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

South West Health Profile

Planning and Evaluation Unit

November 2018

Prepared by

Campbell Anderson, Nancy Bineham, Tia Lockwood, Aqif Mukhtar and Nina Waenerberg of the WA Country Health Service Planning and Evaluation Unit.

Acknowledgements

Thanks are extended to our colleagues and specialists in the field who reviewed and commented on the report.

Special thanks to Tyana Lawless for final proof reading and editing.

Contents

NOTE: Unless otherwise stated within this document the term rate refers to an age standardised rate. This means that the differing age and sex structures of the populations have been taken into account enabling two different areas or time periods to be compared.

Key facts for South West residents

Executive Summary

This report presents an overview of the health of South West residents to inform evidence-based health services and planning.

Note: When state rates are referred to, the state rate is always set at 1.0 when compared against a regional rate. A higher regional rate is generally worse than the state rate and a lower regional rate is generally better than the state rate. Poor access to health care may mean a lower rate does not indicate the true health need.

If the rates are described as significantly different this means statistically significantly different.

Population

- In 2016 the Australian Bureau of Statistics (ABS) found the South West region had an Estimated Resident Population (ERP) of 175,904 in 2016. The region also has a large number of visitors, especially in peak holiday seasons.
- Based on *WA Tomorrow 2017,* the region's resident population is projected to grow by 1.3 per cent per year between 2016 and 2026, with the largest growth in the over 70 year olds. [i]
- Compared to the state, the region has a lower proportion of Aboriginal people (2.6% in 2015), a larger percentage of children aged 5-14 years and adults aged 45 years and over and lower proportion of people aged 20-39 years.

Economic, demographic and socio economic factors

- Based on the 2016 census, the South West region has a lower level of disadvantage compared as per Socio-Economic Indexes for Areas (SEIFA) scores, compared to other regions.
- South West areas with the highest level of disadvantage are Bunbury, Collie and Manjimup which have scores in the lowest 30 per cent of the state.

Maternal Health

- In the South West, between 2011/12 and 2015/16 there was an average annual increase in births of three per cent.
- In 2015, 3.7 per cent of women in the South West who gave birth were aged less than 20 years. This was similar to the State rate. The proportion of births to Aboriginal teenage women was 19 per cent.
- For the period 2011/12 to 2015/16, 42 per cent of Aboriginal mothers and 13 per cent of non-Aboriginal mothers from the South West reported smoking during pregnancy.

Child and Adolescent Health

- In 2015, the proportion of South West children rated as developmentally vulnerable on one or more domains ranged from 13 per cent in Bridgetown-Greenbushes to 32 per cent in Bunbury. Six of the 11 communities with valid data had a higher rate of vulnerability than the national average of 22 per cent.

- For the period 2010 to 2015, South West region residents reported health enhancing behaviours, risk factors and conditions as well as health service utilisation in the past year at similar levels to the State.
- For the period 2011-2015, the rate of Potentially Preventable Hospitalisations (PPH) in South West children was similar to children in the State. Dental conditions (acute) contributed for 43 per cent of PPH (1.2 times the State rate) and Ear, Nose and Throat (ENT) infections (acute) contributed to another 19 per cent (0.7 times the State rate). The third leading cause for PPH was convulsions and epilepsy (acute) at 1.1 times the State rate. The PPH rate for gangrene was 1.6 times the State rate.
- For the period 2011-2015, injury and poisoning in the South West accounted for 11 per cent of all child hospitalisations. The hospitalisation rate for transport accidents was significantly higher (1.3 times) than the State rate.
- For the period 2011-2015, the leading type of notifiable disease was vaccine preventable with a notification rate significantly higher (1.2 times) than the State rate for children aged 0-14 years. The pertussis notification rate was 2.3 times the State rate.

Adult

- For the period 2013-2016, a significantly higher proportion of South West adults aged 16 years and over reported high blood pressure (19%) and obesity (33%) compared with the State. South West residents had a significantly higher rate of arthritis (23%) and osteoporosis (6%) than the State.
- For the period 2011-2015, the main cause of hospitalisation by major category for adults aged 15-64 years was digestive diseases, as it was for the State.
- For the period 2011-2015, Aboriginal South West residents had significantly higher rates than non-Aboriginal residents for both alcohol and tobacco hospitalisations in 15-64 year olds (alcohol 4.5 times and tobacco 3.4 times higher).
- Four per cent of all hospitalisations in South West residents aged 15-64 years were potentially preventable. The PPH rate was significantly lower than the State rate.
- The leading PPH for South West residents aged 15-64 years was dental conditions followed by cellulitis, angina and urinary tract infection.
- The melanoma (skin) cancer rate in the South West was significantly higher (1.4 times) than the State rate for the period 2011-2015.

Notifiable diseases

- For the period 2011-2015, the notification rates for enteric (1.2 times) and vector-borne diseases (1.5 times) for adults aged 15-64 years were significantly higher in the South West compared with the State rates.
- Notably 63 per cent of enteric notifications were for campylobacteriosis, and 66 per cent of vector-borne diseases were for Ross River Virus.
- The influenza notification rate increased significantly (by over 300 per cent) between 2011 and 2015.

Mental Health

- For the period 2013-2016, 14 per cent of South West adults reported having a current diagnosed mental health problem, (17% among females and 11% for males).

- For the period 2011-2015, the rate of mental health occasions of service accessed by South West residents aged 15-64 years was lower than the State rate.
- The leading reason was for schizophrenia schizotypal and delusional disorders, which accounted for 21 per cent of all mental health occasions of service in this age group.
- The rate of occasions of service for substance abuse disorders for South West adults aged 15-64 years was, 1.8 times the State rate.
- During 2006-2015, South West Aboriginal residents aged 15-64 years accessed community mental health services 2.2 times the rate of non-Aboriginal residents.
- For the period 2011-2015, suicide was the leading cause of death in the South West 15-24 year olds causing 19 deaths in the region (1.4 times the State rate).

Older People

- For the period 2011-2015, the hospitalisation rate of South West residents aged 65 years and over was significantly lower than the State rate. The leading causes of hospitalisation were renal dialysis (12%), diseases of the eye (9%) and chemotherapy (8%).
- The leading causes of PPH were congestive cardiac failure (1.1 times) followed chronic obstructive pulmonary disease (COPD) (1.1 times) and angina, 1.3 times the State rate.

Emergency Departments – all ages

- In 2016/17, 58 per cent of attendances to hospitals within South West hospitals were for semi-urgent or non-urgent cases, triage 4 and 5), which was significantly lower than WACHS (66%) indicating better access to primary care in the South West compared with some other regions.

Hospitalisations – all ages

- For the period 2011-2015, the hospitalisation rate of South West residents (38,164 per 100,000) was significantly lower than that of the State.
- The main cause of hospitalisation by major category was digestive diseases, as it was for the State, contributing to 11 per cent of hospitalisations.
- The leading PPH was dental conditions accounting for 14 per cent of PPHs and the rate was significantly lower to the State rate. Among other conditions, COPD, angina and convulsions and epilepsy, had significantly higher rates (1.1, 1.3 and 1.1 times respectively) compared with State rates.
- In 2016/17, 84 per cent of South West residents' hospitalisations to public hospitals occurred within the region. Thus demonstrating a high ability of the region to provide public hospital care for its own residents locally. The WACHS average was 83 per cent (excluding Wheatbelt).

Mortality – all ages

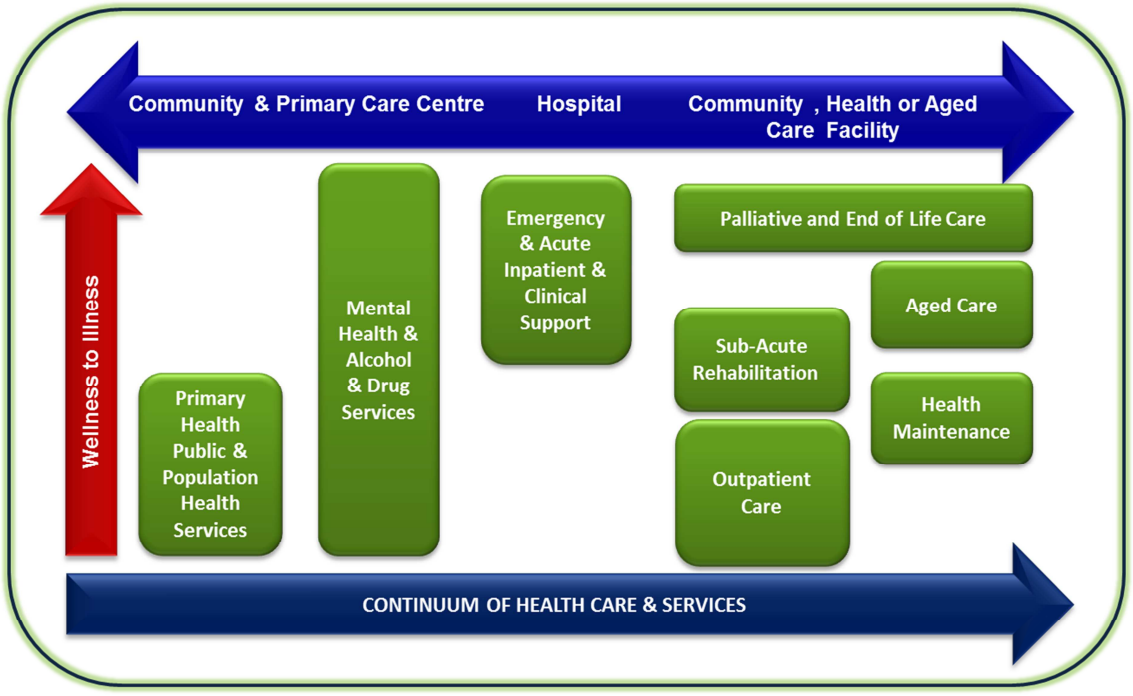
- For the period 2011-2015, the mortality rate for the South West region was similar to the State rate.

- The leading causes of death were ischaemic heart disease, cerebrovascular disease and dementia. The cerebrovascular disease mortality rate was significantly higher (1.3 times) than the State rate.
- Just over half of deaths (52%) of South West residents under the age of 75 years were potentially avoidable. Ischaemic heart disease was the leading cause of avoidable mortality followed by suicide. Transport accidents were the third leading cause of death for South West and the rate was significantly higher than (1.6 times) the State rate.

Introduction

This profile includes regional information on the population, demographics, determinants of health and health statistics such as immunisation rates, mortality and hospitalisation rates for residents of the South West. Where practicable the information is provided in the sequence of the continuity of care, and is provided by age group.

The information can be used to inform planning for service developments, support business cases and to focus services where they can best affect a positive outcome.



Additional information about the region and districts within the region may be found in service plan documents also published on WACHS Publications page along with the WACHS Child Health Profile and WACHS Health Profile Summary 2017.

