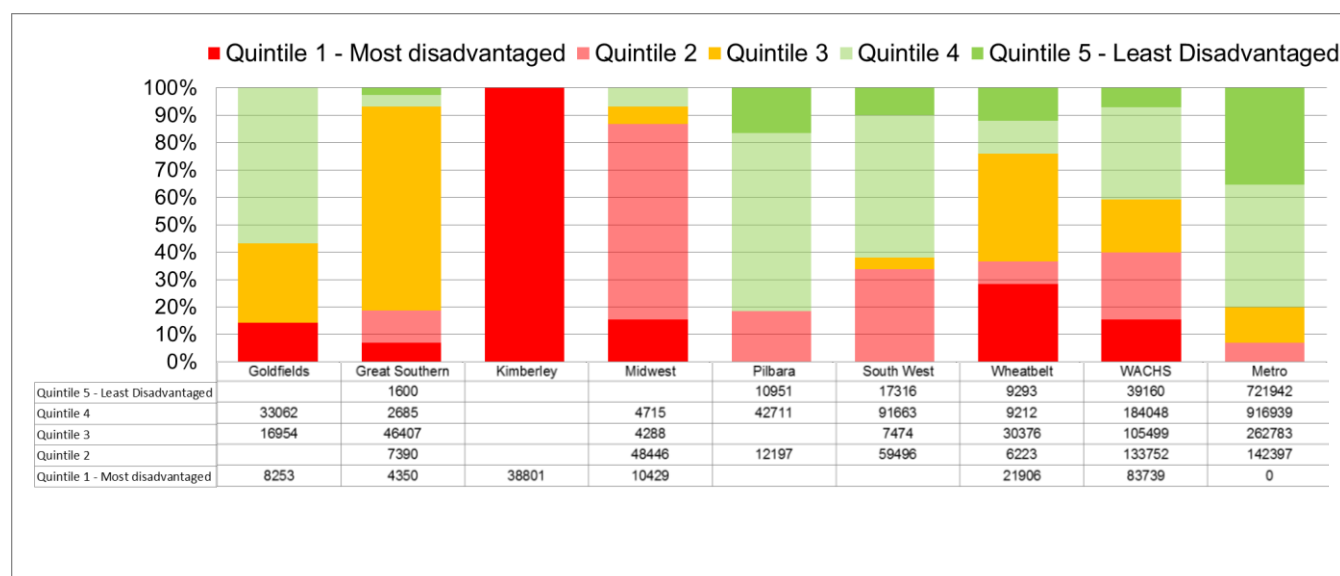
**Figure 4: Map of WACHS regions by SEIFA quintiles**



Sources: 2015 ERP from the ABS and SEIFA from ABS 2011

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**Figure 5: SEIFA 2011 plus 2015 Estimated Resident Population**



Sources: 2015 ERP from the ABS and SEIFA from ABS 2011

- In **WA** only three per cent of all residents live in the most disadvantaged quintile areas but one in 10 live in the second most disadvantaged quintile area 2. The majority, or 72 per cent, of Western Australians live in the two least disadvantaged quintiles 4 and 5.
- No **metropolitan** residents live in the most disadvantaged quintile and only 7 per cent, or 142,397 people, live in the second most disadvantaged quintile. Eighty per cent of people who live in Perth metropolitan area live in the two least disadvantaged quintiles 4 and 5.
- In contrast, two fifths of **WACHS** country residents, or 217,491 people, live in the most disadvantaged quintiles 1 and 2. One in six WACHS residents live in the most disadvantaged quintile 1, and a further 24 per cent live in the second most disadvantaged quintile 2.
- All 38,801 people in the **Kimberley** region live in the most disadvantaged quintile area 1.
- In the **Wheatbelt** region, 28 per cent of the residents (21,906 people) live in the most disadvantaged quintile 1 and a further 8 per cent (6,223 people) live in the second lowest quintile 2. This brings the proportion of Wheatbelt residents who live in the two most disadvantaged areas up to more than one in three (28,129 people).
- Seven per cent (4,350 people) of the **Great Southern** residents live in the most disadvantaged quintile 1 and another 12 per cent (7,390) live in the second most disadvantaged quintile 2.
- In the **Midwest** region, 8,875 people (or 86 per cent of the region's residents) live in the two most disadvantaged areas (quintiles 4 and 5). None of the Midwest residents are classified as living in the least disadvantaged quintile 1.

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- 8,253 **Goldfields** residents (14 per cent of the region's residents) live in the most disadvantaged quintile 5. No Goldfields residents live in the least disadvantaged quintile 1.
- In the **Pilbara**, 82 per cent of the region's residents or 53,662 people live in the two least disadvantaged quintiles 1 and 2. One in five Pilbara residents, or 19 per cent (12,197 people), live in the second most disadvantaged quintile but none were found to live in the most disadvantage area (quintile 1).
- In the **South West**, 62 per cent of the region's residents (or 108,979 people) live in the two least disadvantaged quintiles. One in three South West residents live in the second most disadvantaged area while none live in the most disadvantaged quintile.

## 4. Health Status

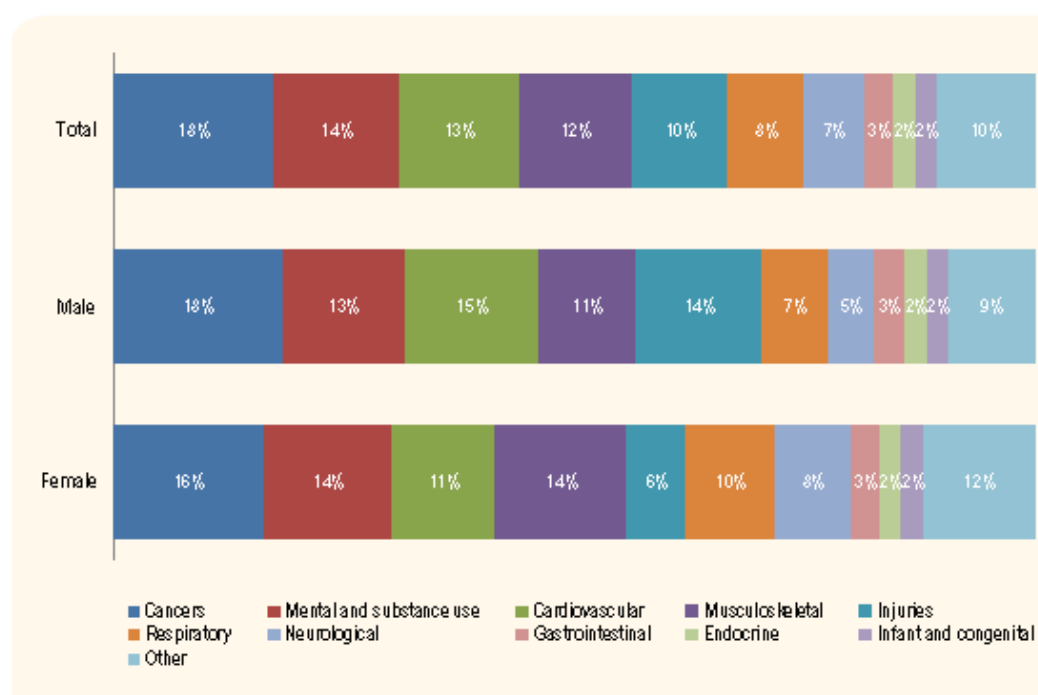
This section covers burden of disease, life expectancy, mortality (death rates), morbidity (hospitalisations), potentially preventable hospitalisations and avoidable mortality of WACHS residents compared with their State and metropolitan counterparts.

### Burden of Disease

Burden of disease measures the gap between the current and ideal health of populations and is the most comprehensive and comparable assessment of a population's health<sup>v</sup>. It measures the loss of life and impact of disability into a measure of total 'burden' of the disease in a measure called Disability Adjusted Life Years (DALYs), and thus provides understanding of the impact of particular diseases and risk factors on communities. At present the data is only available at the whole of WA level and not down to health service or regional level (due late 2018/2019 via the Department of Health's Epidemiology Branch).

In 2011, the top five causes of disease burden in WA (two thirds of the burden of disease) were cancer and other neoplasms, mental and substance use disorders, cardiovascular diseases, musculoskeletal conditions, and injuries. More than 435,000 years of healthy life due to premature death and living with disease and injury were lost to Western Australians<sup>vi</sup>.

**Figure 6: Proportion (%) total burden (DALY) by disease group and sex, 2011**



Source: Epidemiology Branch, Overview of the burden of disease in WA, 2011, fact sheet

## Life Expectancy

- WA males born in 2013-2015 are expected to live to 80.5 years and females to 85 years<sup>v</sup>. The life expectancy at birth for babies born in WACHS regions is 79.3 years for males and 84.1 years for females. In comparison, the Perth metropolitan life expectancy at birth is greater at 81.4 years for males and 85.7 years for females<sup>vii</sup>.
- Aboriginal people in WA have a significantly lower life expectancy compared with non-Aboriginal people. In 2013, the gap was estimated by ABS to be 15.1 years for males and 13.5 years for females. Aboriginal male life expectancy is 65.0 years and Aboriginal female life expectancy is 70.2 years for babies born in 2010-2012 in WA<sup>viii</sup>.

## Mortality and Morbidity

Select hospitalisations (morbidity) and deaths information below has been age standardised to take the differing age structures into account and then compared to the State age standardised ratio (ASR) - persons per 100,000 person years.

To try and achieve simple comparison standardised rate ratios (SRR) are derived from the ASRs relative to the WA State ASR. The State SRR is always 1.0.<sup>2,3</sup> In the tables below, **red** and **orange** values indicate the regional value is higher (worse) than the than 1.0, while **green** values indicate the region's is equivalent to or lower (better) than 1.0.

Rates in orange are 1-1.5 times the State ASR; rates in red are greater than 1.5 times the State ASR. For example, an SRR value of two represents twice the State ASR, and an SRR value of 3 represents three times the State ASR<sup>4</sup>.

For six out of nine selected conditions, the hospitalisation rates are significantly higher for WACHS residents compared with the State as a whole and metropolitan residents. This demonstrates that many WACHS residents have poorer health and thus a greater need to access health care than their metropolitan counterparts. Death rates for WACHS residents are also higher than the State as a whole and for metropolitan residents across all nine conditions.

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<sup>2</sup> NOTE: This information relates to the health status of residents of each health region. They may have received their hospital care within the region or within another WACHS region, a metropolitan hospital or as a private patient in a private hospital.

<sup>3</sup> The region's rate ratio is its ASR divided by the State ASR. ASRs are standardised with the Australian 2001 population and expressed per 100,000 person years.

<sup>4</sup> Where the numbers are in **black font**, the regional rate is statistically significantly different\* than the state rate, and where the figure is in **white font**, the difference is not statistically significant. \*Significantly higher/lower refers to statistical significance, rather than importance, and means that the difference has a 95% confidence of not being the result of chance.

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## Morbidity (hospitalisations) select conditions

The following table shows the hospitalisation rates by select condition for country and metropolitan residents by region of residence.

**Table 4: Hospitalisations, SRR, select conditions, 2010-2014<sup>#</sup>**

	Digestive disease	Dialysis	Diabetes & impaired glucose regulation	Cancer tumours	Respiratory Diseases	Injury and Poisoning	Musculo-skeletal diseases	Circulatory diseases	Transport accidents
Kimberley	1.1	7.6	2.8	1.1	3.4	2.6	0.9	1.7	2.1
Pilbara	0.7	2.6	1.5	0.7	1.5	1.2	0.7	1.1	1.4
Midwest	1.1	1.3	1.5	1.1	1.4	1.3	1.1	1.2	1.5
Goldfields	0.9	1.7	1.7	1.0	1.4	1.1	0.8	1.3	1.3
Wheatbelt	0.9	0.2	1.3	1.1	1.2	1.2	1.1	1.0	1.8
South West	1.1	0.6	1.0	1.0	1.1	1.0	1.1	1.1	1.2
Great Southern	1.1	0.5	0.9	0.9	1.1	0.9	0.9	1.0	1.2
WACHS	1.0	1.2	1.3	1.0	1.4	1.2	1.0	1.1	1.4
Metro	1.0	1.0	0.9	1.0	0.9	1.0	1.0	1.0	0.9

<sup>#</sup>excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 12 July 2016.