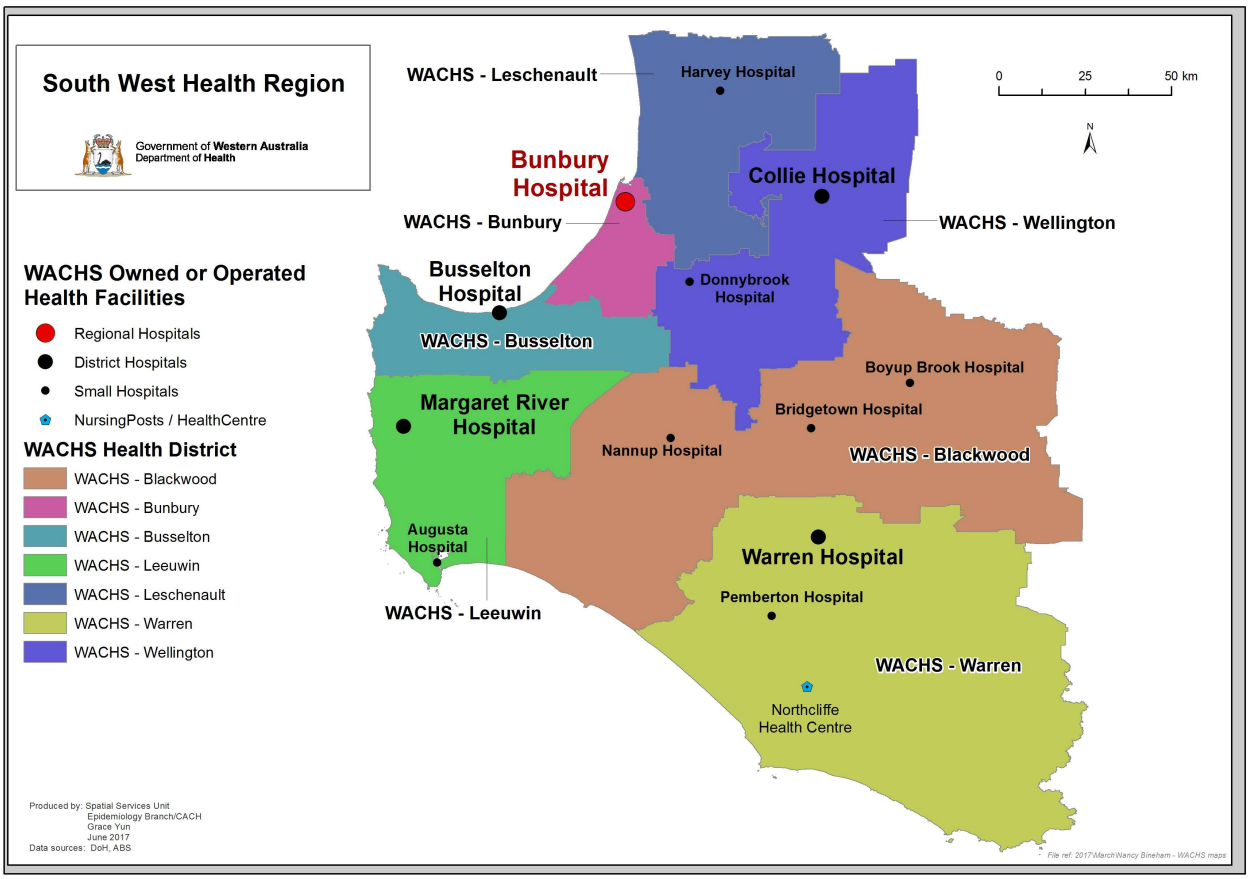
Overview of the region

The South West region is located in the south-west corner of the state, facing the Indian and Southern Oceans. It shares its eastern boundary with Wheatbelt and Great Southern regions. It covers an area of 23,998 sq km, has 12 local government areas and a diverse geographic profile ranging from rugged coastline and beaches to agricultural landscapes. The economy is based around tourism, mining and construction, retail and agriculture.[ii&iii]

Remoteness

According to the Accessibility/Remoteness Index of Australia (ARIA), 50 per cent of the South West region is outer regional, 40 per cent is inner regional and the remaining ten per cent is remote.[iv]

Figure 1: Map of South West showing health districts and WACHS health facilities



Source: Department of Health, Spatial services Unit Epidemiology Branch, Public Health Division, December 2017.

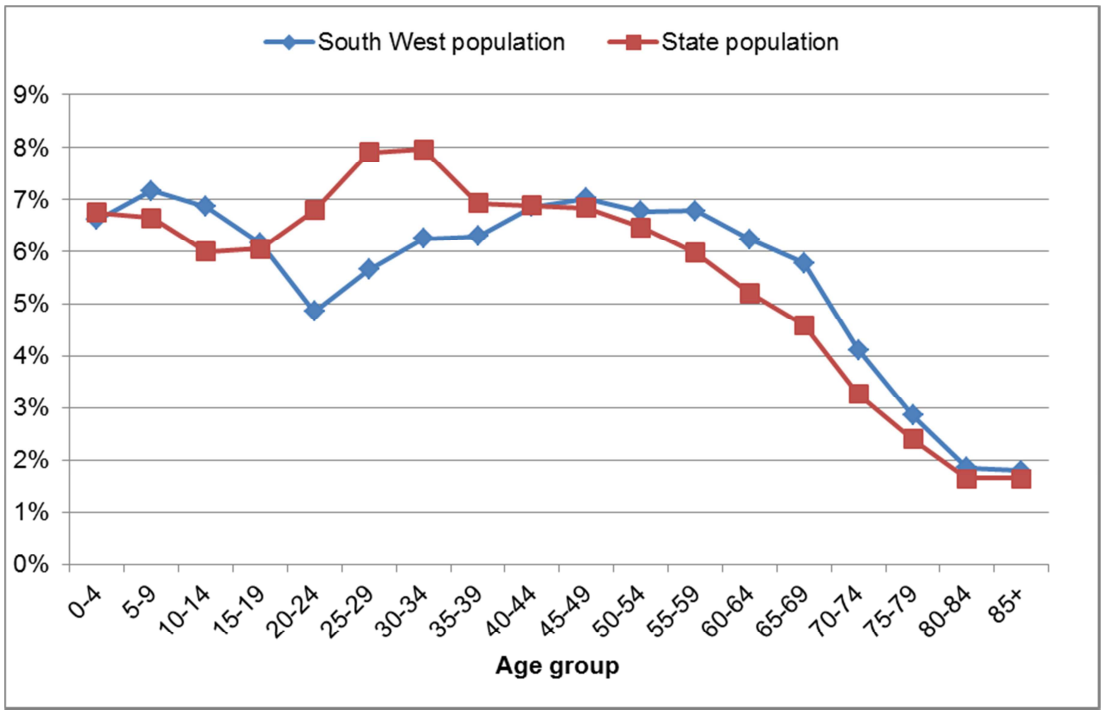
Population

The 2016 Estimated Residential Population (ERP) of the South West was 175,904, which represents 33 per cent of the WACHS population and seven per cent of the State's population. This is an increase of 23 per cent (32,905) since 2006. [v]

The 2015 South West region population density is seven people per sq km, which is greater than State average (1.0 per sq km; WA Rural: 0.24 per sq km). The gender distribution in the South West is quite even, with 49.5 per cent of population being male.[vi]

The age structure differs from that of the State by having a larger percentage of children aged 5-14 years and adults aged 50-74 years and a lower proportion of people aged 15-49 years.[v]

Figure 2: South West vs. State population age distribution 2016



Source: ABS, ERP 2016[v]

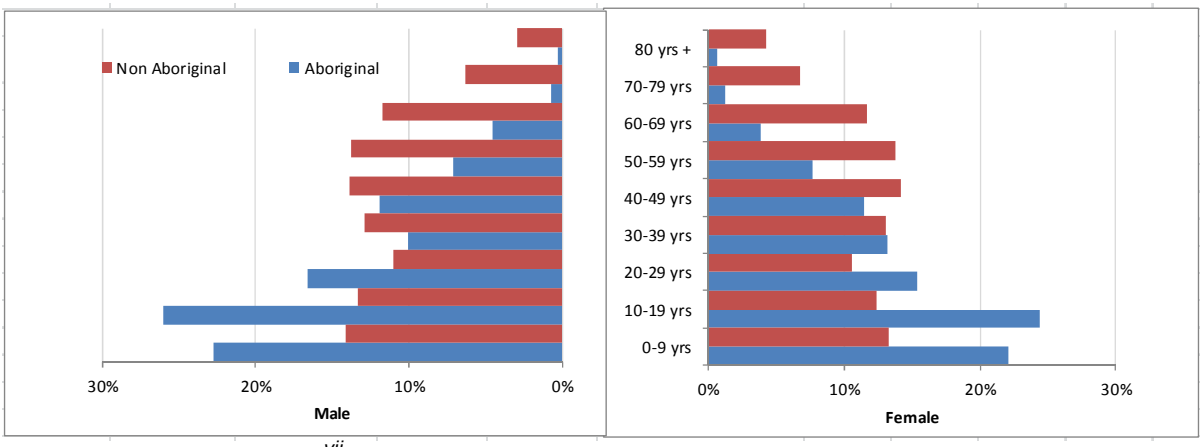
Table 1: South West Estimated Resident Population 2016

Age Group	0-4	5-14	15-49	50-74	75+	Grand Total
Number	11,644	24,697	75,856	52,233	11,474	175,904
Proportion	7%	14%	43%	30%	7%	100%

Source: ABS, ERP 2016[v]

Aboriginal people make up 2.6 per cent (4,548 people) of the region's population which is less than the State proportion (3.6%) based on Aboriginal proportions in the 2015 ERP. The Aboriginal population has a younger age structure than the non-Aboriginal population.[vii]

Figure 3: South West Estimated Resident Population (ERP) by Aboriginality 2015

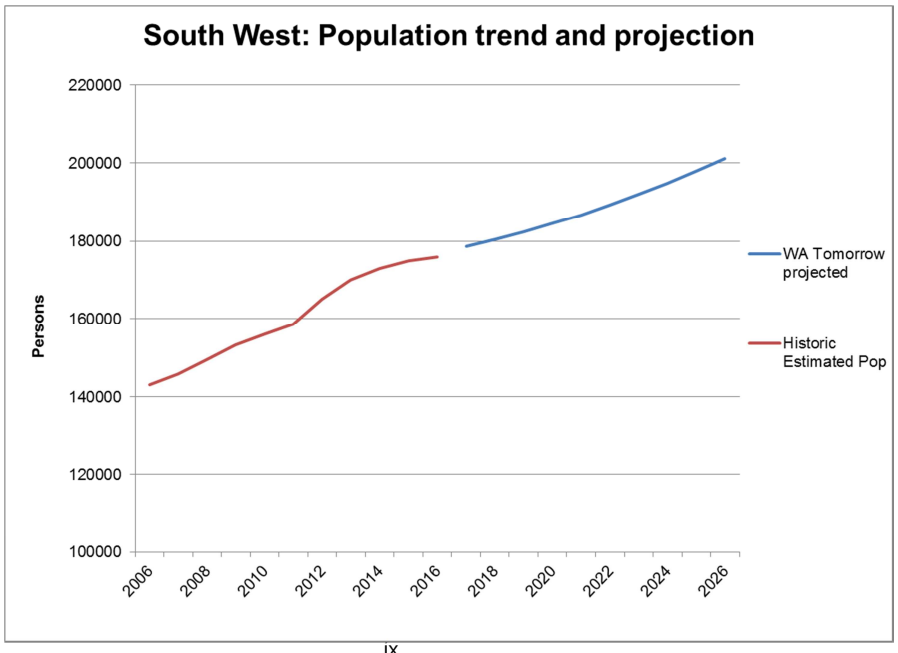


Source: ABS via DoH Epi Calculator[vii]

The South West population has experienced growth (2.1% per year) from 2006 to 2016. From 2017, the South West population is projected to grow at an average of 1.3 per cent per year until 2026. Busselton (2.2% per year) and Leschenault health districts (2% per year) are predicted to have the highest percentage growth.[v & viii]

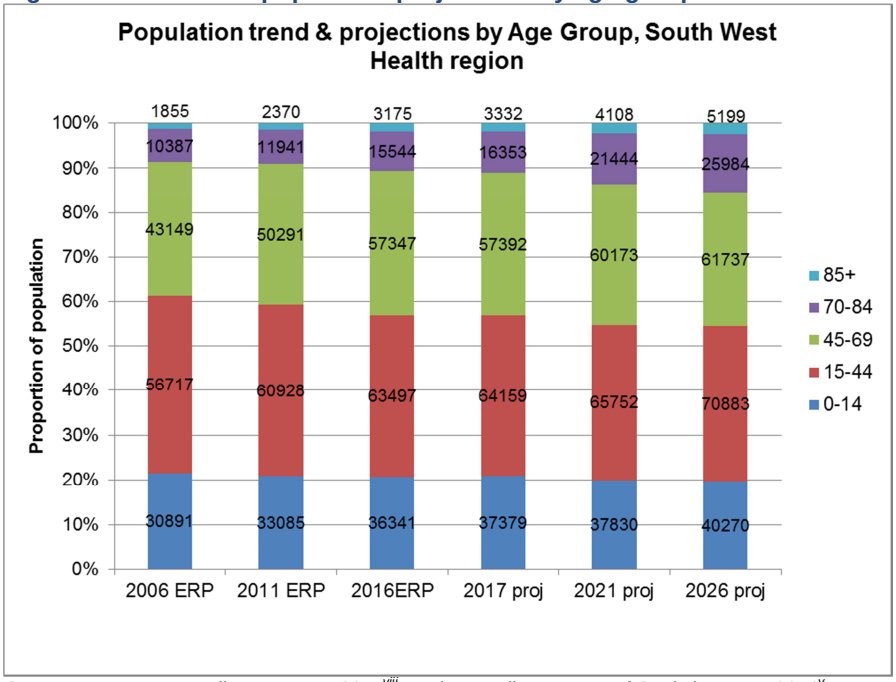
Figure 5 shows projections by age group. The older age groups are expected to grow at a higher rate than younger age groups in the South West region. It is anticipated there will be 58 per cent (11,497) more people over 70 years in 2026 compared to 2016. The growth in the younger age cohorts is slower and the 0-4 year old age group is expected to grow by eight per cent and the15-44 year old cohort by 11 per cent in the same time period.[viii]

Figure 4: South West population projections 2006-2026



Source: Western Australia Tomorrow 2017[ix]*, and Australian Bureau of Statistics, ERP 2016*[v]

Figure 5: South West population projections by age group 2006-2026



Source: Western Australia Tomorrow 2017[viii], and Australian Bureau of Statistics, ERP 2016[v]

Implications for health service planning:

South West has a small proportion of Aboriginal people (2.6% compared to the State proportion of 3.6%) but this is still 4,548 people and they have a much younger age structure than non-Aboriginal population, with half the population aged under 20 (48% compared with 27% for non-Aboriginal people). It would be useful to take into account this differing age structure when planning health services and programs.