Note: Hospitalisation data relates to 2010 to 2014. White numbers are not statistically significantly different to the state rate of 1.0. **Black numbers are statistically significantly different to the Statewide rates.**

- **WACHS** residents were 1.4 times more likely to be hospitalised for motor vehicle accidents and respiratory diseases 1.3 times for diabetes and impaired glucose regulation and 1.2 times for dialysis, and injury and poisoning compared to Statewide rates. Hospitalisation rates for digestive disease, cancer tumours and musculo-skeletal disease were equivalent to State rates.
- **Regions with large populations living in disadvantaged areas and with high proportions of Aboriginal residents had higher hospitalisation rates across most selected conditions.** Where hospitalisation rates were higher than the State rates, it may be indicative of poorer access to health care or if the rates are lower than state rates (green) it may be indicative of a lower population age structure in the north of the State rather than low incidence (ie cancer rates in the Kimberley are lower as the population is a younger age structure than other regions). Thus interpretation should be discussed with regions concerned.
- All northern regions had very high hospitalisations rates for diabetes and impaired glucose regulation. **Kimberley** residents had the highest rate at 7.6 times the State rate followed by the **Pilbara** (2.6) and **Goldfields** (1.7). This is also reflected in these regions' dialysis hospitalisation rates. **Kimberley** women were 12.6 times more likely to be hospitalised for dialysis than their State counterparts; men 4.2 times. For Kimberley Aboriginal men, the

# WACHS Health Profile Summary 2017

dialysis hospitalisation rate was 1.2 times, and for Kimberley Aboriginal women 1.4 times, the State Aboriginal rate<sup>xi</sup>.

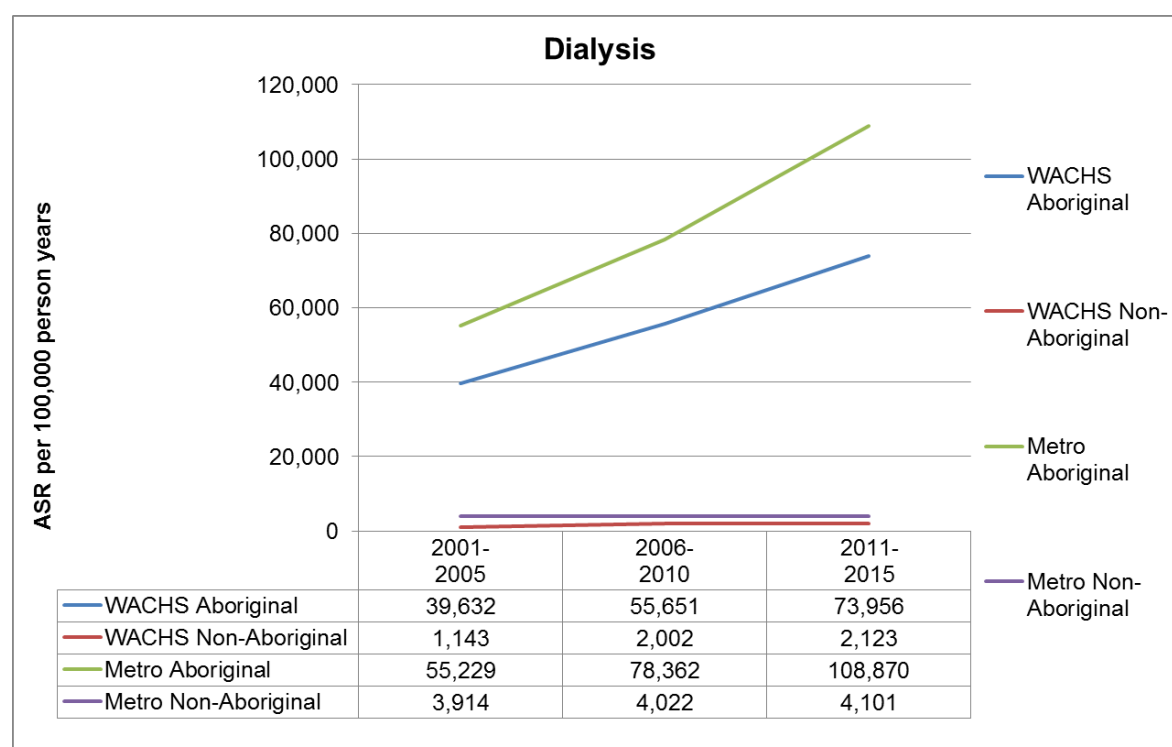
- Hospitalisation rates for respiratory disease were significantly higher across all seven WACHS regions. Again, the **Kimberley** residents had the highest respiratory disease hospitalisation rate at 3.4 times the State rate.
- Motor vehicle accident related hospitalisations were significantly higher across all seven WACHS regions compared with the metropolitan rates, particularly in the **Kimberley** and the **Wheatbelt** regions. The group that had the highest proportion of hospitalisations due to transport accidents were the 25-44 year olds. The percentage of males was 63 per cent for Aboriginal people and 73 per cent for non-Aboriginal people<sup>xi</sup>.

## Morbidity trends for dialysis, heart disease and respiratory disease

In the tables and graphs below, age standardised rate (ASR)<sup>5</sup> per 100,000 person years is used instead of standardised rate ratios (SRR) as it enables a comparison between two groups (such as different time periods or different geographical areas) after adjusting the populations of the two groups to have a similar age structure.

### Dialysis rates

**Figure 7: Dialysis hospitalisation rates (ASR) by Aboriginality<sup>#</sup>, 2001-2015**



<sup>#</sup> excludes visitors

<sup>5</sup> ASR is the age-standardised rate per 100,000 person years. Direct standardisation using all age groups of 2001 Australian Standard Population in order to compare rates between population groups and different years for the same population group.

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Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not raw numbers.

- The data from 2001 to 2015 shows that the dialysis hospitalisation rates were significantly higher for Aboriginal people compared with non-Aboriginal people regardless of where they resided.
- ASR for WACHS non-Aboriginal people was 2,123 and for Aboriginal people it was 73,956, which is nearly 35 times as great. In comparison, the ASR for metropolitan Aboriginal people was even higher at 108,870.
- Aboriginal people from remote areas have an incidence rate of end stage kidney disease (ESKD) up to 30 times higher than non-Aboriginal Western Australians. The incidence of ESKD is highest in the Kimberley, followed by the Pilbara and Midwest regions<sup>ix</sup>.

**Table 5: Dialysis hospitalisation rates (ASR) by region by Aboriginality<sup>#</sup>, 2001-2015**

Dialysis rates per 100,000 person years by region and by Aboriginality						
	2001-2005		2006-2010		2011-2015	
Region of Residence	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
Goldfields	59,638	1,352	74,681	1,722	86,039	1,610
Great Southern	9,960	1,033	8,999	2,178	6,468	2,832
Kimberley	48,927	121	82,415	838	110,000	772
Midwest	33,607	1,597	32,846	2,835	45,017	3,150
Pilbara	48,253	509	61,529	324	95,905	2,111
South West	12,224	1,447	12,538	2,700	30,563	2,648
Wheatbelt	3,625	773	12,281	897	9,305	666

#excludes visitors

Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not crude numbers.

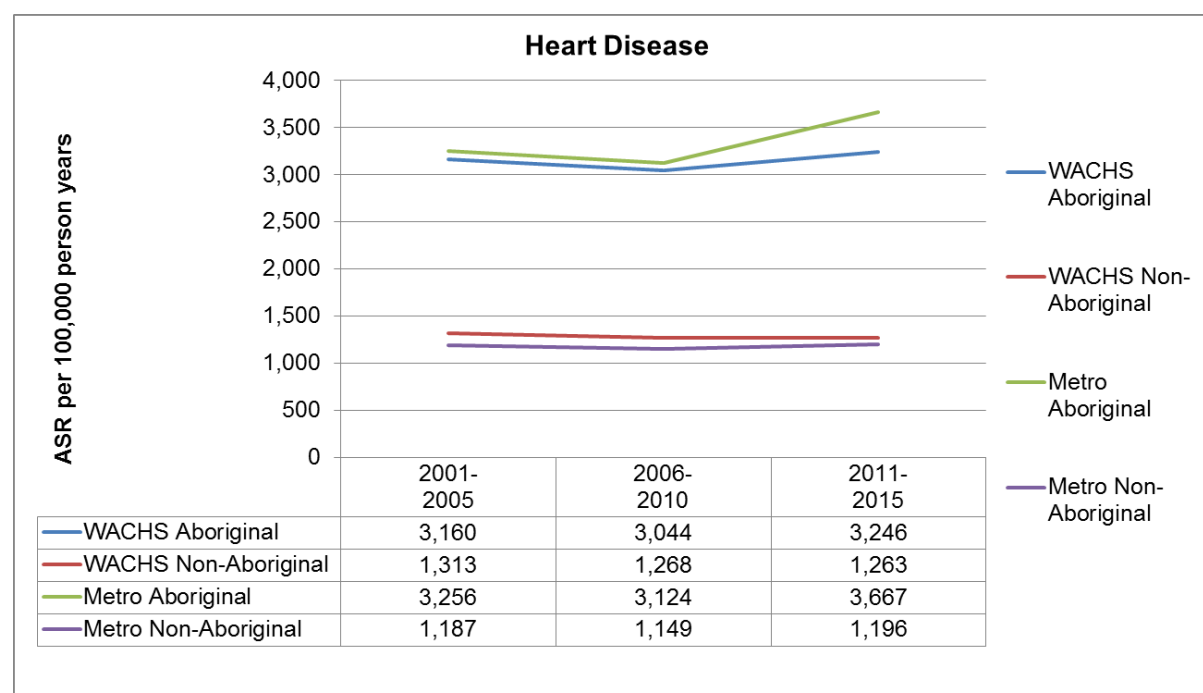
- **Kimberley** Aboriginal people had higher ASR for dialysis hospitalisations than any other region and the rate has more than doubled since 2001-2005. The dialysis rates for residents in all regions except for the Great Southern, as well as metropolitan area have worsened since 2001-2005.

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## Heart disease

- Modifiable risk factors for heart disease include smoking, high cholesterol, high blood pressure, diabetes, lack of physical activity, lack of nutritious foods, alcohol intake, waist circumference and BMI. Non-modifiable risk factors include age and sex, family history of cardiovascular diseases, social history including cultural identity, ethnicity, socioeconomic status and mental health. Diabetes and chronic kidney disease are amongst the comorbidities that increase heart disease risk<sup>x</sup>.

**Figure 8: Heart disease hospitalisation rates (ASR) by Aboriginality<sup>#</sup>, 2001-2015**



<sup>#</sup>excludes visitors

Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not crude numbers.

- Since 2006-2010, the gap in heart disease outcomes for Aboriginal people living in the metropolitan and the country has widened; in 2011-2015 Aboriginal people in the metropolitan area have the highest rate of heart disease.
- Hospitalisation rates for heart disease were significantly higher, by 2.6 times, for Aboriginal people compared with non-Aboriginal people in both metropolitan area and country in 2011-2015.

# WACHS Health Profile Summary 2017

**Table 6: Heart disease hospitalisation rates (ASR) by region by Aboriginality<sup>#</sup>, 2001-2015**

Heart Disease rates per 100,000 person years by region and by Aboriginality						
	2001-2005		2006-2010		2011-2015	
Region of Residence	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
Goldfields	3,181	1,446	4,054	1,420	3,386	1,348
Great Southern	4,168	1,283	3,015	1,160	4,170	1,179
Kimberley	3,011	822	2,913	1,049	3,292	1,199
Midwest	3,632	1,398	2,686	1,249	3,392	1,288
Pilbara	3,224	1,063	3,120	880	3,090	819
South West	3,755	1,303	3,802	1,360	3,554	1,372
Wheatbelt	3,149	1,276	2,793	1,166	3,566	1,128

<sup>#</sup> excludes visitors

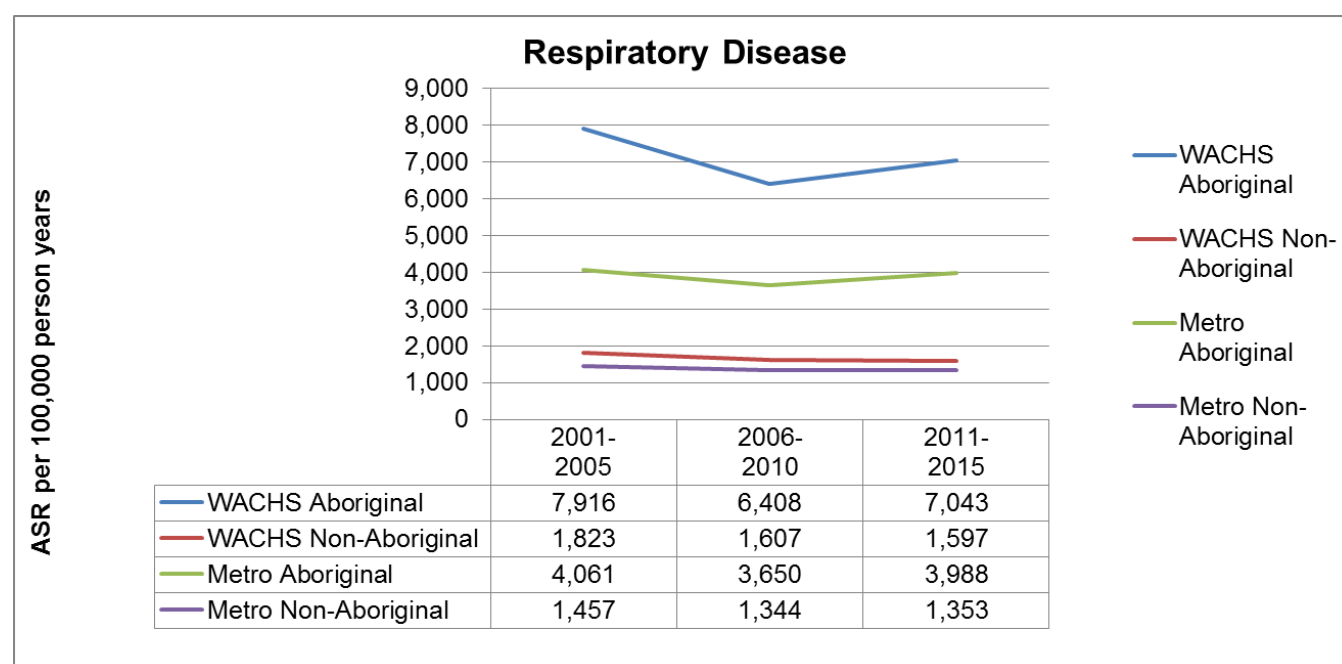
Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not crude numbers.

- Compared to the WA rate, **Goldfields** residents have the highest rate of heart disease hospitalisations, 1.2 times the State rate for both Aboriginal and non-Aboriginal people in 2011-2015<sup>x</sup> (
- When comparing the regions to each other, **Great Southern** Aboriginal people have the highest 2011-2015 ASR for heart disease hospitalisations, and it is 3.5 times as much as the region's non-Aboriginal rate.

## Respiratory disease

**Figure 9: Respiratory disease hospitalisation rates (ASR) by Aboriginality<sup>#</sup>, 2001-2015**



<sup>#</sup> excludes visitors

Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not crude numbers.

- Hospitalisation rates for respiratory disease for non-Aboriginal people were similar between country and metropolitan people, and much lower compared to the rates of Aboriginal people both in the country and metropolitan area.
- While the hospitalisation rate for WACHS Aboriginal people's respiratory disease has decreased from 2001-2005, it remains 4.4 times higher than the rate for WACHS non-Aboriginal people in 2011-2015 and 1.8 times as high as metropolitan rate for Aboriginal people.
- The respiratory diseases included in the graph above range from acute upper respiratory infections to chronic respiratory diseases. Some increased risk factors include smoking and prevalence of infectious disease. Hospitalisation rates for infectious disease were consistently higher than the State rates for **all** WACHS residents, except for South West and Great Southern; regardless of their Aboriginality as well as the smoking rates across WACHS regions (See Table 12, Table 20, Table 23 and Figure 13).
- Smoking rates for WACHS residents is higher than metropolitan and state rates; 16 per cent of country residents self-reported to currently smoke (see Table 20) compared to 12 per cent of metropolitan residents in 2011-2014. Smoking among Aboriginal people is higher still as 48 per cent of WACHS Aboriginal people over 18 smoked in 2014-2015 (See Table 23).

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**Table 7: Respiratory disease hospitalisation rates (ASR) by region by Aboriginality<sup>#</sup>, 2001-2015**

Respiratory Disease rates per 100,000 person years by region and by Aboriginality						
	2001-2005		2006-2010		2011-2015	
Region of Residence	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
Goldfields	9,496	1,993	7,546	1,609	6,850	1,681
Great Southern	6,436	1,754	4,855	1,610	6,164	1,531
Kimberley	8,240	1,642	7,216	1,764	9,111	1,979
Midwest	6,700	2,045	5,110	1,761	5,072	1,703
Pilbara	9,809	1,708	7,625	1,369	7,441	1,361
South West	6,047	1,681	4,610	1,583	3,933	1,602
Wheatbelt	6,177	2,047	4,959	1,765	6,491	1,665

<sup>#</sup>excludes visitors

Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not crude numbers.

- **Kimberley** Aboriginal people had the highest rate of hospitalisations compared with Non-Aboriginal people for respiratory disease in 2011-2015; in 2001-2005 the highest rate was for **Pilbara** Aboriginal people.
- **South West** and **Goldfields** Aboriginal people have had the largest decline in the respiratory disease hospitalisation rates since 2001-2005 contributing to the overall decrease for WACHS Aboriginal people.
- **Goldfields** respiratory disease hospitalisation rate for Aboriginal people was very high; 1.6 times the State rate in 2001-2005 but has decreased to 1.1 times the State rate in 2011-2015<sup>x</sup>.
- On the contrary, the hospitalisation rate for respiratory diseases in **Kimberley** Aboriginal people has been upwards and has increased from 1.4 times the State rate in 2001-2005 to 1.7 times the State rate in 2011-2015, and 7,046 of the region's Aboriginal people were hospitalised in the four year period for these conditions<sup>x</sup>.

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## Mortality including by Aboriginality

The following table shows death rates by selected conditions for country and metropolitan residents, by their residential regions. Further analysis is provided in the Appendix.

**Table 8: Deaths, SRR, select conditions, 2009-2013<sup>#</sup>**

Deaths	Digestive diseases	Diabetes & impaired glucose regulation	Endocrine and nutritional diseases	Cancer tumours	Respiratory Diseases	External causes of mortality	Musculo-skeletal diseases	Circulatory diseases
Kimberley	2.0	5.6	4.5	1.2	2.3	2.5	2.2	1.7
Pilbara	0.7	2.8	2.6	0.6	1.4	1.0	1.9	1.4
Midwest	1.3	1.3	1.4	1.2	1.2	1.5	0.8	1.2
Goldfields	1.5	1.9	1.7	1.2	1.7	1.4	1.2	1.4
Wheatbelt	1.0	1.1	1.1	1.1	0.9	1.6	1.0	1.1
South West	0.9	1.2	1.2	1.0	0.9	1.1	1.4	1.1
Great Southern	1.2	1.2	1.1	1.0	0.9	1.1	0.7	1.1
WACHS	1.1	1.5	1.4	1.1	1.1	1.4	1.2	1.2
Metro	1.0	0.9	0.9	1.0	1.0	0.9	1.0	1.0

<sup>#</sup>excludes visitors

External causes of mortality include but are not restricted to transport accidents, falls, fires, burns, assault, drowning, poisoning, suicide and self-inflicted injuries and deaths related to medical and surgical misadventures.

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 12 July 2016.

Note: Death data relates to 2009 to 2013.

- The **WACHS** death rates across all selected conditions were greater than metropolitan death rates.
- Diabetes and impaired glucose regulation death rates are very high in all seven WACHS regions. **Kimberley** (5.6), **Pilbara** (2.8) and **Goldfields** (1.9 times the State rate), have the highest rates. **Kimberley** women were 7.5 times more likely to die from diabetes and impaired glucose regulation compared with their State counterparts in 2009-2013 (11 per cent of all cases). For Kimberley men the death rate for diabetes and impaired glucose regulation was 4.2 times the State rate in 2009-2013<sup>xi</sup>. These rates are influenced by the high Aboriginal population (46 per cent) in the Kimberley region.
- The pattern for death rates for endocrine and nutritional diseases is similar with the northern regions topping the list again: **Kimberley** (4.5), **Pilbara** (2.6), **Goldfields** (1.7) and **Midwest** at 1.4 times the State rate.
- External causes of mortality cause 1.4 times more deaths for country residents compared with the State rate. Death rates are highest in the **Kimberley** (2.5), **Midwest** (1.5) and the

# WACHS Health Profile Summary 2017

**Wheatbelt** (1.6 times the State rate) regions. External causes of mortality are also a leading cause of avoidable deaths, refer Table 19.

- Circulatory diseases related deaths are high across all seven WACHS regions. Again, the northern regions are worse off **Kimberley** having the highest death rate at 1.7 times the State rate.
- Musculo-skeletal disease death rates are very high among the residents of the **Kimberley** (2.2), **Pilbara** (1.9) and the **South West**, 1.4 times the State rate.
- **Kimberley** Aboriginal people had significantly higher death rates for neoplasms, blood diseases, endocrine and nutritional diseases, nervous system diseases, circulatory diseases, respiratory diseases compared with the State Aboriginal rates in 2004-2013<sup>xi</sup>.
- Compared to WA rates for Aboriginal people, the **WACHS Aboriginal death rates** were significantly higher for circulatory and respiratory diseases as well as endocrine and nutritional diseases and external causes of mortality<sup>xi</sup>. In 2004-2013 the all-cause death rate was 1.1 for WACHS Aboriginal people compared with the State rates. For WACHS non-Aboriginal people, the death rates were higher for external causes of mortality, circulatory diseases and endocrine and nutritional diseases.

## Linking Morbidity with Mortality

While the figures in the below table are reported and analysed in Tables 3 and 7, this format shows that hospitalisation rates across WACHS regions are mostly higher than the State rates, and that the death rates are, in some cases, higher still compared with the State. The outcomes for country residents are worse across some of the selected conditions compared with the West Australians. This may be indicative that country residents have restricted access to specialist medical care for some of these conditions.

**Table 9: Hospitalisations and deaths SRR for select conditions by region<sup>#</sup>**

Region of residence	Digestive diseases		Cancer tumours		Respiratory Diseases		Musculo-skeletal diseases		Circulatory diseases		Diabetes & impaired glucose regulation	
	Hospitalisation	Deaths	Hospitalisation	Deaths	Hospitalisation	Deaths	Hospitalisation	Deaths	Hospitalisation	Deaths	Hospitalisation	Deaths
Kimberley	1.1	2.0	1.1	1.2	3.4	2.3	0.9	2.2	1.7	1.7	2.8	5.6
Pilbara	0.7	0.7	0.7	0.6	1.5	1.4	0.7	1.9	1.1	1.4	1.5	2.8
Midwest	1.1	1.3	1.1	1.2	1.4	1.2	1.1	0.8	1.2	1.2	1.5	1.3
Goldfields	0.9	1.5	1.0	1.2	1.4	1.7	0.8	1.2	1.3	1.4	1.7	1.9
Wheatbelt	0.9	1.0	1.1	1.1	1.2	0.9	1.1	1.0	1.0	1.1	1.3	1.1
South West	1.1	0.9	1.0	1.0	1.1	0.9	1.1	1.4	1.1	1.1	1.0	1.2
Great Southern	1.1	1.2	0.9	1.0	1.1	0.9	0.9	0.7	1.0	1.1	0.9	1.2
WACHS	1.0	1.1	1.0	1.1	1.4	1.1	1.0	1.2	1.1	1.2	1.3	1.5
Metro	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	0.9	0.9

# WACHS Health Profile Summary 2017

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#excludes visitors

Source: Department of Health WA, Health Tracks – Epidemiology Branch (PHI) in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed via the Epidemiology Branch 25 August 2016.