The population of the South West is projected to grow at 1.3 per cent per year. The number of people 70 years and over is projected to increase by 58 per cent between 2016 and 2026 (11,497). This changing age structure is taken into account in the commencement and placement of services particularly in chronic condition management, older person's health and aged care. This includes the use of Telehealth services to improve service access and reduce travel. Partnerships with primary health providers and General Practitioner (GP) services and other non-government providers will be important for this increasing older population.

Economic, demographic and social factors

There are many factors that influence a person's health, including genetics, lifestyle and environmental, economic and social factors. The demographics within the South West are very diverse and different areas can differ in function and infrastructure. For example a coastal harbour or viticulture community will differ from an inland farming or forest community. The level of isolation and impact on health by environmental conditions is often more marked in rural than metropolitan communities. [x]

Table 2 lists some of the socio-demographic factors for South West compared to the rest of the State.

Table 2: South West vs. State vs. WACHS vs. Metro socio demographic factors 2011

Measure	South West Health Region		Metro	Country	State
	Counts	%	%	%	%
Born overseas	28,664	18.6	34.9	18.8	30.7
People who don't speak English at home	8,135	5.3	17.1	7.1	14.5
At primary school	14,727	9.5	8.2	9.2	8.4
At secondary school	8,940	5.8	5.7	5.1	5.5
At TAFE, CAE or Uni	5,442	3.5	7.3	3.5	6.3
Left school aged less than 15 years old	12,599	10.4	8.1	10.6	8.7
Persons with tertiary qualification	50,276	41.4	45.3	38.3	43.6
Families with annual income < $20,800	1850	4.4	3.9	5.1	4.2
One-parent families	6,009	14.4	14.7	14.1	14.5
Unemployed	3538	4.7	4.8	4.4	4.7

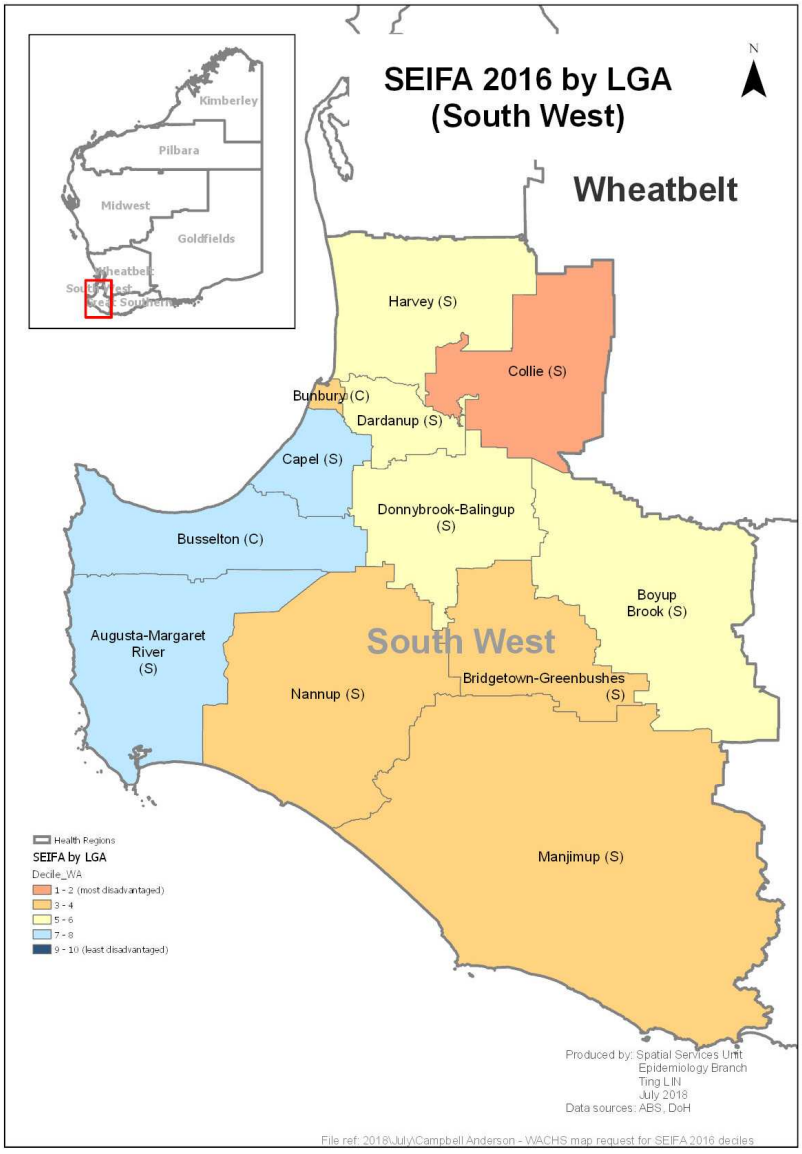
Source: ABS Census 2011 results via DoH, Health Tracks [vi]

Socio-Economic Disadvantage

The Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) as a product of the Socio-Economic Indexes for Areas (SEIFA), is calculated from responses to the ABS Census. The more disadvantaged an area, the higher self-reported ill health or risk factors for ill health. A score below 1,000 indicates an area is relatively disadvantaged compared to an area with a score of at least 1000 or more. [xi]

Based on the 2016 Census, the lowest score for a South West LGA is 899 in Collie and the highest is in Capel with 1,009. There is an SA1 within Bunbury with a score of 703 and one in Busselton with a score of 1,136. Bunbury, Collie and Manjimup are the only LGAs with a score in the lowest 30 per cent of scores in the State. This indicates the South West is one of the least disadvantaged regions in the State. An indication of the distribution can be seen in Figure 6. [xii]

Figure 6: South West Socio-Economic Indexes for Areas distribution 2016



Source: DoH, Epidemiology GIS branch, 2018.

Notes: Index of Relative Socio-Economic Advantage and Disadvantage SEIFA 2016 is released according to the Australian Statistical Geography Standard (ASGS). Statistical Areas Level 1 (SA1s) are built from whole Mesh Blocks. There are 54,805 SA1s covering the whole of Australia without gaps or overlaps. They have been designed as the smallest area of output for the Census of Population and Housing, replacing the Census Collection Districts (CCDs). Whole SA1s aggregate to form Statistical Areas Level 2 (SA2s).

Implications for health service planning:

The SEIFA Index shows that there are areas within South West with high levels of disadvantage, even though the South West is one of the least disadvantaged regions in the State. Any services and programs that are planned may be better targeted towards more disadvantaged areas, such as Collie, Manjimup and specific suburbs of Bunbury.

Maternal Health Status

Births

In 2015, the overall South West age-specific birth rate was 68.7 per 1,000 women. This was significantly higher than the State rate (63.6 per 1,000 women). For the period 2011-2015, the age-specific birth rate for Aboriginal women in the South West was 66.4 per 1,000 women and for non-Aboriginal women it was 68.4 per 1,000 women.[xiii]

In 2015, in the South West, the proportion of births (3.7%) to women aged less than 20 years was higher to that of the State (2.8%) and the mean maternal age was 24.7 years for Aboriginal women and 29.0 years for non-Aboriginal women.[xiii]

In 2015/16, the proportion of births to non-Aboriginal teenage women was three per cent and to Aboriginal teenage women it was 19 per cent compared with 3% for WACHS Non-Aboriginal and 16% of WACHS Aboriginal women. [xiii]

Table 3: South West State vs. Metro maternity data 2011- 2015

Maternity data	South West Health Region	Perth Metropolitan Area	WA State
Age-specific birth rate (per 1,000 women aged 15-44 years, not having had hysterectomy)	68.7	62.0	63.6
Teenage births (%) <20 years old	3.7%	2.2%	2.8%
Birth in women aged 35 years and older (%)	17.5%	22.2%	20.7%

Source: DoH, Health Tracks[vi]

Within the South West hospitals, there was a 12 per cent increase in births between 2012 and 2016, an average annual increase of 2.8 per cent. The average annual increase was 9.1 per cent in Aboriginal women and 2.5 per cent in non-Aboriginal women. There was an increase in births of 3 per cent for South West region over the same period. This included a 31 per cent increase in Aboriginal births and a two per cent decrease in non-Aboriginal births. [xiv]

Table 4: South West births by Aboriginal status of mother 2012 - 2016

Birth Year	Births in a South West hospital			All births by South West residents		
	Aboriginal	Non-Aboriginal	Total	Aboriginal	Non-Aboriginal	Total
2012	55	1374	1429	65	2124	2189
2013	57	1419	1476	71	2138	2209
2014	70	1458	1528	85	2180	2265
2015	61	1511	1572	64	2204	2268
2016	78	1516	1594	85	2176	2261
Increase	42%	10%	12%	31%	2%	3%
Average annual increase	9.1%	2.5%	2.8%	6.9%	0.6%	0.8%

Source: WACHS Online data – Obstetric Deliveries[xiv]

Teenage mothers

In the period 2015/16, in the South West, the average (mean) maternal age was 24.7 years for Aboriginal women and 29 years for non-Aboriginal women.

Over the period 2006-2015 teenage pregnancy has not changed significantly within the South West Health Region and the proportion of births to women aged less than 20 years was similar to the State. In the period 2015/16 in the South West, the proportion of births to Aboriginal teenage women was significantly higher (19%) than non-Aboriginal teenage women (3%).

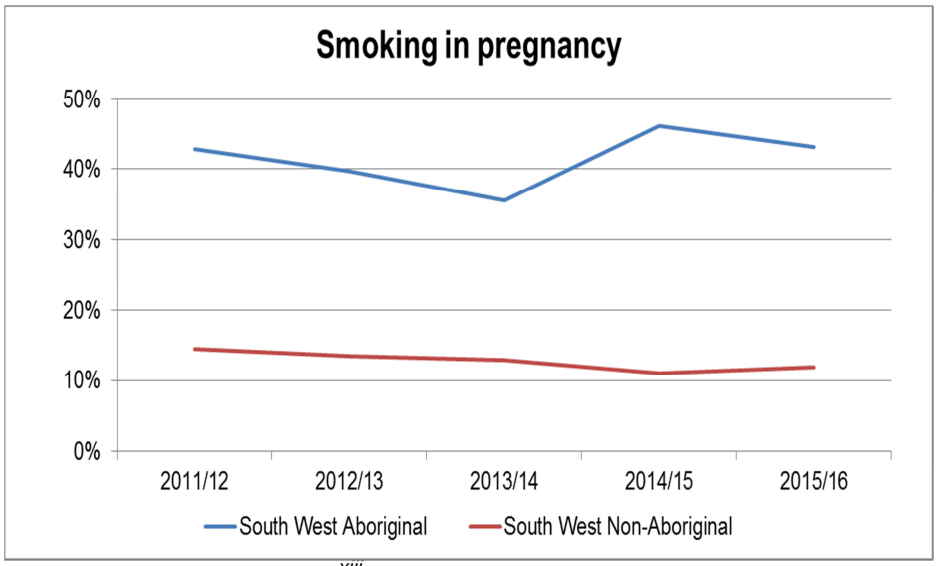
Smoking in pregnancy

Smoking during pregnancy is associated with low birth weight, pre-term birth, placental complications and perinatal mortality[xv].

The proportion births to Aboriginal South West women who reported smoking during pregnancy (between 2011/12 and 2015/16) fluctuated and after a low of 35 per cent in 2013/14 finished slightly higher (43%) in 2015/16.