Note: Hospitalisation data relates to 2008 to 2012, while death data relates to 2007 to 2011. N/A indicates that the cell content has been suppressed due to privacy policies, or to withhold an unreliable rate derived from a low count.

- Compared to the State rate of 1.0, **country** residents had a similar hospitalisation rate for neoplasms. However, the death rate for neoplasms was significantly higher than the State rate. Compared to the State, diabetes and impaired glucose regulation hospitalisation rate for country residents was 1.3 times higher. Death rate for diabetes was 1.5 times higher than the State rate for WACHS.
- For digestive diseases, hospitalisation rates were higher than State rates at 1.1 in the **Kimberley**; yet death rates were even higher - double the State rate. **Goldfields** hospitalisation rate was lower than State rate at 0.9 but the death rate was 1.5 times the State rate.
- Cancer Tumour hospitalisation rates were similar to the State rate in the **Goldfields** region; however the death rate was significantly higher, as the region's residents are 1.2 times more likely to die from neoplasms compared with their State counterparts.
- Respiratory disease hospitalisation rates are higher than the State rate across all regions. Similarly, the death rates across WACHS regions are higher than the State rate
- Musculo-skeletal hospitalisation rates are also higher than the State rate across all regions. The death rates across WACHS regions are also higher than the State rate.
- Circulatory disease hospitalisation rates for the **Pilbara** are 1.1 times higher than the State. The residents of the Pilbara are 1.4 times more likely to die as a result of these diseases compared with their Western Australian counterparts.
- Diabetes and impaired glucose regulation hospitalisation rate is significantly higher at 2.8 than the State in the **Kimberley**. The region's residents are 5.6 times more likely to die from these conditions. **Pilbara** region's residents have a similar situation where the hospitalisation rate was 1.5 times the State rate but death rate 2.8 times. Residents of the **South West** region have similar hospitalisation rate to the State rate but are 1.2 times more likely to die as a result of diabetes and impaired glucose regulation compared with their State counterparts.

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**Table 10: Alcohol, tobacco and mental health deaths (7-11) and hospitalisations (8-12), SRR<sup>#</sup>**

Region of residence	Alcohol-related		Tobacco-related		Mental disorders	
	Hospitalisation	Deaths	Hospitalisation	Deaths	Hospitalisation	Deaths
Kimberley	3.3	2.7	2.3	1.8	1.8	2.1
Pilbara	1.4	1.2	1.4	1.3	0.8	N/A
Midwest	1.3	1.3	1.4	1.4	1.0	0.9
Goldfields	1.4	1.5	1.5	1.5	1.1	1.0
Wheatbelt	1.3	1.5	1.1	1.1	1.3	1.3
South West	1.0	1.0	1.2	1.0	0.9	1.1
Great Southern	1.0	1.1	1.0	1.1	1.7	1.3
WACHS	1.3	1.3	1.3	1.2	1.1	1.2
Metro	0.9	0.9	0.9	1.0	0.9	1.0

<sup>#</sup>excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch (PHI) in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed via the Epidemiology Branch 25 August 2016.

Note: Hospitalisation data relates to 2008 to 2012, while death data relates to 2007 to 2011. N/A indicates that the cell content has been suppressed due to privacy policies, or to withhold an unreliable rate derived from a low count.

- Alcohol-related hospitalisation rates were significantly higher in all WACHS regions except for the **South West** than the State rate. **Kimberley** had particularly high rates for alcohol-related hospitalisations; 3.3 times the State rate; **Pilbara** and **Goldfields** both had a rate of 1.4 and **Midwest** and **Wheatbelt** 1.3 times higher.
- Alcohol-related death rates were also higher than the State rate in all WACHS regions and particularly high in the **Kimberley** (2.7), **Goldfields** (1.5) and **Wheatbelt** (1.5) regions. **Midwest** (1.3) and **Pilbara** (1.2) rates were also high.
- Hospitalisation rates for tobacco-related conditions were higher than the State rates in all seven regions. Rates were particularly high in the **Kimberley** (2.3), the **Goldfields** (1.5), **Pilbara** (1.4) and the **Midwest** (1.4) regions.
- The pattern is similar for tobacco-related deaths across the regions. The death rate for tobacco-related conditions was 1.8 times higher in the **Kimberley**, 1.5 times higher in the **Goldfields**, 1.4 times higher in the **Midwest** and 1.3 times higher in the **Pilbara** regions.
- Hospitalisation rates for mental disorders were significantly higher in the **Kimberley** (1.8), **Great Southern** (1.7), **Wheatbelt** (1.3) and **Goldfields** (1.1). It is worth noting that there is no Acute Psychiatric Unit in the Midwest region and this is likely reflected in the rate (i.e. poorer access to acute mental healthcare) rather than low incidence.
- Mental disorder related deaths were particularly high in the **Kimberley** region, 2.1 times the State rate. In the **Wheatbelt** and **Great Southern** the death rate was 1.3 times the State rate for mental disorders.

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**Table 11: Total all-cause deaths and SRR, 2009–2013<sup>#</sup>**

All-cause deaths, 2009-2013		
Region of residence	N	SRR
Kimberley	814	1.9
Pilbara	526	1.1
Midwest	1,960	1.2
Goldfields	1,343	1.3
Wheatbelt	2,507	1.1
South West	4,739	1.0
Great Southern	1,993	1.0
WACHS Total	13,882	1.1
Metropolitan	50,233	1.0

<sup>#</sup>excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 13 September 2016.

Note: Standardised rate ratios (SRR) are relative to the WA rate.

- Compared to the WA State rate, the rate of all-cause deaths in the **WACHS** area was significantly higher ( $p < 0.05$ ) i.e. 1.1 times the State rate totalling 13,882 deaths in the seven WACHS regions.
- The all-cause death rate was particularly high for the **Kimberley** residents (1.9 times the State rate) followed by the **Goldfields** (1.3 times the State rate).
- The rate of all-cause deaths for **Kimberley** Aboriginal people was significantly higher (3.8 times) than the region's non-Aboriginal rate<sup>xi</sup>.
- In the **Great Southern**, **South West** and **metropolitan** regions, the all-cause death rates were consistent with the State rate.

# WACHS Health Profile Summary 2017

**Table 12: Hospitalisations and notifications for communicable diseases, SRR, 2010-2014<sup>#</sup>**

Communicable diseases					
Region of residence*	Hospitalisations for infectious diseases	Notifications enteric infections	Notifications blood-borne diseases	Notifications vaccine preventable	Notifications STI
Kimberley	2.8	2.9	1.7	2.4	5.3
Pilbara	1.2	1.2	0.7	0.9	1.6
Midwest	1.2	1.1	1.1	1.1	1.6
Goldfields	1.1	1.0	1.4	0.7	1.5
Wheatbelt	1.2	1.1	0.9	1.1	0.7
South West	0.9	1.2	0.9	1.0	0.8
Great Southern	1.0	1.1	1.3	1.1	0.8
WACHS	1.2	1.2	1.1	1.1	1.5
Metro	1.0	0.9	1.0	1.0	0.9

<sup>#</sup>excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 8 August 2016.

Notes: Data relates to 2010 to 2014 for both hospitalisations and notifications.

Data for 2012-2013 reporting of Barmah Forest virus (BFV) infection is unreliable due to the inclusion of a large number of cases based on the detection of BFV-specific IgM on a single serum sample using a laboratory method that was found to have a high propensity to detect false positives. Therefore, data for BFV cases reported in the given period are inflated and unreliable.

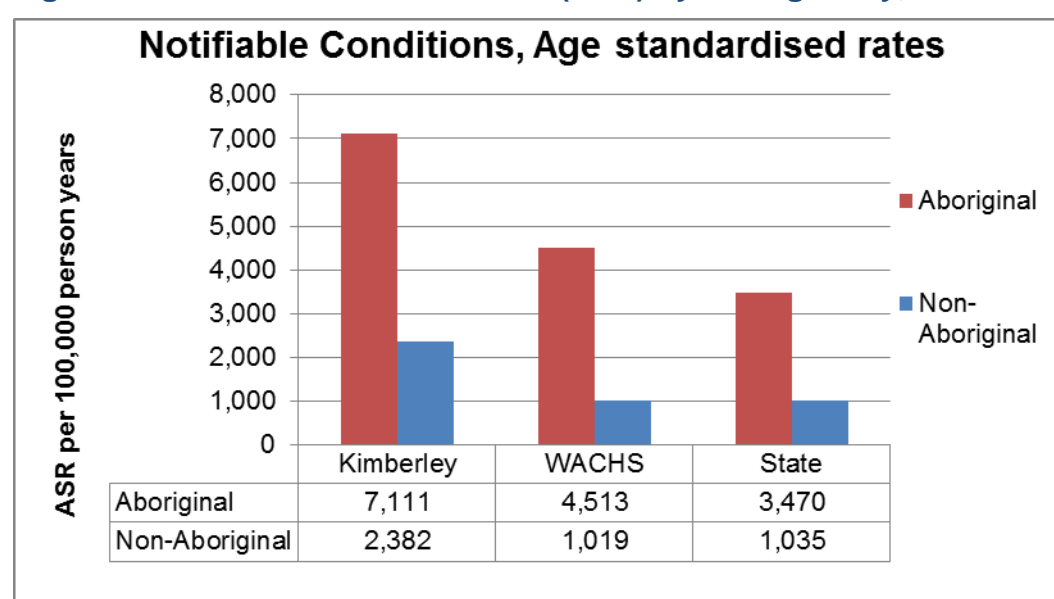
- **WACHS** residents had higher rates for hospitalisations for all diseases investigated, particularly notable is the rate for sexually transmitted infections (STI), which was 1.5 times the State rate which is affected by the very high Kimberley rate.
- Hospitalisation rates for infectious diseases were higher than State rates in five out of seven **WACHS** regions **Kimberley** rate being the highest (2.8). **South West** was the only region with a rate lower than the State rate.
- Notifications for enteric infections were high in the **Kimberley** (2.9), **Pilbara** (1.2) and **South West** (1.2 times the State rate) regions.
- Notifications for blood-borne diseases were 1.7 times the State rate in the **Kimberley**, 1.4 times in the **Goldfields** and 1.3 times in the **Great Southern**. The low rate in the **Pilbara** (0.7) may reflect a lower diagnosis or screening in the region rather than a lower incidence rate.
- Notification rate for vaccine-preventable diseases was again high in the **Kimberley** (2.4). Also the rates in the **Midwest**, **Wheatbelt** and **Great Southern** were 1.1 times the State rate. While the **Pilbara** (0.9 times) and the **Midwest** (0.7 times) had a significantly lower

# WACHS Health Profile Summary 2017

notification rates for vaccine preventable diseases this may reflect a lower diagnosis or screening in the areas rather than a lower incidence rate.

- Notification rates for Sexually Transmitted Infections (STI) were very high in the **Kimberley** (5.3), **Pilbara** (1.6), **Midwest** (1.6) and the **Goldfields**, 1.5 times the State rate. In the **Wheatbelt**, **South West** and the **Great Southern** the STI notification rates were below the State rate.
- Compared with the WA Aboriginal rates, **WACHS Aboriginal notification rates** due to enteric infections; STIs; vector-borne diseases; vaccine-preventable diseases; and all notifications were significantly greater in 2005-2014. Rates for all notifications for WACHS Aboriginal people were 1.3 times and for Kimberley Aboriginal people it was 2.1 times the State rate<sup>xi</sup>.

**Figure 10: Notifiable diseases rates (ASR) by Aboriginality, 2010-2014<sup>#</sup>**



<sup>#</sup> excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 6 December 2016.

Note: Aboriginal data relates to 2005-2014 and non-Aboriginal data relates to 2010-2014.

Values represented are rates, not crude numbers.