The five year average proportion of births to smoking Aboriginal women was 42 per cent, which was lower than the WACHS rate of 48 per cent. For non-Aboriginal mothers, the proportion of births to women who reported smoking during pregnancy had a downward trend and the five year average was 13 per cent (WACHS rate 13 %).[xiii]

Figure 7: South West proportion of women smoking during pregnancy 2011/12 to 2015/16



Source: Midwives Notification System[xiii]

Alcohol in pregnancy

High rates of alcohol consumption while pregnant, is associated with Foetal Alcohol Spectrum Disorder (FASD) and various other impairments of the central nervous system. A 2014 report using data from 1980-2010 obtained from the WA Register of Developmental Anomalies and the Midwives Notification System, showed a birth prevalence of FASD in WA of 0.26 per 1000 births. The majority were Aboriginal (89%). The prevalence rate has doubled over the last 30 years in WA.[xvi]

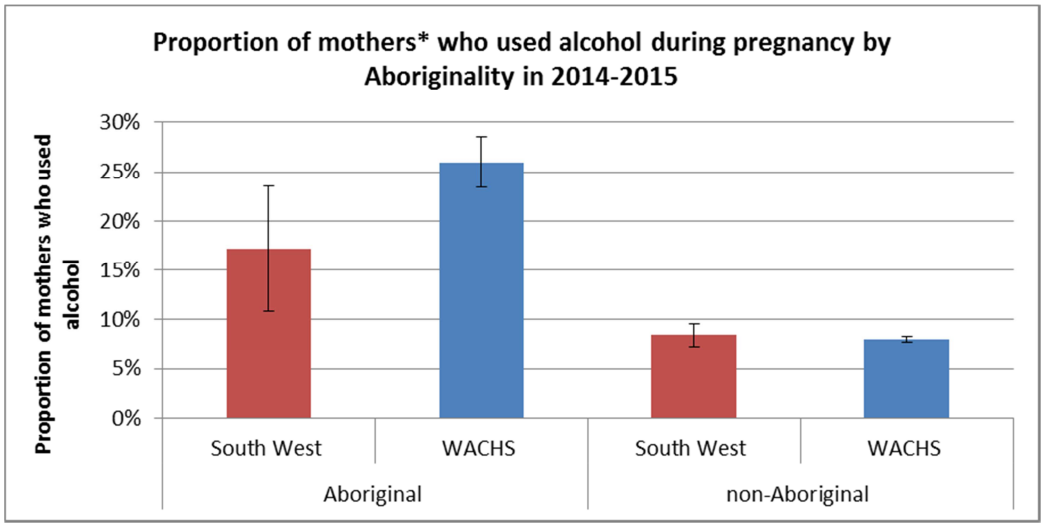
In 2017 a pioneering Western Australian study, '*Prevalence and profile of Neurodevelopment and Fetal Alcohol Spectrum Disorder (FASD) amongst Australian Aboriginal children living in remote communities',* found that in remote Australian Aboriginal communities, where high rates of prenatal alcohol exposure have been recorded, FASD/partial FASD prevalence rates of 120.4 per 1,000 children have been reported. [xvi & xvii]

Figure 8 demonstrates an initial indication of the use of alcohol in pregnancy, with data that is currently available by Aboriginality in the South West region compared to that of WACHS. The data should be interpreted with caution as the question regarding alcohol consumption was only made compulsory to answer from June 2017 onwards and regional response rates vary.

Figure 8 demonstrates the majority (91%) of South West respondents did not report using alcohol during pregnancy. Sixteen (17%) South West Aboriginal mothers used alcohol. This rate is lower than the WACHS Aboriginal rate (340 mothers or 26% of respondents). Out of the 16 who had used alcohol, ten Aboriginal respondents had occasional alcohol i.e. less than one standard drink a week during pregnancy and six, reported alcohol use at higher risk levels.

Eight per cent (165) of South West non-Aboriginal mothers used alcohol during pregnancy; this rate was similar with WACHS non-Aboriginal mothers. Of the 165 who used alcohol, 118 had occasional alcohol, less than one standard drink a week during pregnancy and 47 mothers used higher levels of alcohol.

Figure 8: South West vs. WACHS proportion of mothers who used alcohol during pregnancy 2014-2015



**Proportion of mothers who responded to the question, not proportion of all mothers who gave birth. WACHS response rate was 72% and South West response rate 67%. No validation was carried out on the responses. Alcohol use became a compulsory field in June 2017 and will in the future provide more reliable data.*
Note: The error bars represent the 95% confidence interval of the proportion
Source: Stork Perinatal Database as at 2 June 2017, accessed via Health Support Services

A number of projects are being conducted in regions throughout the State to address alcohol use during pregnancy and to secure out more information about FASD. Details can be obtained from the Australian Indigenous Health*InfoNet*[xviii] and the Telethon Kids Institute.[xix]

Gestational Diabetes Mellitus (GDM)

In 2010, the Australian Institute of Health and Welfare (AIHW) released a report on GDM discussing its impact on Australian woman and their babies. The report concluded that mothers with diabetes in pregnancy and their babies were at higher risk of adverse effects of pregnancy, labour and delivery, compared with those not affected by diabetes in pregnancy. Those with pre-existing diabetes who had diabetes in pregnancy and their babies were at higher risk of developing these adverse effects.

Aboriginal mothers and their babies experienced generally higher rates of the adverse effects of pregnancy, labour and delivery compared with non-Aboriginal mothers and their babies. The report stated that diabetes in pregnancy is an indicator of increased risk of developing Type 2 diabetes (also known as adult onset diabetes) later in life, and therefore provides an opportunity to intervene to improve health outcomes.

In the period 2011/12 – 2015/16, 6.8 per cent of South West Aboriginal women who gave birth had gestational diabetes mellitus (GDM). The proportion of GDM in non-Aboriginal South West women who gave birth was 6.3 per cent. The prevalence of GDM in WACHS Aboriginal mothers was 7.1 per cent and in WACHS non-Aboriginal mothers it was 5.9 per cent for the same time period.[xiii]

Implications for health service planning:

In the South West, Aboriginal women are more likely than non-Aboriginal women to be teenage mothers and to smoke during pregnancy. Alcohol consumption and diabetes in pregnancy are risk factors for all women. This suggests a need for targeted, culturally safe and appropriate health promotion strategies and ante-natal services for these women. Strengthening partnerships with primary care providers, including local GPs and Aboriginal Community Controlled Health Services could provide better outcomes.

Resources to tackle Aboriginal maternal smoking in WA have been developed such as the Australian Indigenous Health*InfoNet* new portal launched recently.

(Source: Australian Indigenous Health*InfoNet* accessed June 2015: *http://www.healthinfonet.ecu.edu.au/about/news/3305 http://www.healthinfonet.ecu.edu.au/population-groups/preventing-aboriginal-maternal-smoking).*

Health Status - Child and Adolescent

Low birth weight

Babies born with a low birth weight (less than 2,500g) have a higher risk of health complications. For the period 2007/08-2015/16, the low birth weight rate for full term babies born to women in the South West was 1.8 per cent and the State rate was two per cent. The low birth weight rate for South West Aboriginal babies born full term was 4.8 per cent and for the State Aboriginal babies it was 5.1 per cent.[xiii]

Australian Early Childhood Development Census (AEDC)

The AEDC uses the early development instrument tool to measure how young children have developed as they start their first year of full-time school. A teacher completes a checklist for each child across each of the five domains of early childhood development: physical health and wellbeing, social competence, emotional maturity, language and cognitive skills, communication skills and general knowledge. The scores of all Australian children are ranked and children ranked in the bottom 10 per cent are classed as “developmentally vulnerable” whereas those in the top 75 per cent are classed as “on track” while those in between are classed as “at risk”. Results are reported by a child’s community of residence.

Across Australia in 2015, one in five children (22%) was developmentally vulnerable on one or more domains of the AEDC. Furthermore, 11 per cent were developmentally vulnerable on two or more domains.

The results for the South West local communities are shown in the Table 5, with 11 local communities having sufficient data for publishing. Bunbury, Capel, Dardanup Donnybrook-Balingup, Harvey and Manjimup had a higher proportion, vulnerable on one or more domains than the overall Australian proportion. The total published number of South West children vulnerable in at least one domain was 578 (284 in at least two domains) and there were additional vulnerable children in communities with numbers too low to publish.

Within the South West the proportion of children rated as developmentally vulnerable on one or more domains ranged from 13 per cent in Bridgetown-Greenbushes to 32 per cent in Bunbury. The proportion rated vulnerable on two or more domains ranged from five per cent in Boyup Brook to 17 per cent in Manjimup. It is important to consider the number of children, in relation to the proportion of children classed as developmentally vulnerable.

One South West local community had too few children to publish results. However, of the 11 for which data has been published, six had a higher proportion vulnerable on one or more domains than the overall Australian proportion and the same six had a higher proportion vulnerable on two or more domains than the overall Australian proportion.[xx]

Table 5: South West AEDC children developmentally vulnerable on at least one domain 2015

Local Community	Children Vulnerable				Total children surveyed
	One or more domains		Two or more domains		
	Number	%	Number	%	
Augusta-Margaret River	48	20.5%	17	7.2%	234
Boyup Brook	4	18.2%	1	4.5%	22
Bridgetown-Greenbushes	7	13.2%	3	5.7%	53
Bunbury	126	31.9%	63	15.9%	395
Busselton	97	17.6%	46	8.4%	552
Capel	67	26.5%	35	13.8%	253
Collie	24	17.9%	12	9.0%	134
Dardanup	54	28.6%	26	13.8%	189
Donnybrook-Balingup	18	24.0%	12	16.0%	75
Harvey	96	23.7%	47	11.6%	405
Manjimup	37	28.9%	22	17.2%	128
Nannup	*	-	*	-	11
Australia		22.0%		11.1%	

Source: AEDC[xx]
#AEDC data are not reported for locations in which three or fewer children had been assessed.
* Suppression of AEDC data also occurs when one or more of the following have not been met:
Fewer than fifteen children had valid AEDC scores/Less than two teachers had completed AEDC instruments for children in that location/AEDC instruments were completed for less than 80% of all non-special needs children.
Additional minor suppressions have occurred where necessary to preserve confidentiality of related suppressed cells
These tables and more information may be found at http://www.aedc.gov.au/

Implications for health service planning:

The AEDC results indicate the need for child development services including access to multidisciplinary teams made up of medical services, child health nurses, speech pathology, physiotherapy and occupational therapy.

It is important to consider the number of children in relation to the proportion of children classed as developmentally vulnerable.

Childhood Vaccinations

Immunisation against communicable disease is an effective public health intervention that reduces the mortality and morbidity associated with vaccine preventable conditions. Australian vaccination coverage targets of greater than 90 per cent of children at two years of age and near 100 per cent of children at school entry age are recommended. The coverage needs to exceed 90 per cent to create the community immunity necessary to stop the ongoing transmission of these diseases.[xxi]

In 2017, the childhood vaccination coverage for South West was over 90 per cent for all age groups except for the 24-<27 months which had a coverage of 89 per cent. The State coverage

was similarly over 90 per cent for the all age groups except for the 24-<27 month age group. The overall WACHS coverage was above 90 per cent for all age groups. Refer to Table 6.

Childhood immunisation coverage for South West Aboriginal children was lower than the State and WACHS for the age group 12 to <15 months. However, the South West Aboriginal immunisation coverage was higher than the non- Aboriginal people for children aged 24 to <27 months and 60 to <63 months. Childhood immunisation coverage for WACHS Aboriginal children was lower than the WACHS Non-Aboriginal children for the age groups 12 to <15 months and 24 to < 27 months but higher for children aged 60 to < 63 months. Same trend was observed at the State level. Refer to Table 6.

Table 6: South West vs. WACHS vs State childhood immunisation 2017

Age Group	South West Health Region			WACHS			WA State		
	Aboriginal	Non-Aboriginal	Persons	Aboriginal	Non-Aboriginal	Persons	Aboriginal	Non-Aboriginal	Persons
12 to < 15 Months	91%	93%	93%	90%	94%	94%	88%	94%	94%
24 to < 27 Months	96%	88%	89%	85%	92%	91%	83%	90%	89%
60 to < 63 Months	96%	93%	93%	96%	92%	93%	95%	92%	92%

Source: Australian Childhood Immunisation Register - Coverage Report[xxii].

Health and Wellbeing Surveillance System (HWSS), 0-15 years

The Department of Health in WA conducts a continuous HWSS. This is a population survey carried out by phone, which is designed to provide results and examine trends at a population level. It is unlikely to be representative of minority groups such as Aboriginal people and the homeless as they are less likely to have phone access. Parents/guardians report on behalf of children aged 0-15 years. Given there is a low proportion of Aboriginal people in the South West, the prevalence counts and rates are more likely to be a closer estimate of the true amount than other regions.[xxiii]

The HWSS (2010-2015) showed that health enhancing behaviours, risk factors, conditions and health service utilisation were proportionally similar for the South West children compared with the children in the State, although the State shouldn't be used as a benchmark in this instance as many state rates are not within acceptable ranges.

For the South West region, the HWSS also showed:

- One in four children (25%) had a parent who smoked during their pregnancy although the proportion of people who reported their home was smoke free was 99 per cent;
- most children (89%) did not eat the recommended daily serves of vegetables;
- two in seven children (28%) did not eat the recommended daily serves of fruit;
- over half of children (53%) did not do sufficient physical activity;
- one in twenty children (5%) reported height and weight measurements that classified them as obese;
- one in five children (20%) reported an injury requiring treatment from a medical professional in the previous year; and
- one in eleven children (9%) had asthma.

Table 7: South West vs. State Health and Wellbeing Surveillance System (HWSS) child population profile 2010-2015

	South West Prevalence (%)	Western Australia Prevalence (%)	Significant difference from WA*
Health Enhancing Behaviours			
Health is rated excellent or very good	88.3	87.0	-
Home is smoke free	98.5	98.2	-
Eats recommended serves of fruit daily 5-15 years (a)	71.8	67.4	-
Eats recommended serves of vegetables daily 5-15 years (b)	10.5	8.1	-
Sufficient physical activity 5-15 years (c)	46.9	46.1	-
Risk factors			
Either or both parents smoked during pregnancy	24.7	24.9	-
Sedentary for more than two hours a day 5-15 years	22.5	24.5	-
Overweight 5-15 years	15.5	16.1	-
Obese 5-15 years	5.1	6.5	-
Conditions and injury			
Current asthma	9.1	9.2	-
Injury	20.4	20.7	-
Health Service Utilisation in the last 12 months			
Used a primary health care service (e)	80.3	80.7	-
Used a dental health care service	61.0	58.5	-
Used a mental health care service (f)	4.6	4.2	-
Used an allied health care service (g)	28.8	27.3	-
Used a hospital health care service (h)	25.5	27.2	-

Results significantly better than the State are highlighted green, significantly worse are highlighted red. Where result could be interpreted as either better or worse, or results similar to the State have not been highlighted.

Notes:

(a) The number of serves of fruit recommended for sufficient consumption in the 2013 Australian Dietary Guidelines by the National Health and Medical Research Council varies dependent on age and sex. For reporting purposes, this table just presents the prevalence of children aged 5-15 years who consume 2 serves of fruit daily, this is not equivalent to 'sufficient intake'.

(b) The number of serves of vegetables recommended for sufficient consumption in the 2013 Australian Dietary Guidelines by the National Health and Medical Research Council varies dependent on age and sex. For reporting purposes, this table just presents the prevalence of children aged 5-15 years who consume 5 serves of vegetables daily, this is not equivalent to 'sufficient intake'.

(c) Based on the 2014 Australian Physical Activity and Sedentary Behaviour Guidelines, children aged between 5 and 15 years are required to complete at least 60 minutes of moderate to vigorous physical activity each day to achieve good health. Table 5 presents the prevalence of children who are physically active 7 or more sessions per week and for at least 60 minutes a session.

(d) Injury in the last 12 months requiring treatment from a health professional

(e) Primary health care service includes medical specialist, general practitioner, community health centre, community or district nurse.

(f) Mental health care services include psychiatrist, psychologist or counsellor.

(g) Allied health care services includes optician, physiotherapist, chiropractor, podiatrist, dietitian, nutritionist, occupational therapist or diabetes/ other health educator.

(h) Hospital based health care service includes an overnight stay in hospital, an attendance at the emergency department or an outpatient clinic.

Source: WA Health and Wellbeing Surveillance System[xxiii]

Potentially Preventable Hospitalisations (PPH), 0 -14 years

Hospitalisations are an indicator of severe conditions in the community and assist in targeting primary care resources to prevent hospitalisations. Many hospitalisations result from conditions where hospitalisations could potentially be avoided using preventive care and early disease management. These hospitalisations are known as PPH and are grouped into three major categories:

- Acute: This category includes dehydration and gastroenteritis, pyelonephritis (kidney infection), pelvic inflammatory disease (PID), ear, nose and throat (ENT) infections, dental conditions, appendicitis, epilepsy, gangrene and cellulitis (skin infection).
- Chronic: This category includes asthma, diabetes (excluding renal dialysis), chronic obstructive pulmonary disease (COPD), iron deficiency anaemia, nutritional deficiencies and rheumatic heart disease.
- Vaccine preventable: This category includes mumps, measles, rubella, whooping cough, influenza and pneumonia.

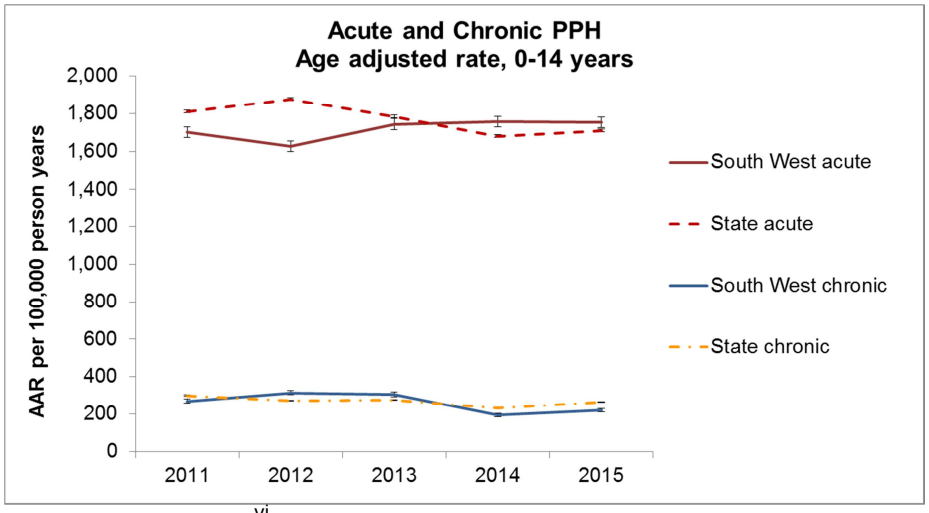
Public health measures have the greatest influence on vaccine preventable conditions. Effective clinical care with regular review is essential to reduce avoidable admissions for people with chronic conditions.

For the period 2011-2015, PPH accounted for 3,564 hospitalisations of South West children aged 0-14 years (13% of all child hospitalisations). The rate was similar to the State. In South West, the PPH rate has been steady throughout the five-year period. [vi]

For the period 2011-2015, PPH rates were largely similar to the State for both chronic and acute conditions while vaccine preventable conditions were significantly lower than the State. The PPH rate for acute conditions has significantly increased in 2013-2015 compared with 2011-2012 rate. The PPH rate for chronic conditions peaked in 2013 and hit a low in 2014 with a slight increase in 2015, remaining below the State rate. [vi]

Figure 9 compares age-adjusted rates from 2011 to 2015 for acute and chronic conditions. PPH rates for vaccine preventable conditions are significantly lower than acute and chronic conditions and are not shown in the figure.

Figure 9: South West vs. State PPH Acute and Chronic 0-14 years 2011-2015

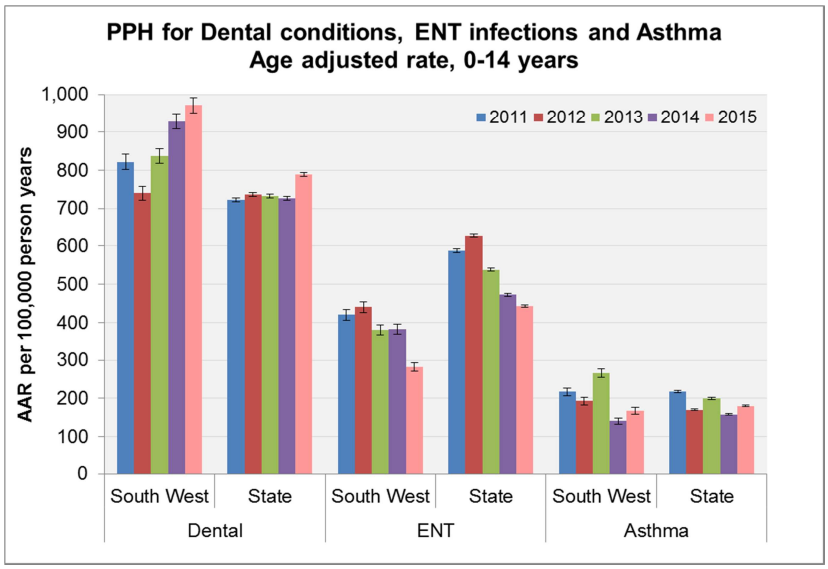


Source: DoH, Health Tracks[vi] *(The error bars represent the 95% confidence interval of the rate).*

The leading causes of PPH for 2011-2015 for children aged 0-14 years in the South West were dental conditions (acute), ENT infections (acute), convulsions and epilepsy (acute) and asthma (chronic). The PPH rate for dental conditions increased significantly between 2011 and 2015 and was at its highest in 2015. The State rate remained steady from 2011 – 2014 but had a significant increase in 2015. However, the PPH rate for ENT decreased in the South West over the five year period and remained significantly lower than the state which followed a similar declining trend throughout the five-year period.[vi]

The PPH rate for asthma fluctuated between 2011-2015, peaking in 2013 before declining in 2014 and slightly increasing in 2015. The State rate also fluctuated between 2011 and 2015.

Figure 10: South West vs State Dental Conditions, ENT Infection and Asthma 0-14 years 2011-2015



Source: DoH Health Tracks[Error! Bookmark not defined.] *Note: The error bars represent the 95% confidence interval of the rate.*

The PPH rate for dental conditions was significantly higher (1.2 times) than the State PPH rate in children of this age group, accounting for 43 per cent of all PPH. The PPH rate for ENT infections was significantly lower than the State rate and accounted for 19 per cent of all PPH. Most PPH for ENT infections in children were in very young children aged 0-4 years. [vi]

Data from a national survey in 2012-13, focussing on Aboriginal populations show that hearing problems and ear diseases, caused by chronic otitis media (middle ear infection) in childhood, is considerably higher among Aboriginal children aged 0-14 years (7%) than non-Aboriginal children (3.6%). This is of key concern as hearing loss resultant from otitis media has significant consequences for child language, social development and education.[xxiv]

Throughout the five-year period 2011-2015, the rate of hospitalisations for disease of the ear and mastoid process for children aged 0-14 years in the South West (824 per 100,000 person years) was similar with the State (796 per 100,000 person years in 2014). [vi]

The PPH for children aged 0-14 years in the South West are shown in Table 8.

Table 8: South West leading PPH 0-14 years 2011-2015

PPH Condition	Number of PPH	% all child PPH	SRR
dental conditions (acute)	1,525	43%	**1.2**
ENT infections (acute)	674	19%	**0.7**
convulsions and epilepsy (acute)	388	11%	**1.1**
asthma (chronic)	345	10%	**1.1**
urinary tract infections, including pyelonephritis (acute)	298	8%	**1.1**
cellulitis (acute)	124	3%	**0.5**
diabetes complications (chronic)	90	3%	**1.0**
pneumonia and influenza (vaccine-preventable) (vaccine)	32	1%	**0.4**
gangrene (acute)	17	0%	**1.6**
pneumonia (not vaccine-preventable) (acute)	15	0%	**1.1**
All Potentially Preventable Hospitalisations (PPH) (0-14 years)	**3,564**	**100%**	**1.0**

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.