- The graph above shows that **Kimberley** Aboriginal people had twice as many hospitalisations for notifiable diseases compared with the Aboriginal people across the whole State. Also Kimberley non-Aboriginal rate was over twice the State non-Aboriginal rate.
- WACHS** (Including the Kimberley region) non-Aboriginal people had an almost equivalent rate of notifiable conditions compared with the State.
- Great Southern, Midwest, South West, Wheatbelt** all had lower notifiable disease rate for Aboriginal compared to non-Aboriginal people<sup>xi</sup>.

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- In the **metropolitan** area, Aboriginal people had a lower rate of notifiable disease compared with non-Aboriginal people but in the country the rates are higher; particularly in the **Goldfields**, **Midwest** and **Kimberley** regions<sup>xi</sup>.

## Cancer

- Cancer incidence rates** for **WACHS** residents were significantly higher (1.03 times) than the West Australian and metropolitan rates.
- On regional level, **cancer incidence rates** in the **Wheatbelt**, **South West** and **Great Southern** were significantly higher than the State rate. Cancer incidence rate for **Pilbara** residents was significantly lower than the State rate.
- Cancer death rates** for **WACHS** residents were significantly higher than for metropolitan residents and West Australians (1.07 times) as a whole. **Kimberley**, **Midwest** and **Goldfields** residents had significantly higher cancer death rates while **Pilbara** residents had a significantly lower cancer death rate compared with the State and metropolitan rates.

**Table 13: Cancer incidence and death rates (ASR) 2011-2015**

Cancer incidence and death rates per 100,000 person years 2011-2015				
Region	Incidence		Deaths	
	Rate	Number of people	Rate	Number of people
Kimberley	493.9	643	181.0	192
Pilbara	337.5	574	124.1	117
Midwest	506.0	1,831	189.6	667
Goldfields	510.9	1,229	175.8	380
Wheatbelt	527.6	2,618	165.5	823
South West	500.1	4,798	165.8	1,582
Great Southern	517.3	1,963	167.3	662
WACHS	498.5	13,656	168.6	4,423
Metro	476.5	47,942	155.9	15,675
WA State	481.2	61,598	158.5	20,098

- Cancer incidence rates** for **WACHS Aboriginal** and non-Aboriginal people were consistent with the State and metropolitan rates. Aboriginal people had higher cancer incidence rates compared to their State counterparts in the **Kimberley** and the **Midwest** regions. This may be indicative of poorer access to services for WACHS residents in some regions.
- The only region with a statistically significantly higher cancer incidence rate for **non-Aboriginal** people is the **Wheatbelt**, where the residents were 1.1 times more likely to be diagnosed with cancer compared with Western Australians in general.
- When comparing **Aboriginal** people's cancer incidence rates to non-Aboriginal people in each region, no significant difference was found. This is impacted by the lower age profile of Aboriginal people compared to non-Aboriginal people.

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**Table 14: Cancer incidence 2010-2014 and death rates (ASR) by Aboriginality 2009-2013<sup>#</sup>**

Cancer incidence and death rates per 100,000 person years				
Incidence			Deaths	
Region	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
Kimberley	473.7	479.7	297.8	122.3
Pilbara	425.3	356.4	221.2	114.5
Midwest	490.5	479.7	279.4	188.8
Goldfields	396.9	472.7	162.1	194.9
Wheatbelt	524.5	483.4	291.4	175.6
South West	510.9	462.2	N/A	165.1
Great Southern	400.5	463.1	N/A	170.7
WACHS	454.8	461.9	249.0	170.1
Metro	424.6	454.9	184.3	164.5
WA State	442.9	456.3	228.5	165.6

<sup>#</sup> excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 3 February 2017.

Notes: Incidence data relates to 2010 to 2014, while death data relates to 2009 to 2013 for Non-Aboriginal people. Incidence data for Aboriginal people relates to 2005-2014 and death data to 2004-2013.

N/A indicates that the cell content has been suppressed due to privacy policies, or to withhold an unreliable rate derived from a low count.

- For **WACHS non-Aboriginal people**, incidence rate for lip, oral cavity and pharynx cancer was significantly greater than the State rate. **WACHS residents** self-reported higher prevalence rates for smoking, which is reflective of the oral cancer rates in 2005-2014<sup>xi</sup>.
- Non-Aboriginal residents of the **Pilbara** had a significantly lower cancer incidence rate (0.7 times the State rate) which means significantly fewer new people are diagnosed with cancer compared with the State. The cancer death rate was also significantly lower, 0.6 times the State rate. The figures may be reflective of the socio-economic structure of the population as 80 per cent of the region's residents or 54,476 people, live in areas identified as being the least disadvantaged and potentially have higher access to cancer treatment services in Perth. Higher socio-economic areas tend to reflect healthier lifestyles overall (refer section on Socio-economic )<sup>iii</sup>.

## WACHS Health Profile Summary 2017

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- In 2005-2014 The **Kimberley** lip, oral cavity and pharynx cancer incidence rate was significantly greater for all males and Aboriginal females compared with the State rate<sup>xi</sup>. Similarly to all of WACHS, this is reflective of the high smoking rates in the region. The smoking rates among Aboriginal people are higher (47.9 per cent of adults reported being daily smokers in 2014-15 as per Table 20), and 46 per cent of the Kimberley population is Aboriginal.
- **The cancer death rate** was significantly higher for **Western Australian Aboriginal people** compared with their non-Aboriginal counterparts. **Country Aboriginal** residents were also worse off compared with country non-Aboriginal people.
- The cancer death rate was significantly higher than the State rate in the **Kimberley** (1.3) and the **Midwest** (1.3) regions for **Aboriginal people**, but rates were higher compared to non-Aboriginal people's rates across all regions (with the exception of the Goldfields region), where data was available. This may be indicative of poorer access to diagnostic and treatment services for the regions' Aboriginal residents and less healthy lifestyles as demonstrated by Survey results<sup>xv</sup>.
- **WACHS non-Aboriginal people** residing in the **Midwest** and **Goldfields** regions had significantly higher death rates compared to their counterparts living elsewhere in the State.

## Potentially preventable hospitalisations and avoidable mortality

Many hospitalisations and deaths result from conditions where hospitalisations could potentially have been prevented and deaths could potentially have been avoided by the use and access to preventive and primary care and early or chronic disease management. These hospitalisations are known as Potentially Preventable Hospitalisations (PPH) and are grouped into three major categories – vaccine, chronic and acute preventable.

**Table 15: Potentially preventable hospitalisations and all avoidable deaths, SRR 2010-2014<sup>#</sup>**

Potentially preventable hospitalisations and avoidable deaths				
Region	Vaccine-preventable hospitalisations	Chronic-preventable hospitalisations	Acute-preventable hospitalisations	All avoidable deaths
Kimberley	6.0	3.0	3.0	2.3
Pilbara	2.1	1.5	1.2	1.1
Midwest	1.5	1.3	1.3	1.5
Goldfields	1.9	1.6	1.1	1.5
Wheatbelt	0.9	1.1	1.1	1.3
South West	0.6	1.1	0.9	1.0
Great Southern	0.7	1.0	0.9	1.0
WACHS	1.4	1.3	1.2	1.3
Metro	0.9	0.9	1.0	0.9

<sup>#</sup> excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 9 August 2016.

Notes: Hospitalisation data relates to 2010 to 2014, while death data relates to 2009 to 2013. Avoidable deaths relate to 0 to 74 year olds only. Vaccine preventable hospitalisations only account for a small proportion of hospitalisations

- Overall **WACHS** PPH rates were significantly higher for all three subgroups. It should be noted that vaccine-preventable hospitalisations account for a small amount of hospitalisations only. Avoidable deaths were high at 1.3 times the State rate for all WACHS residents.
- Vaccine-preventable hospitalisation rates were significantly higher for **Kimberley** (6.0), **Pilbara** (2.1), **Goldfields** (1.9) and **Midwest** residents, 1.5 times the State rate.
- Chronic-preventable hospitalisation rates were the highest in the **Kimberley** (3.0), **Goldfields** (1.6) and **Pilbara** (1.5 times the State rate) regions. The only region with a rate similar to the State was the **Great Southern**.

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- Acute-preventable hospitalisation rate was again the highest in the **Kimberley**, 3 times the State rate. All regions except for **South West** and **Great Southern** had statistically significantly higher rates in this subgroup also.
- Avoidable death rates show a similar pattern to the PPH rates. **Kimberley** has the highest rate, 2.3 times the State rate, followed by the **Midwest** and the **Goldfields** regions, both with rates at 1.5 times the State rate.
- **WACHS Aboriginal** people had statistically significantly higher PPH rates for vaccine preventable conditions, acute conditions and chronic conditions than the State Aboriginal people. All avoidable deaths for WACHS Aboriginal people were also statistically significantly greater (1.2 times the State Aboriginal rate)<sup>xi</sup>.
- **WACHS non-Aboriginal** avoidable death rate was significantly greater (1.2 times) than the State non-Aboriginal rate. Compared to the WA non-Aboriginal rates, non-Aboriginal potentially preventable hospitalisation rates due to chronic conditions; and all potentially preventable hospitalisations were significantly higher<sup>xi</sup>.

**Table 16: Select PPH condition, SRR, 2010-2014<sup>#</sup>**

Potentially Preventable hospitalisation (PPH) rates for WACHS top 10 conditions 2010-2014										
Condition	dental conditions	urinary tract infections, including pyelonephritis	chronic obstructive pulmonary disease	ENT infections	diabetes complications	angina	cellulitis	congestive cardiac failure	convulsions and epilepsy	iron deficiency anaemia
Kimberley	1.3	2.9	4.2	4.0	2.7	1.9	5.4	4.0	3.9	2.0
Pilbara	0.8	1.2	2.3	1.4	1.5	1.2	1.7	2.1	1.2	0.7
Midwest	1.1	1.2	1.7	1.3	1.5	1.3	1.9	1.3	1.5	0.8
Goldfields	0.7	1.1	1.7	1.2	1.6	1.7	1.3	1.6	1.5	1.2
Wheatbelt	0.9	1.0	1.4	1.4	1.3	0.9	1.0	1.0	1.2	0.9
South West	0.9	0.8	1.1	0.8	1.0	1.2	0.8	1.1	1.1	1.0
Great Southern	0.8	0.9	1.0	1.2	0.9	1.0	0.8	0.9	1.0	1.2
WACHS	0.9	1.1	1.4	1.4	1.3	1.2	1.4	1.2	1.4	1.0
Metro	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0

<sup>#</sup>excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 9 August 2016.

Note: Data relates to 2010 to 2014

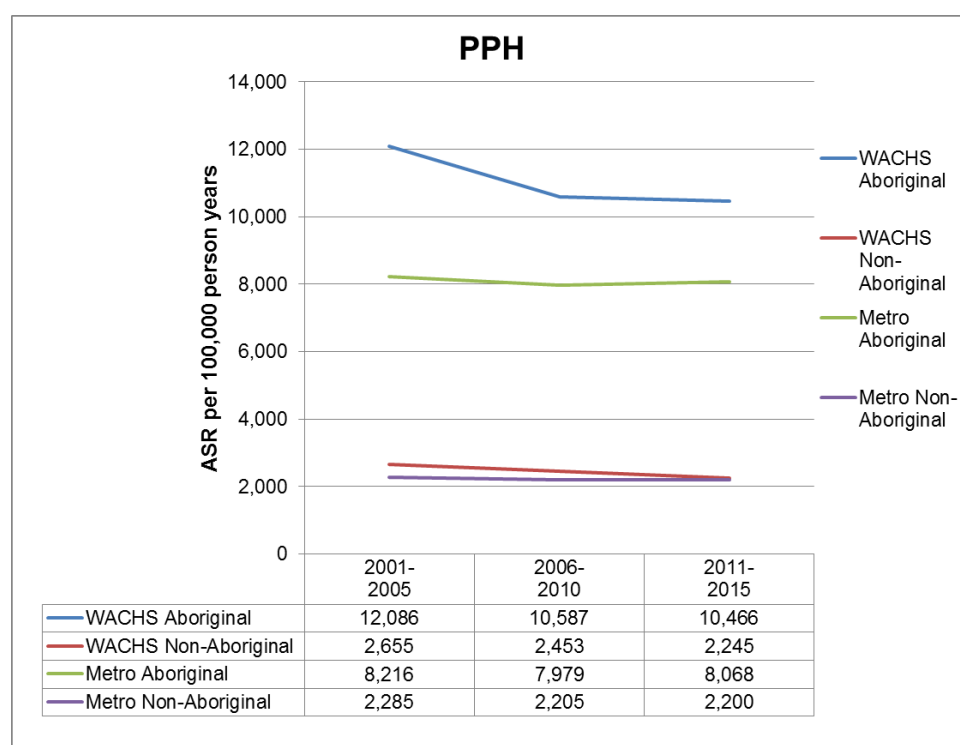
- For **WACHS** residents, hospitalisation rates for eight out of 10 potentially preventable conditions were significantly higher than the State rates and metropolitan rates. These conditions are COPD (1.4 times), cellulitis (1.4 times), ear, nose and throat (ENT) infections (1.4 times), convulsions and epilepsy (1.4 times), diabetes complications (1.3 times), angina (1.2 times), congestive cardiac failure (1.2 times) and urinary tract infections (UTI) including pyelonephritis, 1.1 times the State rates. PPH rates for dental

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conditions were lower than the State rate, possibly due to lack of access to dental health services.