Source: DoH, Health Tracks[vi]

Injuries, 0-14 years

For the period 2011-2015, injury and poisoning hospitalisations in children aged 0-14 years in the South West accounted for 2,947 hospitalisations (11% of all hospitalisations in children). The hospitalisation rate of all injury and poisoning for South West children (1,674 per 100,000 person years) was similar to the State rate (1,664 per 100,000 person years).[vi]

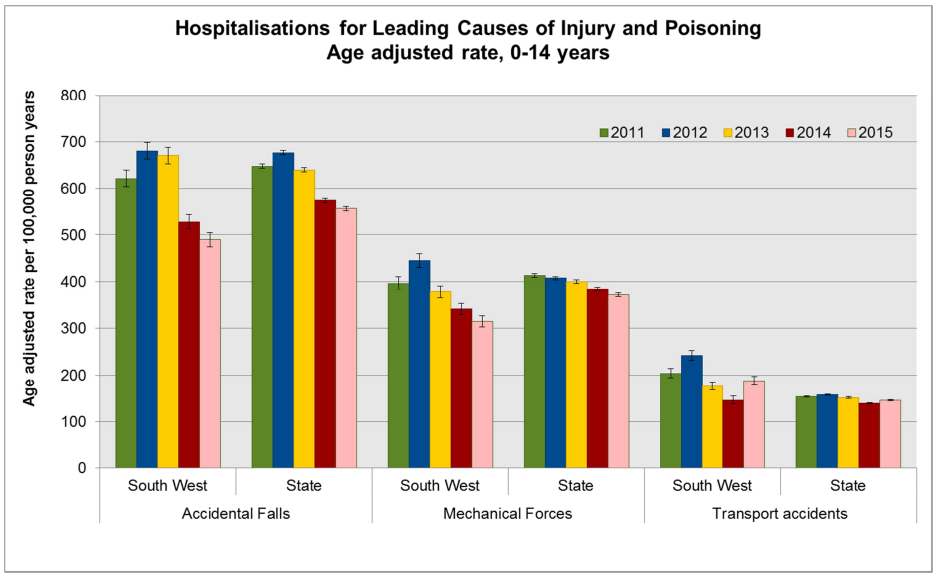
The leading causes of injury and poisoning hospitalisations for children aged 0-14 years in the South West were accidental falls, exposure to mechanical forces and transport accidents. The hospitalisation rate for transport accidents was significantly higher (1.3 times) than the State rate.[vi]

The rate of hospitalisations for accidental falls in children in the South West increased significantly from 2011 to 2012 before decreasing significantly in 2014 and 2015. The State rate followed a similar trend; however the change was less significant.[vi]

Injury due to exposure to mechanical forces in children in the South West were mainly due to being hit struck or crushed by an object, cutting/piercing objects and accidents caused by other person(s). The hospitalisation rate due to mechanical forces peaked in 2012 before a downward trend from 2013 to 2015 to significantly lower levels than the State rate.[vi]

Pedal cyclist and motor vehicle/motorcycle occupants injured in a transport accident were the main causes of transport accident hospitalisations in South West children. The transport accident hospitalisation rate was significantly higher than the State rate. The rate for all transport accidents fluctuated between 2011 and 2015, peaking in 2012 while the State rate remained steady.[vi]

Figure 11: South West vs. State hospitalisations for leading causes of injury and poisoning 0-14 years 2011-2015



Source: DoH, Health Tracks[vi] *(The error bars represent the 95% confidence interval of the proportion)*

Notifiable Infections, 0-14 years

Death and illness resulting from communicable diseases are a major public health problem. Effective containment of many communicable diseases has occurred due to public health legislation requiring reporting of these diseases. 'Notifiable' diseases includes a range of vaccine preventable diseases, vector borne diseases, food and water borne diseases, sexually transmitted infections and infections such as Severe Acute Respiratory Syndrome (SARS).

Under the provisions of the *Public Health Act 2016*[xxv], any medical practitioner or nurse practitioner attending a patient known or suspected to have a notifiable communicable disease

has a legal obligation to report the diagnosis to the Department of Health. The *Act* states that notifications must also be made in the case of post mortem examination and by Pathologists who identify a patient may have a notifiable condition. A complete list of the current notifiable diseases can be accessed via the WA Department of Health.[xxvi]

For the period 2011-2015, there were 1,697 notifiable diseases in children aged 0-14 years in the South West. The notification rate of notifiable diseases (964 per 100,000 persons) was significantly higher, 1.1 times the State rate.

The leading disease notification type was vaccine preventable. The notification rate (665 per 100,000) (mainly pertussis, influenza, varicella) was significantly higher, 1.2 times than the State rate for children, while the pertussis notification rate was 2.3 times the State rate.

The enteric disease notification rate (269 per 100,000) (mainly campylobacteriosis, salmonellosis, rotavirus and cryptosporidiosis) was similar to the State rate for children. Sixty per cent of the enteric disease notifications were in the 0-4 year old age group, and the notification rate for this age group was also similar to the State rate. [vi]

Table 9: South West disease notifications 0-14 years 2011-2015

Condition	Number	SRR	AAR*
vaccine preventable diseases	1,168	**1.2**	665.0
enteric diseases	477	**1.0**	269.2
vector-borne diseases	34	**1.1**	19.4
All notifications (including others)	**1,697**	**1.1**	**963.9**

Source: DoH, Health Tracks[vi] *(* Age-adjusted rate per 100,000 persons*

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.

For younger children aged 0-4 years in the South West, the notifiable disease rate was highest for pertussis/whooping cough (vaccine preventable). The rate was significantly higher, 1.8 times the State rate. The next leading notifiable disease in the 0-4 year old age group was campylobacteriosis (enteric disease) and the rate was also significantly higher, 1.4 times the State rate.**Error! Bookmark not defined.**

Implications for health service planning:

The leading causes of PPH for children in the South West, were acute dental conditions and acute ENT infections. As potentially preventable conditions can be greatly influenced by public health measures this suggests a need for increased preventative programs as well as maintenance programs and primary health care services.

For the period 2011-2015, the notification rate of notifiable diseases was significantly higher than the State rate and the leading disease notification type was vaccine preventable. This highlights the importance of Public Health measures such as better immunisation coverage within the region.

Health of Adults

Self-reported risk factors, 16 years and over

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

Results from the HWSS 2013-2016 for adults aged 16 years and over for the South West population are shown in Table 10. In summary:

- one in eight adults (13%) smoked;
- nearly half (48%) of adults did not eat the recommended daily serves of fruit;
- most adults (87%) did not eat the recommended daily serves of vegetables;
- nearly a third (31%) drank alcohol at risk for long-term harm;
- one in eight (12%) drank alcohol at risk for short-term harm;
- over a third (36%) of adults did not do sufficient physical activity;
- one in five (19%) adults reported high blood pressure, significantly higher than the State;
- one third (33%) of adults reported height and weight measurements that classified them as obese, significantly higher than the State.

While most risk factors showed no significant difference in the prevalence of South West residents compared with the State, the prevalence is still important because these behaviours are modifiable risk factors for chronic conditions.

Lifestyle risk factor information is not readily available for Aboriginal South West residents. For State Aboriginal people, 39 per cent were obese and 67 per cent were overweight or obese (BMI 25 or higher) in 2012-13. In 2014-15, 38 per cent of State Aboriginal people aged 18 years and over reported high or very high levels of psychological stress which is significantly more than the State prevalence of 7.6 per cent.[xxvii]

Table 10: South West vs. State lifestyle and psycho-social risk factors for persons aged 16 years and over by gender 2013-2016

Indicator	South West Prevalence			Population Estimate	WA Prevalence Estimate			Comparison to WA		
	Female	Male	Persons		Female	Male	Persons	Female	Male	Persons
Health risk factors										
Currently smokes	10.9	14.3	12.6	17,335	9.8	14.6	12.2	-	-	-
Does not eat two or more serves of fruit daily	42.5	52.6	47.6	65,250	45.3	52.7	49	-	-	-
Does not eat five or more serves of vegetables daily	85.1	89	87.1	119,405	87.3	90.8	89.1	-	-	-
Drinks at high risk levels for long-term harm (1)	19.9	40.7	30.5	41,743	17.9	38.6	28.3	-	-	-
Drinks at high risk levels for short-term harm (2)	6.8	16.4	11.7	16,021	5.4	16.5	11	-	-	-
Completes less than 150 minutes of moderate physical activity per week (adults 18 years and over)	40.2	32.1	36.1	49,453	40.6	32.2	36.4	-	-	-
Current high blood pressure	18.4	18.5	18.5	25,292	15.6	16.6	16.1	Higher	-	Higher
Current high cholesterol	18	20.6	19.3	26,465	16.9	18.9	17.9	-	-	-
Overweight (3)	33.2	44.9	39.2	53,775	32.6	44.7	38.8	-	-	-
Obese (3)	32.4	33.4	32.9	45,128	27.4	28.2	27.8	Higher	Higher	Higher
High or very high psychological distress	8.1	7	7.6	10,364	9.4	7	8.2	-	-	-
Lack of control over life in general (4)	4.6	3.5	4.1	5,576	5.4	4.2	4.8	-	-	-

Notes: Results significantly better than the State are highlighted green, significantly worse are highlighted red. Where result could be interpreted as either better or worse, or results similar to the State have not been highlighted. Population estimate refers to the estimated number of people with the risk factor/ condition. It is derived by multiplying the Estimated Resident Population by the persons prevalence estimate.

1. Drinks more than 2 standard drinks on any one day. 2. Drinks more than 4 standard drinks on any one day. 3. Height and weight measurements have been adjusted for errors in self-report. 4. Often or always feels a lack of control over life in general.

Source: WA Health and Wellbeing Surveillance System, Epidemiology Branch, DoHvi

Self-reported chronic conditions, 16 years and over

Hospital data only captures chronic conditions hospitalisations and cannot provide a complete picture of the prevalence of chronic conditions in the community. This type of information is more appropriately collected by population based surveys, such as the WA HWSS or Bettering the Evaluation and Care of Health (BEACH) surveys, which provide a more complete picture of prevalence of chronic conditions.

The HWSS survey 2013-2016 for self-reported, doctor diagnosed chronic conditions for South West adults found:

- one in four adults (24%) reported an injury requiring treatment from a medical professional in the previous year;
- nearly one in four adults (23%) reported arthritis, significantly higher than the State (20%);
- one in seven adults (14%) reported a current mental health problem;
- one in twelve adults (8%) had asthma;
- one in fourteen (7%) had diabetes;
- one in sixteen (6%) had osteoporosis, which was significantly higher than the State (5%).

As the HWSS may not be representative of the Aboriginal population, national levels of chronic disease among the Aboriginal population must be factored into estimates of chronic disease in the South West region; given that three per cent of the population is Aboriginal. Nationally, Aboriginal people report a higher prevalence of most chronic conditions compared with non-Aboriginal people.[xxiv]

Table 11: South West vs. State self-reported doctor diagnosed health conditions for persons aged 16 years and over by gender 2013-2016

Indicator	South West Prevalence			Population Estimate	WA Prevalence Estimate			Comparison to WA		
	Female	Male	Persons		Female	Male	Persons	Female	Male	Persons
Doctor diagnosed health conditions										
Diabetes	6.8	6.6	6.7	9,166	5.9	6.4	6.2	-	-	-
Heart disease	5	7.8	6.5	8,847	4.5	7	5.8	-	-	-
Cancer (1)	7.5	5.2	6.3	8,617	6	4.9	5.5	-	-	-
Current asthma	8.9	6.5	7.7	10,549	9.8	6.9	8.4	-	-	-
Current respiratory problem (2)	2.3	2.8	2.6	3,508	1.9	2.2	2	-	-	-
Stroke	1.6	2.5	2.1	2,820	1.5	1.9	1.7	-	-	-
Arthritis	26.1	18.9	22.5	30,783	23	16.1	19.5	Higher	-	Higher
Osteoporosis	8.2	3.5	5.8	7,960	7.2	2.4	4.8	-	-	Higher
Injury (3)	20.3	26.9	23.6	32,403	19.7	25.8	22.8	-	-	-
Current mental health problem (4)	17.3	11.1	14.1	19,384	18.1	11.1	14.6	-	-	-

Notes: Results significantly better than the State are highlighted green, significantly worse are highlighted red. Where result could be interpreted as either better or worse, or results similar to the State have not been highlighted. Population estimate refers to the estimated number of people with the risk factor/ condition. It is derived by multiplying the Estimated Resident Population by the persons prevalence estimate.
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.
Source: WA Health and Wellbeing Surveillance System, Epidemiology Branch, DoH[xxviii].

Self-reported service utilisation, 16 years and over

For the period 2013-2016, South West adult residents aged 16 years and over, reported that in the previous year:

- most adults (88%) have used a primary health care service;
- half of adults (52%) have used a dental health care service;
- over half of adults (54%) have used an allied health care service;
- nearly a third (29%) have used a hospital based health care service;
- one in nine (11%) have used an alternative health care service; and
- South West health service utilisation was similar to the State.