- The residents of the northern regions had far higher rates of PPH than their southern country regions' and metropolitan area counterparts. **Kimberley** region, in particular, had very high PPH rates across all top 10 conditions. These regions have large populations living in the two most disadvantaged areas and also have the highest proportions of Aboriginal residents.
- For **WACHS** Aboriginal people, the PPH rates were significantly greater for all select conditions except for angina and dental conditions compared with the State<sup>xi</sup>.
- Compared to the WA non-Aboriginal rates, potentially preventable hospitalisation rates due to asthma, angina, gangrene, hypertension, ENT infections, diabetes complications, COPD, cellulitis, convulsions and epilepsy, congestive cardiac failure and pneumonia and influenza (vaccine preventable), were significantly greater for **WACHS** non-Aboriginal people<sup>xi</sup>.

**Figure 11: PPH rates (ASR) by Aboriginality, 2001-2015<sup>#</sup>**



<sup>#</sup> excludes visitors.

Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

Note: Values represented are rates, not crude numbers.

- The **WACHS** Aboriginal people PPH rate decreased from 12,086 in 2001-2005 to 10,587 in 2006-2010 but has since plateaued and remains 1.3 times higher than the metropolitan Aboriginal PPH rate and 4.7 times higher than the WACHS non-Aboriginal rate.

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- PPH rates for non-Aboriginal people were consistently lower than the Aboriginal rates from 2001 to 2015 for both metropolitan and country residents. The gap between metropolitan and country non-Aboriginal people narrowed in 2011-2015 to similar rates.
- The health disparity between Aboriginal and non-Aboriginal people remains unchanged for metropolitan residents as the Aboriginal PPH rates were 3.7 times higher than the non-Aboriginal rates.

**Table 17: PPH rates (ASR) by Aboriginality by region, 2001-2015<sup>#</sup>**

PPH rates per 100,000 person years by region and by Aboriginality						
	2001-2005		2006-2010		2011-2015	
Region of Residence	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
Goldfields	13,123	2,702	11,583	2,445	10,430	2,317
Great Southern	11,162	2,589	8,129	2,349	8,633	2,150
Kimberley	12,797	2,230	11,605	2,367	13,328	2,781
Midwest	11,693	2,899	8,726	2,590	8,684	2,563
Pilbara	12,955	2,360	12,311	2,013	10,016	1,786
South West	9,846	2,521	8,681	2,469	7,267	2,182
Wheatbelt	10,538	2,932	9,811	2,635	9,466	2,382

<sup>#</sup> excludes visitors.

Source: WA Hospital Morbidity Data System, WA Registry of Births, Deaths and Marriages via Epidemiology Branch, Department of Health WA. Data as at 9 December 2016.

- In 2011-2015 **Kimberley** Aboriginal people had the highest rate of PPH and it is 4.8 times higher than the region's non-Aboriginal rate.
- The greatest disparity between Aboriginal and non-Aboriginal people was in the **Pilbara** region, where the Aboriginal PPH rate was 5.6 times greater compared to the non-Aboriginal rate in 2011-2015.

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**Table 18: Select avoidable deaths 2009-2013<sup>#</sup>**

Total avoidable death rates for Country area residents (aged 0-74 years) by condition, 2009 - 2013							
Region of residence*	Infections	Cancer	Diabetes	Diseases of the circulatory system	Diseases of the genitourinary system	Diseases of the respiratory system	Maternal & infant causes
Kimberley	2.5	0.8	5.8	3.2	4.1	N/A	1.5
Pilbara	N/A	0.4	4.0	1.7	3.6	N/A	N/A
Midwest	2.7	1.2	1.4	1.4	2.3	N/A	1.4
Goldfields	1.6	1.2	2.6	1.5	2.6	3.5	N/A
Wheatbelt	1.2	1.0	1.0	1.2	0.7	1.9	0.9
South West	0.6	1.0	1.1	0.8	1.0	1.3	0.9
Great Southern	N/A	1.1	0.9	0.9	N/A	1.0	N/A
WACHS Total	1.2	1.0	1.6	1.2	1.5	1.5	0.9
Metropolitan	1.0	1.0	0.8	1.0	0.9	0.9	1.0

<sup>#</sup>excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 9 August 2016.

Notes: N/A indicates that the cell content has been suppressed due to privacy policies, or to withhold an unreliable rate derived from a low count.

- For **WACHS** residents aged 0-74 years, the avoidable death rates were significantly higher for diabetes, diseases of the circulatory system, genitourinary system and respiratory system. Generally the greatest issues were in the northern regions except for cancer avoidable deaths, which is likely due to a lower population age structure of the regions compared to metropolitan residents.
- Diabetes** avoidable deaths were highest in the Kimberley, Pilbara and Goldfields regions. **Kimberley** diabetes avoidable death rate was 5.8 times and even higher for women in the Kimberley, at 9.8 times the State rate. Kimberley Aboriginal people had a significantly higher rate than the non-Aboriginal people; 14 times higher for males and 21 times higher than the State rate for females.
- For **Pilbara** Aboriginal residents, the rate of diabetes avoidable deaths for was 20 times higher than the non-Aboriginal rate. For Pilbara Aboriginal women, the rate was 58.9 times higher than the for the region's non-Aboriginal females.
- Goldfields** Aboriginal people were 24.5 times more likely to suffer an avoidable death due to diabetes compared to the region's non-Aboriginal; and for Aboriginal females the rate was 53.3 times the non-Aboriginal female rate<sup>xi</sup>.
- Diseases of the genitourinary system caused 1.5 times more avoidable deaths for country residents, aged 0-74 years. **Kimberley** (4.1), **Pilbara** (3.6) **Goldfields** (2.6) and

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**Midwest** (2.3) all had very high rates. All Kimberley women were 7.1 times more likely to suffer an avoidable death compared with the State rate due to diseases of the genitourinary system.

- For **WACHS** non-Aboriginal men, the rates of avoidable deaths due to COPD and prostate cancer were significantly greater compared with the State rate<sup>xi</sup>.
- For **WACHS** Aboriginal males the avoidable death rates were significantly greater than Aboriginal State rates. The country Aboriginal female avoidable death rates due to diabetes (1.3 times); and all avoidable deaths (1.2 times) were significantly greater<sup>xi</sup>.

**Table 19: Avoidable deaths SRR, for selected external causes of morbidity and mortality 9-13<sup>#</sup>**

Avoidable death rates for select external causes of morbidity and mortality for country residents aged 0 - 74 years (2009-2013)						
Region of residence <sup>#</sup>	Suicide and self-inflicted injuries	Transport accidents	Exposure to inanimate mechanical forces	Accidental drowning and submersion	Assault	Other external causes*
Kimberley	3.2	2.5	N/A	3.2	5.1	2.1
Pilbara	0.8	1.5	N/A	0.0	2.4	1.2
Midwest	1.4	2.4	N/A	N/A	2.8	1.9
Goldfields	1.5	1.9	N/A	N/A	2.3	1.6
Wheatbelt	1.3	4.1	N/A	1.6	1.1	2.5
South West	1.1	1.8	1.9	1.1	0.8	1.3
Great Southern	1.1	1.7	N/A	N/A	N/A	1.3
WACHS Total	1.3	2.2	1.7	1.4	1.8	1.6
Metropolitan	0.9	0.7	0.8	0.9	0.8	0.8

<sup>#</sup>excludes visitors

\*Other external causes of morbidity and mortality **include** but are not restricted to transport accidents, exposure to inanimate mechanical forces, accidental drowning and submersion accidental poisoning; assault, and contact with venomous plants and animals.

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 9 August 2016.

Notes: N/A indicates that the cell content has been suppressed due to privacy policies, or to withhold an unreliable rate derived from a low count.

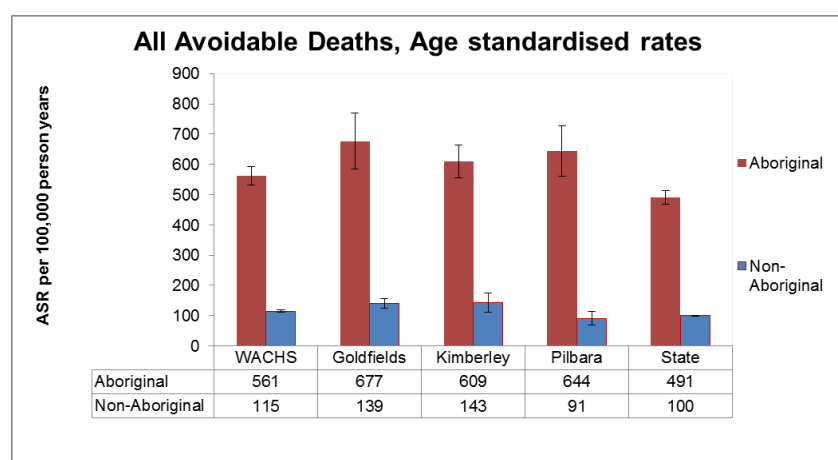
- The above table shows the avoidable death rates for select external causes of morbidity and mortality. Compared to the metropolitan area, transport accidents that occur in regional WA are more severe and are more likely to lead to death or hospitalisation.
- According to Road Safety Commission, there were 194 fatalities on WA roads in 2016, and nearly two thirds (61 per cent or 119 deaths) of these occurred in the country (number includes all fatalities regardless of the region of residence). The majority, 72

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per cent of the people who died on WA country roads were male. Most people killed in crashes were aged between 25 and 29<sup>xii</sup>.

- For **WACHS** residents aged 0-74 years, the avoidable death rates for select external causes of morbidity and mortality were significantly higher across all causes. Generally the greatest issues were in the northern regions except the high rates of transport accidents which were high across the regions. The avoidable death rate for transport accidents was substantially higher in the **Wheatbelt** compared to other regions.
- **Wheatbelt** residents were 2.5 times more likely to suffer from an avoidable death due to other external causes of morbidity and mortality; and the rate for transport accidents was 4.1 times the State rate. The rate was significantly higher for both men (3.8) and women (5.0) compared with their State counterparts.
- For **non-Aboriginal** people in **WACHS** (both men and women), only the rate of avoidable deaths due to transport accidents was significantly greater than their State counterparts<sup>xi</sup>.
- The rate of transport accidents avoidable deaths for **Aboriginal** people was significantly higher than the non-Aboriginal rate (2.5 times)<sup>xi</sup>.
- Assaults led to more avoidable deaths across all regions except for South West and Great Southern. Kimberley residents aged 0-74 were 5.1 times more likely to suffer an avoidable death due to an assault compared to their State counterparts.

**Figure 12: All avoidable death rates (ASR) by Aboriginality 2009-2013<sup>#</sup>**



<sup>#</sup> excludes visitors

Source: Department of Health WA, Health Tracks - Epidemiology Branch Public Health Division, Department of Health WA in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI). Accessed 6 December 2016.

Note: Aboriginal data relates to 2004-2013 and non-Aboriginal data relates to 2009-2013.

- Compared to the WA rates, **WACHS** all avoidable death rates were high for both Aboriginal (1.1 times) and non-Aboriginal people (1.2 times the State rates).
- Avoidable death rates for **Aboriginal** people were significantly higher than for the non-Aboriginal people across the regions, ranging from 4.9 times higher WA wide to 7.1 times higher in the **Pilbara**.

## 5. Self-reported measures of health and wellbeing

The following data is for those aged 16 years and over.

### Prevalence estimates for self-reported risk factors

Lifestyle health behaviours and risk factors are particularly important due to their relationship with chronic conditions that are considered to be preventable. Prevention and management of these modifiable behaviours and risk factors can have a substantial effect on preventable chronic conditions.

The Department of Health, WA, conducts a continuous annual Health and Wellbeing Surveillance System (HWSS). This population survey is carried out by phone and is designed to provide results and examine trends at a population level. It is unlikely to be representative of minority groups such as some Aboriginal people, some people who do not speak English as a first language, and people who are homeless. This may affect estimates for areas where these minority groups are more prominent.

Figures in the following tables (Table 20-Table 22) are percentages of those surveyed. Where the proportion of people who self-reported was significantly higher, the cell is highlighted in **red** and in **green**, where the proportion is significantly lower than the proportion of the WA State residents.

**Table 20: Health behaviours, adults 16 and over, 2011-2014**

Self-reported health behaviours by region of residence*, adults 16 and over, 2011-2014										
	Kimberley	Pilbara	Midwest	Goldfields	Wheatbelt	South West	Great Southern	WA State	WACHS	Metropolitan
Currently smokes	22.9%	20.1%	16.3%	18.2%	14.9%	12.6%	14.0%	13.2%	16.1%	12.4%
Does not eat two or more serves of fruit daily	56.2%	52.4%	48.0%	53.0%	52.4%	46.6%	48.7%	49.4%	50.2%	49.2%
Does not eat five or more serves of vegetables daily	88.4%	92.1%	88.0%	89.5%	88.0%	87.7%	87.6%	89.8%	88.5%	90.1%
Drinks at high risk levels for long-term harm (1)	43.3%	42.5%	35.0%	35.6%	32.5%	33.3%	27.7%	31.4%	35.0%	30.4%
Drinks at high risk levels for short-term harm (2)	22.5%	19.3%	12.9%	16.4%	11.6%	14.0%	12.6%	13.3%	15.1%	12.8%
Completes less than 150 minutes of moderate physical activity per week (adults 18 years and over)	38.1%	37.4%	36.5%	38.3%	42.9%	36.9%	38.4%	36.5%	38.2%	36.0%

\*excludes visitors

Source: WA Health and Wellbeing Surveillance System via Health Tracks, Epidemiology Branch, Department of Health WA.

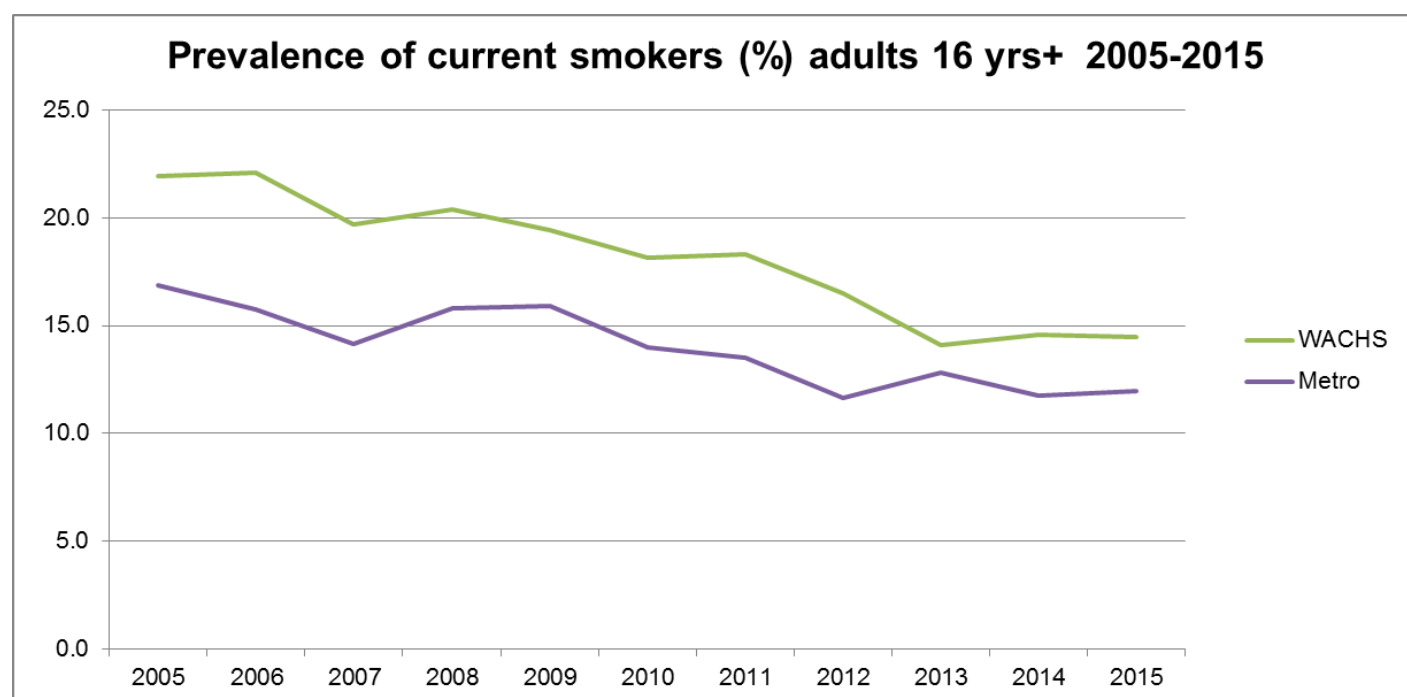
Notes: (1). Drinks more than 2 standard drinks on any one day. (2). Drinks more than 4 standard drinks on any one day.

- **WACHS** residents had significantly higher prevalence rates for smoking and drinking at high risk levels for long-term harm compared with the State rates.

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- The regions with significantly higher rates for smoking were the **Kimberley** (22.9 per cent), **Pilbara** (20.1 per cent) and **Goldfields** (18.2 per cent).
- An ABS survey<sup>xv</sup> shows that smoking among Aboriginal people was significantly higher than among non-Aboriginal people, as 48 per cent of WACHS Aboriginal adults aged 18 years and over smoked in 2014-15.
- A significantly larger proportion of **Kimberley** residents (56.2 per cent) did not eat their recommended serves of daily fruit compared with 49.4 per cent State wide.
- Kimberley and Pilbara had significantly larger proportion of their residents drinking at high risk levels for both short-term and long-term harm compared with their State counterparts.
- A significantly larger proportion of **Wheatbelt** residents (42.9 per cent) did not meet their recommended weekly physical activity compared with 36.5 per cent of Western Australians.

**Figure 13: Prevalence of current smokers, adults 16 and over, 2005-2015**



\*excludes visitors

Source: WA Health and Wellbeing Surveillance System (WAHWSS) accessed via Epidemiology Branch, DoH WA. Data as at 6 December 2016.

- While both metropolitan and country residents' smoking rates have steadily declined since 2005, a larger proportion of WACHS residents (14.5 per cent) remain smokers in 2015 compared with metropolitan people (12 per cent). The differences in smoking rates have been statistically insignificant between metropolitan and country residents since 2012.

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**Table 21: Risk factors, adults 16 and over, 2011-2014**

Self-reported risk factors by region of residence*, adults 16 years and over, 2011-2014										
	Kimberley	Pilbara	Midwest	Goldfields	Wheatbelt	South West	Great Southern	WA State	WACHS	Metropolitan
Current high blood pressure	10.9%	10.0%	19.7%	20.7%	19.3%	17.9%	18.5%	16.0%	17.1%	15.7%
Current high cholesterol	12.8%	10.8%	20.8%	18.4%	20.8%	19.3%	18.4%	18.2%	17.9%	18.3%
Overweight (1)	36.2%	39.2%	36.6%	36.5%	39.7%	38.7%	41.0%	39.1%	38.5%	39.3%
Obese (1)	27.6%	36.2%	36.0%	38.9%	37.3%	31.0%	30.3%	27.3%	33.5%	25.6%
High or very high psychological distress	7.2%	6.9%	6.7%	8.4%	6.6%	6.8%	6.2%	7.6%	6.9%	7.8%
Lack of control over life in general (2)	4.2%	4.3%	3.7%	3.5%	4.0%	3.6%	4.2%	4.5%	3.9%	4.7%

\*excludes visitors

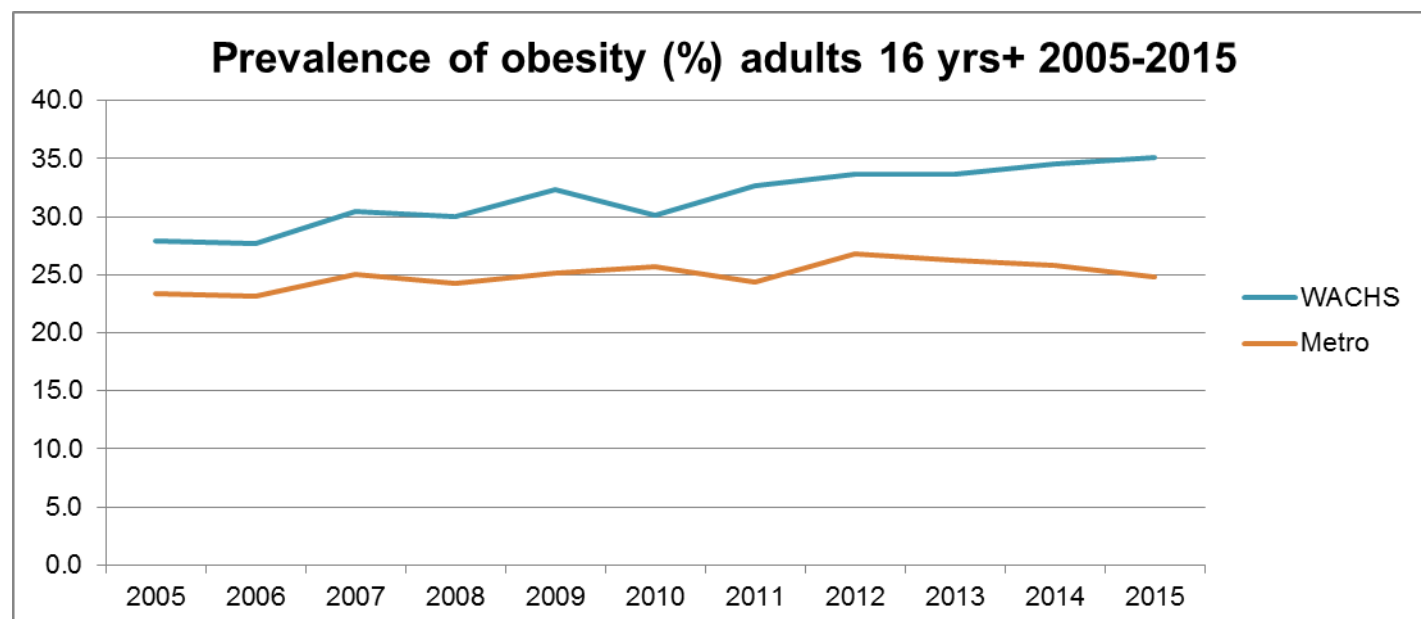
Source: WA Health and Wellbeing Surveillance System (WAWSS)

Notes: 1. Self-reported height and weight have been adjusted for under-reporting. BMIs classified as overweight ( $25 \leq \text{BMI} < 30$ ) or obese ( $\text{BMI} \geq 30$ ). 2. Often or always feels a lack of control over life in general.