Table 12: South West vs. State self-reported health service utilisation for persons aged 16 years and over by gender 2013-2016

Indicator	South West Prevalence			Population Estimate	WA Prevalence Estimate			Comparison to WA		
	Female	Male	Persons		Female	Male	Persons	Female	Male	Persons
Health service utilisation in the past 12 months										
Used a primary health care service (1)	91.1	85.6	88.3	121,023	92	86.3	89.1	-	-	-
Used a dental health care service	56.2	48.4	52.2	71,610	59.9	49.9	54.9	-	-	-
Used a mental health care service (2)	8.2	7.7	7.9	10,854	9.1	6.1	7.6	-	-	-
Used an allied health care service (3)	59	48.4	53.6	73,486	56	46.6	51.3	-	-	-
Used a hospital health care service (4)	27.4	29.8	28.6	39,196	27.9	25.2	26.5	-	-	-
Used an alternative health care service (5)	13.6	8	10.8	14,760	11.9	7.3	9.6	-	-	-
Mean number of health service visits in the past 12 months (of those who attended the service)										
Mean visits to primary health care service (1)	4.8	3.9	4.3		4.9	3.7	4.3	-	-	-
Mean visits to dental health care service	1.1	0.9	1		1.2	0.9	1	-	-	-
Mean visits to mental health care service (2)	0.5	0.4	0.5		0.7	0.4	0.6	-	-	-
Mean visits to allied health care service (3)	3.3	2.3	2.8		3.6	2.4	3	-	-	-
Mean visits to hospital based health care service (4)	0.5	0.5	0.5		0.6	0.5	0.6	-	-	-
Mean visits to alternative health care service (5)	0.6	0.4	0.5		0.6	0.4	0.5	-	-	-

Note: Results significantly better than the State are highlighted green, significantly worse are highlighted red. Where result could be interpreted as either better or worse, or results similar to the State have not been highlighted. Population estimate refers to the estimated number of people with the risk factor/ condition. It is derived by multiplying the Estimated Resident Population by the persons prevalence estimate.
1. e.g. medical specialist, general practitioner, community health centre, community or district nurses.
2. e.g. psychiatrist, psychologist or counsellor.
3. e.g. optician, physiotherapist, chiropractor, podiatrist, dietician, nutritionist, occupational therapist, diabetes/other health educator.
4. e.g. overnight stay, emergency department or outpatients.
5. e.g. acupuncturist, naturopath, homeopath or any other alternative health service.
Source: WA Health and Wellbeing Surveillance System, Epidemiology Branch, DoH[xxviii].

Implications for primary health service planning:

Primary health services are particularly important as they provide an opportunity to monitor modifiable risk factors and chronic conditions, and to implement public health programs and interventions, such as vaccinations. A high prevalence of a condition, but a low health service utilisation for that condition may suggest either a lack of access to services, or optimal control of the condition. Therefore, the reporting of actual numbers, as well as rates of conditions and service provision, could be a better representation of chronic condition management.

A continued focus on ambulatory and primary health care in partnership with local government, other private and not-for-profit health providers is one means to improve chronic disease management is recommended

Hospitalisations, 15-64 years

For the period 2011-2015, the overall hospitalisation rate of South West residents aged 15-64 years was similar to the State rate.

Table 13: South West resident's hospitalisations adults 15-64 years by gender 2011-2015

	Number	SRR	AAR*
South West			
Males	80,374	**1.0**	27,465
Females	107,963	**1.0**	38,497
Persons	**188,337**	**1.0**	**32,988**

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.
Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.
Source: DoH, Health Tracks ***Error! Bookmark not defined.***

For the period 2006-2015, the overall hospitalisation rate of Aboriginal South West residents aged 15-64 years was significantly lower than the Aboriginal State. However, this rate was significantly higher (2.2 times) than the non-Aboriginal South West rate, highlighting the disparity between the Aboriginal and non-Aboriginal residents in the region. The rate for non-Aboriginal South West residents aged 15-64 years was significantly higher (1.1 times) than the non-Aboriginal State rate.

Table 14: South West hospitalisations Aboriginal and non-Aboriginal residents 15-64 years 2006-2015

	Number	SRR	AAR*
South West			
Aboriginal	14,562	**0.6**	68,968
Non-Aboriginal	331,076	**1.1**	31,474

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.

Source: DoH, Health Tracks[vi]

For the period 2006-2015 the leading cause of hospitalisation by major diagnosis category for 15-64 year old South West residents was digestive diseases. This accounted for 13 per cent of hospitalisations in this age group, followed by pregnancy and childbirth (9%) and musculo-skeletal diseases (9%).

Table 15: South West leading cause of hospitalisation 15-64 years 2011-2015

Rank	Cause of Hospitalisation	Number	% of all hospitalisations (15-64yrs)	State Rank
1	Digestive diseases	24,726	13%	1
2	Pregnancy and childbirth	17,843	9%	2
3	Musculo-skeletal diseases	17,003	9%	4
4	Ill-defined conditions	14,020	7%	3
5	Injury and Poisoning	13,474	7%	5
	All hospitalisations (15-64yrs)	**188,337**	**100%**	

Note: The list of leading causes exclude 'Factors influencing health status and contact with health services' and 'attending health services for examination and investigation', reproduction, specific procedures, and other circumstances, and potential health hazards related to communicable diseases, socioeconomic and psychosocial circumstances, family and personal history. This also exclude renal dialysis. These are included in the total.

Source: DoH, Health Tracks[vi]

For the period 2011-2015 South West residents aged 15-64 years had 14,313 separations for dialysis (4% of total). For adults aged 15-64 years, across the State renal dialysis accounted for 343,744 separations, while 7% of total 'Other' leading reasons for South West hospitalisations by minor category were chemotherapy (3%), delivery (3%), arthropathies (3%) and symptoms involving the digestive system and abdomen (2%).**Error! Bookmark not defined.**

The leading cause of hospitalisation by minor diagnosis category for Aboriginal residents aged 15-64 years was also dialysis, which accounted for 28 per cent of hospitalisations in this age group (2006-2015). This was followed by alcohol and drug disorders (3%), delivery (3%), symptoms involving the circulatory and respiratory systems (2%) and ischaemic heart disease (2%).[vi]

For non-Aboriginal residents, the leading cause of hospitalisation by minor diagnosis category was chemotherapy (4%), followed by dialysis (3%), delivery (3%) arthropathies (3%) and symptoms involving the digestive system and abdomen (2%). The non-Aboriginal residents' leading causes were similar to the overall South West residents aged 15-64 years. The period stated for Aboriginal people is longer to provide more accurate and confidential data. [vi]

Alcohol and tobacco related hospitalisations, 15-64 years

For the period 2011-2015, the alcohol-related hospitalisation rate was 826 per 100,000 person years for South West adults aged 15-64 years. This was similar with the State rate. The tobacco-related hospitalisation rate (518 per 100,000 person years) was also similar to the State rate. [vi]

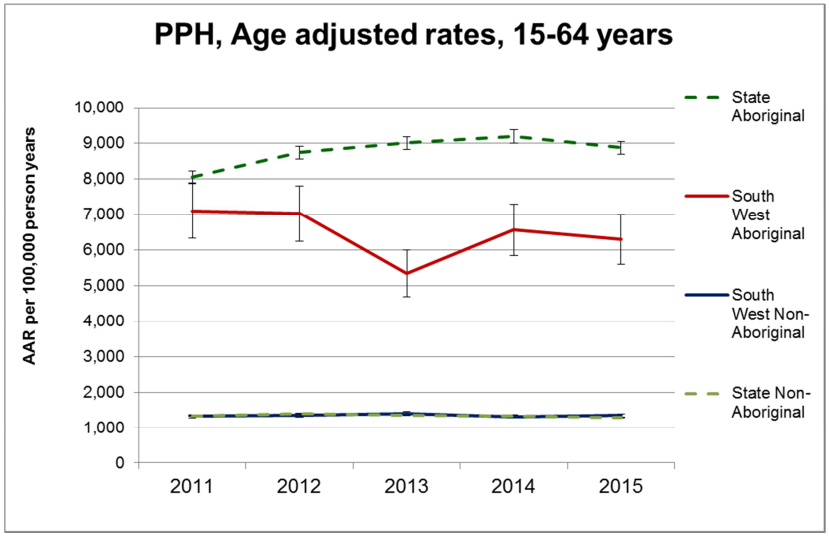
For the period 2011-2015, South West Aboriginal residents had significantly lower rates for both alcohol (0.7 times) and tobacco (0.8 times) than State Aboriginal residents. Although South West Aboriginal residents had lower rates compared to the State, they had significantly higher rates than non-Aboriginal residents for both alcohol and tobacco hospitalisations in this age group (alcohol 4.5 times and tobacco 3.4 times). South West non-Aboriginal residents had significantly higher rate for tobacco-related hospitalisations (1.1 times) than State non-Aboriginal residents in this age-group. [vi]

Potentially preventable hospitalisations (PPH), 15-64 years

For the period 2011-2015, PPH accounted for 8,338 hospitalisations of South West adults (4% of all hospitalisations in this age group). The overall PPH rate for adults was significantly lower for the South West region than for the State. Specifically, the rate for acute conditions was significantly lower while vaccine preventable and chronic condition rates were similar to the State rates. [vi]

The Figure 12 compares age-adjusted rates from 2011 to 2015 for the South West and State by Aboriginality. South West Aboriginal residents aged 15-64 years had a significantly higher rate than South West non-Aboriginal residents in this age group, over the whole period. However, they had a significantly lower rate than State Aboriginal residents for most of the period except in 2011, where the rate was similar. [vi]

Figure 12: South West vs State PPH by Aboriginality 15-64 years 2011-2015

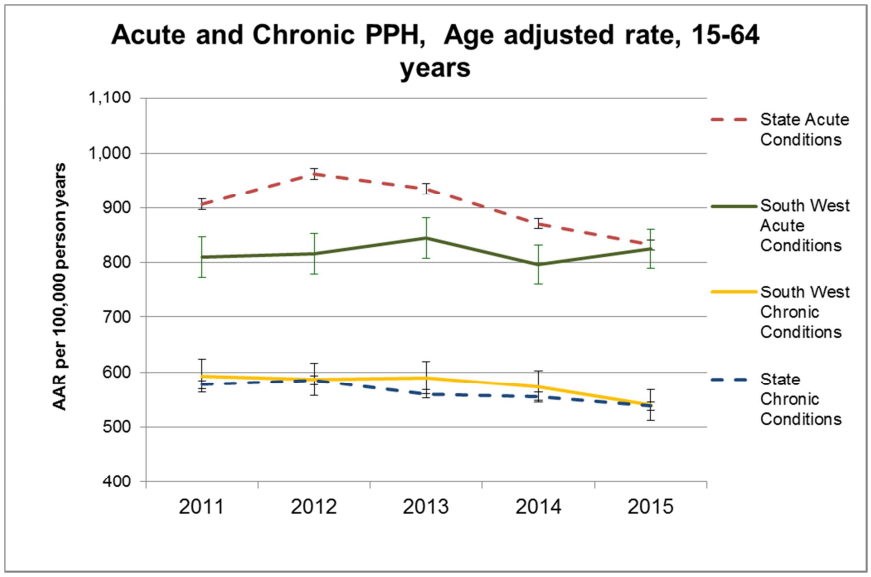


Notes: The error bars represent the 95% confidence interval of the proportion;
Source: DoH, Health Tracks [vi]

Figure 13 shows the trends in PPH rates for acute and chronic conditions for adults in the South West. The PPH rates for vaccine preventable conditions in South West adults aged 15-64 years were lower than acute and chronic conditions and during 2011-2015. The rate increased significantly during the five year period and was 2.4 times higher in 2015 compared with 2011. **Error! Bookmark not defined.**

The PPH rate for acute conditions for South West residents aged 15-64 years was significantly lower than the State rate from 2011 to 2014 and was similar to the State rate in 2015. While the PPH rate for chronic conditions was similar to the State rate throughout the 2011- 2015 period. [vi]

Figure 13: South West vs. State Acute and Chronic PPH 15-64 years 2011-2015

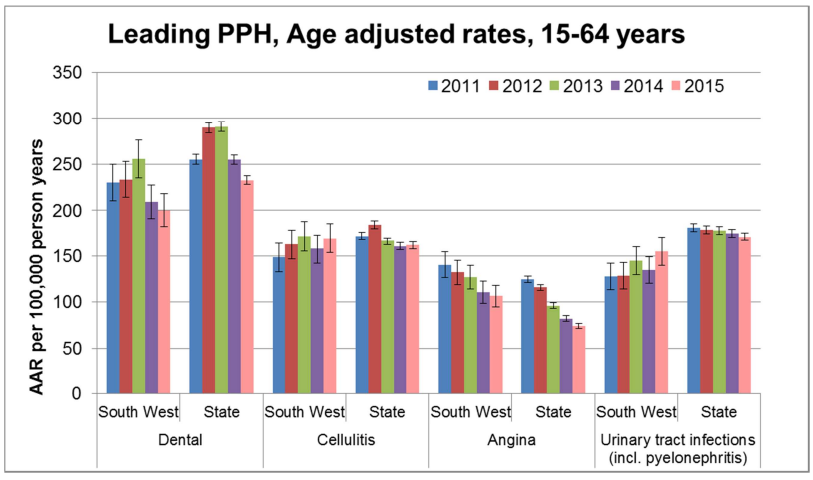


Notes: The error bars represent the 95% confidence interval of the proportion;
Source: DoH, Health Tracks[vi]

For the period 2011-2015, the overall leading PPH condition in South West residents aged 15-64 years were dental conditions, which accounted for 15 per cent of all PPH in this age group. The PPH rate for dental conditions was lower than the State rate during this period.**Error! Bookmark not defined.**

The second leading cause of PPH for South West residents aged 15-64 years was cellulitis. The PPH rate remained fairly steady between 2011 and 2015 in the South West and was similar to the State rate. The third leading cause of PPH rates for South West residents aged 15-64 years was angina. The PPH rate decreased significantly from 2011 to 2014 and then remained steady. The rate was 1.3 times higher than the State rate in 2011-2015 for this age group. The fourth leading cause of PPH, urinary tract infections including pyelonephritis, was below the State rate for the five year period.**Error! Bookmark not defined.**

Figure 14: South West vs. State Top 4 PPH 15-64 years 2011-2015



Notes: The error bars represent the 95% confidence interval of the proportion; Source: DoH, Health Tracks **Error! Bookmark not defined.**

Other leading PPH for adults aged 15-64 years in the South West are shown in Table 16**.** Rates of PPH caused by convulsions and epilepsy and chronic obstructive pulmonary disease (COPD) were significantly higher (1.1 times) than the State rates for adults aged 15-64 years.