- High blood pressure and obesity were the two conditions that residents of five out of seven **WACHS** regions reported at significantly higher levels compared to other regions.
- 33.5 per cent of **WACHS** residents were obese, compared with 23.5 per cent of metropolitan residents. 38.5 per cent of WACHS residents were overweight, which was similar to the metropolitan rate of 39.3 per cent.
- The presence of high cholesterol, overweight, high or very high psychological distress and lack of control over life in general were reported slightly less by **WACHS** residents compared with their metropolitan counterparts
- The **Kimberley** and the **Pilbara** residents reported high blood pressure and cholesterol less than other regions. This could be due to the lower population age structure in the regions.
- Of Western Australian Aboriginal people, 39.1 per cent were obese and 66.7 per cent were overweight or obese (BMI 25 or higher) in 2012-2013. The highest prevalence rate for overweight and obese Aboriginal people were in South Hedland, where 75.2 per cent of the population had a BMI over 25. In Geraldton the proportion was 70.3 per cent<sup>xiii</sup>.

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Figure 14: Prevalence of obesity by health service area<sup>#</sup>, 16 years and over, 2005-2015



# excludes visitors

Source: WA Health and Wellbeing Surveillance System (WAHWSS) accessed via Epidemiology Branch, DoH WA. Data as at 6 December 2016.

- The 10 year trend from 2005 to 2015 shows that the **obesity gap between country and metropolitan residents is widening**. In 2015, 35 per cent of WACHS residents were obese compared with 25 per cent of the metropolitan residents.
- The regions with significantly higher (compared with the State) prevalence of obesity are **Goldfields** (35 per cent), **Midwest** (37.8 per cent), **Pilbara** (40 per cent), **South West** (33.4 per cent) and **Wheatbelt** (36.9 per cent).
- WACHS obesity rate was statistically significantly higher at 35.1 per cent. The metropolitan obesity rate was 24.9 per cent in 2015.
- The proportion of overweight (i.e. not obese) adults, 16 years and older, remains similar to the metropolitan region and State and ranges from 36.1 per cent in the **Midwest** to 44.7 per cent in the **Kimberley**. WACHS overweight rate was 39.4 per cent and metropolitan 40.3 per cent in 2015<sup>xiv</sup>.

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## Prevalence estimates for self-reported doctor diagnosed health conditions

In general, out of the select 10 doctor diagnosed health conditions, WACHS adult residents, aged 16 and over, reported significantly greater prevalence of arthritis at 20.1 per cent compared with 18.9 per cent State wide and 18.6 per cent in the Perth metropolitan area.

**Table 22: Doctor diagnosed health conditions, adults 16 and over, 2011-2014**

Self-reported doctor diagnosed health conditions by region of residence*, adults 16 years and over, 2011-2014										
	Kimberley	Pilbara	Midwest	Goldfields	Wheatbelt	South West	Great Southern	WA State	WACHS	Metropolitan
Diabetes	4.4%	5.4%	8.2%	6.3%	7.6%	6.3%	6.0%	6.0%	6.4%	5.9%
Heart disease	4.6%	3.0%	5.8%	5.8%	7.2%	6.2%	6.1%	5.9%	5.7%	5.9%
Cancer (1)	3.8%	2.4%	5.7%	4.9%	6.6%	6.5%	5.5%	5.3%	5.4%	5.2%
Current asthma	8.1%	7.1%	11.1%	7.2%	9.7%	7.2%	10.6%	8.1%	8.5%	8.0%
Current respiratory problem (2)	2.0%	1.4%	2.3%	1.7%	2.2%	2.1%	2.1%	2.0%	2.0%	2.0%
Stroke	1.5%	0.9%	2.1%	1.8%	2.3%	2.0%	1.9%	1.6%	1.8%	1.6%
Arthritis	13.7%	10.3%	19.0%	20.1%	25.6%	21.7%	25.5%	18.9%	20.1%	18.6%
Osteoporosis	2.4%	2.6%	4.8%	4.6%	5.7%	5.3%	6.0%	4.6%	4.7%	4.6%
Injury (3)	28.7%	29.9%	21.3%	20.9%	20.0%	23.8%	23.8%	23.6%	23.9%	23.5%
Current mental health problem (4)	12.9%	17.0%	12.3%	11.8%	12.5%	13.0%	12.7%	14.4%	13.2%	14.8%

\*excludes visitors

Source: WA Health and Wellbeing Surveillance System

Notes: 1. Excludes skin cancer. 2. Respiratory problem other than asthma that has lasted 6 months or more. 3. Injury in the last 12 months requiring treatment from a health professional. 4. Diagnosed with depression, anxiety, stress-related or other mental health problem in the past 12 months.

- The **Wheatbelt**, **South West** and the **Great Southern** residents reported higher rates of arthritis, while the Kimberley and Pilbara residents reported it much less. Only 13.7 per cent of Kimberley residents and 10.3 per cent of the Pilbara residents had been diagnosed with arthritis, likely due to the lower population age structure in these regions.
- 8.2 per cent of **Midwest** residents reported to have been diagnosed with diabetes compared with 6 per cent across the State and 5.9 per cent in the metropolitan area. Kimberley residents reported diabetes significantly less than the metropolitan residents and as mentioned before, is likely due to lacking in responses from some Aboriginal people.
- 6.5 per cent of the **South West** residents reported to have been diagnosed with cancer rate compared with 5.3 per cent in the State and 5.2 per cent in the metropolitan area.

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- 6 per cent of the **Great Southern** residents reported to have been diagnosed with osteoporosis compared with 4.6 per cent in the whole of WA State and 4.6 per cent in the Perth metropolitan area.
- 29.9 per cent of the **Pilbara** residents reported to have been diagnosed with an injury compared with 23.6 per cent across the State and 23.5 per cent in the metropolitan area.

## Aboriginal lifestyle risk factors in Western Australia

As the WA Health and Wellness Surveillance System (HWSS) is unlikely to capture the health conditions and lifestyle risk behaviours of Aboriginal people, this section is based on ABS summary results from the 2014–15 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) and the data below relates to the whole State rather than WACHS. The survey was conducted throughout Australia, including remote areas, from September 2014 to June 2015 with a sample of 11,178 Aboriginal and Torres Strait Islander people living in private dwellings across Australia. The following section provides information about specific long term health conditions and lifestyle risk factors and some socioeconomic characteristics.

**Table 23: Health conditions and lifestyle risk factors for Aboriginal people in WA**

Current health conditions and lifestyle risk factors of WA Aboriginal and Torres Strait Islander people	
Excellent/very good self-assessed health (15 yrs+)	40.9%
Current daily smoker - age standardised rates (18yrs+) Note: rate refers to WACHS Aboriginal people only	47.9%
High/very high levels of psychological distress (age standardised rates) (18yrs+)	36.3%
Households living in houses of an acceptable standard	79.0%
Inadequate daily fruit intake* (15yrs+)	52.3%
Inadequate daily vegetable intake** (15 yrs+)	91.8%
Has a long-term health condition (15 yrs+)	60.2%
Alcohol use exceeded single occasion risk guidelines* (15yrs+)	33.1%
Has used substances in the last 12 months (15yrs+)	31.5%
Highest qualification is year 12 or equivalent (15 yrs+)	21.7%
Employed (15-64yrs)	39.5%

Source: Australian Bureau of Statistics (ABS), 4714.0 - National Aboriginal and Torres Strait Islander Social Survey, 2014-15. Accessed 21 December 2016.

Notes: \*NHMRCH Guidelines 2009, \*\*NHMRC Guidelines 2013.

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- In 2014-15, around two in five (40.9 per cent) Western Australian Aboriginal and Torres Strait Islander people aged 15 years and over rated their health as excellent or very good.
- Nearly half (47.9 per cent) of WACHS Aboriginal and Torres Strait Islander people aged 18 years and over smoked on a daily basis.
- One in three (33.1 per cent) WA Aboriginal and Torres Strait Islander people 15 years and older drinks at high-risk level for short-term harm. 16.8 per cent drinks at high-risk for long-term harm.
- Just under half (47.7 per cent) Aboriginal and Torres Strait Islander people aged 15 years and over met the guidelines for daily fruit intake and only one in twelve (8.2 per cent) met the guidelines for daily vegetable intake.
- One in five (21.7 per cent) Aboriginal and Torres Strait Islander people aged 15 years and over had completed Year 12 or equivalent as their highest qualification.
- Two in five (39.5 per cent) Aboriginal and Torres Strait Islander people aged 15–64 years were employed — of whom 66 per cent were working full-time and 34.8 per cent part-time<sup>xv</sup>.
- One in five (21 per cent) households in WA lived in houses of unacceptable standard. Additionally, nearly one third (30.5 per cent) of persons 15 years and older responded that their household members ran out of money for basic living expenses in last 12 months. One in four (26.8 per cent) of adults 15 years and over had experienced physical or threatened physical violence in last 12 months<sup>xvi</sup>.

## Access to hospital inpatient care in WACHS

### A measure of care closer to home - inpatient self-sufficiency

Inpatient self-sufficiency rates are a useful indication of a region's ability to provide public inpatient care for its residents close to home. Self-sufficiency is the proportion of WACHS residents who are treated locally in their own region of residence versus having to be referred or transferred out of the region (primarily to Perth) for more complex care (excluding those who choose to access private health care).

Despite the increasing and ageing regional population, which leads to increasing complexity, acuity and proportion of chronic disease, WACHS has maintained high levels of self-sufficiency in the six regions that have Regional Hospitals over the last nine (9) years within its endorsed WA Clinical Services Framework (CSF) role delineations. WACHS has a significantly higher regional self-sufficiency rate than the outer metropolitan health districts, containing hospitals with similar CSF role delineations to WACHS<sup>xvii</sup>. The Wheatbelt region does not have a larger Regional Hospital so it has an expected lower self-sufficiency rate as its residents access the more complex care seen by other Regional Hospitals in outer metropolitan general hospitals.

**Table 24: Inpatient public self-sufficiency by region<sup>#</sup>, 2010/11-2015/16**

Region of residence	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Goldfields	80%	79%	77%	78%	78%	75%
Great Southern	84%	83%	82%	82%	84%	83%
Kimberley	85%	82%	83%	86%	89%	89%
Midwest	76%	77%	77%	77%	75%	74%
Pilbara	80%	78%	78%	79%	78%	78%
South West	83%	84%	84%	84%	84%	84%
Wheatbelt	42%	43%	41%	39%	37%	35%
WACHS	76%	76%	76%	76%	77%	76%
WACHS excl Wheatbelt	82%	81%	81%	81%	82%	82%

<sup>#</sup> excludes visitors

Source: WACHS Online Data - Inpatient pivot as at 10 January 2017.

- All WACHS regions have a degree of seasonal trend regarding the volume of activity in their emergency departments and hospitals. The northern regions are busier in the drier winter months, and the southern regions are busier in the summer holidays. Part of this variation is due to people from other regions visiting the region at these times and requiring the use of a WACHS service. For example, **South West** emergency departments have 2,100 more visitors in January than in June, **Kimberley** have almost 1,800 more visitors to their emergency services in July than in February, **Midwest** have about 1,600 more visitors attend emergency services in July compared to February, and **Great Southern** have 900 more visitors attend their emergency services in January than in June.

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- The trend for inpatients is similar; however, the numbers are only about 25 per cent those of emergency services. The flow of visitors is spread across all age groups, with the more of the increase due to families with children heading south in the summer holidays. Local operations managers are able to adjust local supply to meet the varying demand.
- The **Wheatbelt** region's self-sufficiency continues to decline despite substantial investments in SIHI medical and emergency networks and thus lowers the WACHS regions overall self-sufficiency rates. While emergency models are now far more stable and robust in the Wheatbelt, the region still only provides lower level inpatient services in accordance with the WA Clinical Services Framework 2014 – 2024 given its lack of a Regional hospital. The Wheatbelt continues to transfer both planned (elective) and unplanned (emergency) cases to Perth hospitals for admission and treatment.
- In addition, **Wheatbelt** residents access outer metropolitan emergency departments and public inpatient care of their own volition given the proximity, particularly of the Coastal and Western Wheatbelt areas to Perth's outer metropolitan general hospitals (Joondalup, Midland and Armadale). It is clear that more acute and complex conditions continue to be (appropriately) referred to intra-regionally to the larger regional and metropolitan services.

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