Table 16: South West leading PPH 15-64 years 2011-2015

PPH Condition	Number	% all PPH (15-64 years)	SRR
dental conditions	1,222	15%	**0.8**
cellulitis	924	11%	**1.0**
angina	820	10%	**1.3**
urinary tract infections, including pyelonephritis	783	9%	**0.8**
iron deficiency anaemia	717	9%	**1.02**
diabetes complications	696	8%	**0.9**
convulsions and epilepsy	688	8%	**1.1**
chronic obstructive pulmonary disease	514	6%	**1.1**
ENT infections	422	5%	**0.9**
asthma	398	5%	**1.1**
gangrene	243	3%	**1.01**
congestive cardiac failure	206	2%	**0.8**
pneumonia and influenza (vaccine-preventable)	158	2%	**0.8**
pelvic inflammatory disease	115	1%	**0.8**
hypertension	89	1%	**1.01**
All PPH (15-64yrs)	**8,338**	**100%**	**0.9**

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the *state are highlighted green.*

Source: DoH, Health Tracks[vi]

Implications for health service planning:

The overall PPH rate for adults was significantly lower for the South West compared to the State. The PPH rate for South West Aboriginal residents was significantly higher that the non-Aboriginal rate. This highlights the health disparity between Aboriginal and non-Aboriginal people in the region and the need to prioritise investment in preventative programs, maintenance programs and primary health care services that engage with and support Aboriginal people to better manage and improve their health.

Notifiable Infections and Events, 15-64 years

For the period 2011-2015, communicable disease notification rates for South West region residents aged 15-64 years were significantly lower than the State rates. However enteric (1.2 times) and vector-borne diseases (1.5 times) were significantly higher than State rates.

Table 17: South West resident communicable disease notification rates 15-64 years 2011-2015

Condition	Number	SRR	AAR*
sexually transmitted diseases	2,970	**0.8**	621.0
enteric diseases	953	**1.2**	177.1
vaccine preventable diseases	1,681	**0.9**	302.1
vector-borne diseases	958	**1.5**	174.3
blood-borne diseases	448	**0.9**	86.4
All notifications (15-64yrs)	**7,052**	**0.9**	**1,367.8**

Source: DoH, Health Tracks **Error! Bookmark not defined.** *Notes: * Age-adjusted rate per 100,000 persons*

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

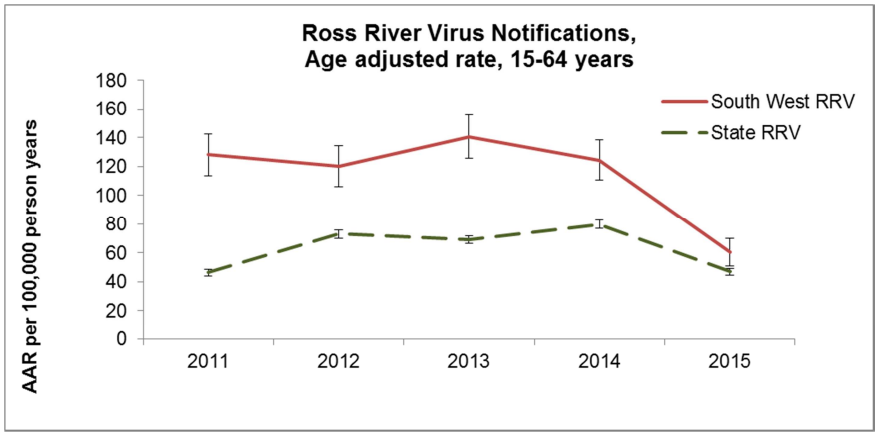
Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.

Vector-borne diseases, 15-64 years

There were 958 vector-borne notifications for the period 2011-2015 in South West residents aged 15-64 years, mostly notifications of Ross River Virus (RRV) (66% of all notifications for vector borne diseases in this age group; 114 per 100,000 persons). The RRV rate was significantly higher (1.8 times) than the State rate for this age group. The age group most affected by vector-borne diseases and RRV was the 45-64 year olds. **Error! Bookmark not defined.**

The notification rate for RRV fluctuated between 2011 and 2015 for both the South West and the State. There was a significant decrease in 2014 and 2015 for the South West and the rate was similar to the State rate in 2015. [vi]

Figure 15 South West Ross River Virus notifications residents aged 15-64 years 2011-2015

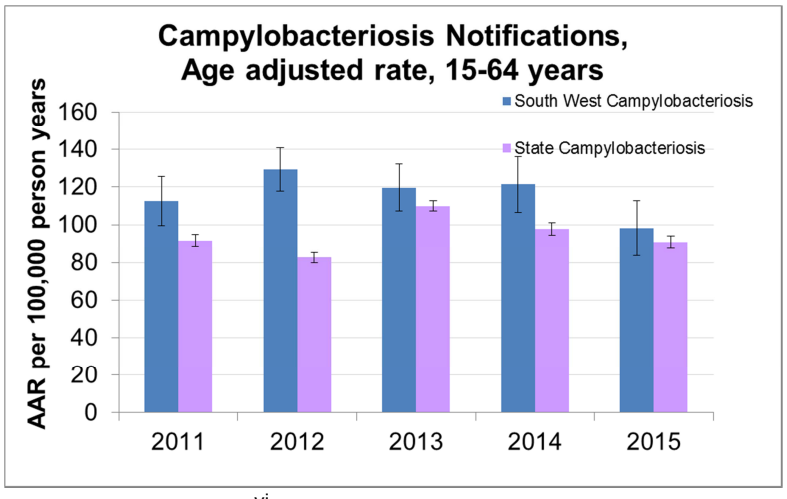


Source: DoH, Health Tracks[vi] *(Notes: The error bars represent the 95% confidence interval of the proportion)*

Enteric diseases, 15-64 years

There were 953 enteric notifications for the period 2011-2015 in South West residents aged 15-64 years, mostly notifications of campylobacteriosis (63% of all enteric notifications; 110 per 100,000 person years). The campylobacteriosis notification rate was significantly higher (1.2 times) than the State rate for this age group for this period as a whole. The notification rate in the South West 15-64 year old age group peaked in 2012 but was similar to the State rate in 2013 and 2015. [vi]

Figure 16: South West South West Campylobacteriosis notifications 15-64 years 2011-2015



Source: DoH, Health Tracks[vi] *The error bars represent the 95% confidence interval of the proportion*

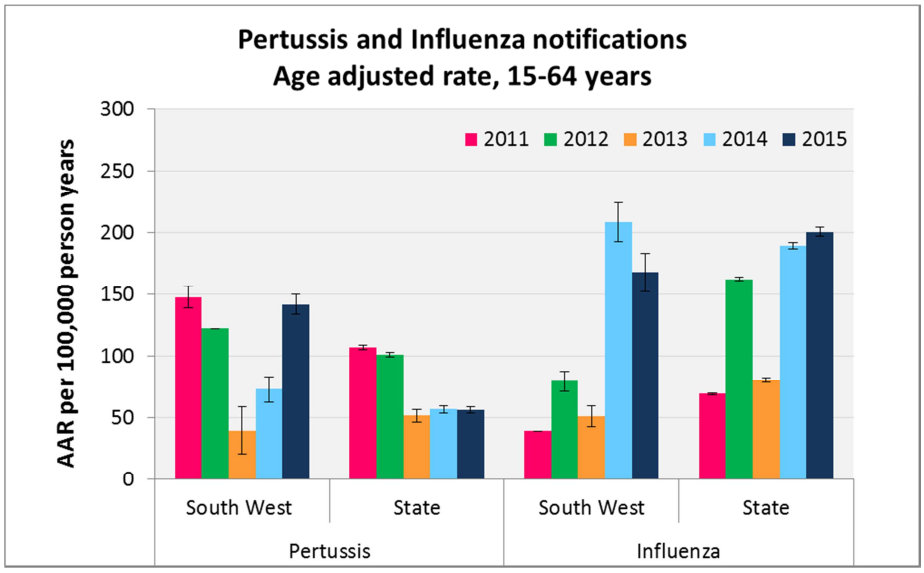
Vaccine preventable diseases, 15-64 years

There were 1,681 vaccine preventable notifications For the period 2011-2015 in South West residents aged 15-64 years, mostly for influenza (37% of all vaccine preventable; 111 per 100,000 person years) and pertussis/whooping cough (34%; 105 per 100,000 person years). The pertussis rate was significantly higher (1.4 times) than the State rate for this age group. The

age group most affected by pertussis was the 5-14 year olds. The pertussis notification rate fluctuated over 2011 -2015 bottoming out in 2013 and increasing back up to 2011 levels in 2015. The State rate decreased significantly after 2012 and remained steady in 2013-2015.[Error! Bookmark not defined.]

For influenza notifications, the rate increased significantly between 2013 and 2014 and while it decreased significantly again in 2015, the rate remained significantly higher (3 times higher) than in 2011-2013 for this age group. The State rate fluctuated significantly within the time period and was at its highest in 2015. [vi]

Figure 17: South West residents Pertussis/whooping cough and Influenza notifications 15-64 years 2011 to 2015

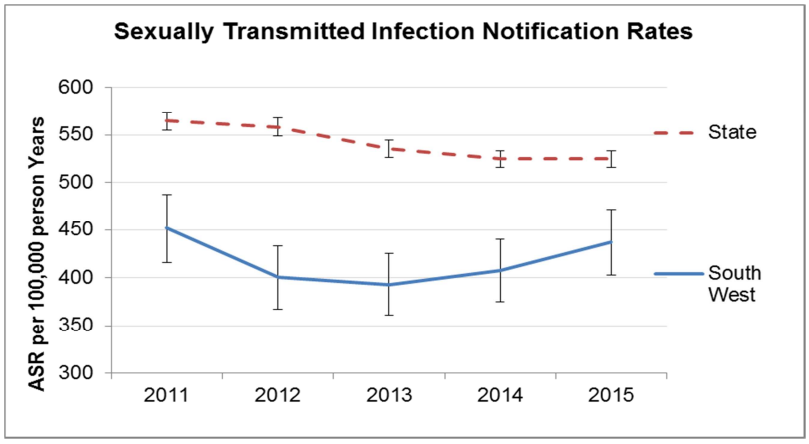


Notes: The error bars represent the 95% confidence interval of the proportion;
Source: DoH, Health Tracks[vi]

Sexually Transmitted Infections, all ages

Notifiable STIs information for South West residents is represented in Figure 18, Figure 19 and Table 18 Information for this section presents all age groups combined as per the data source.

Figure 18: South West vs. State sexually transmitted notification rates 2011-2015



Notes: The error bars represent the 95% confidence interval of the proportion; Source: DoH, Health Tracks[vi]

The rate of sexually transmitted infections (STI) was lower among South West residents compared with the State between 2011 and 2015. The trend for STIs in the South West was fairly steady throughout the five year period with no significant change. The State rate remained steady until 2013 and decreased significantly in 2014 and remained the same in 2015. [vi & xxix]

At the State level, there are noticeable differences in the rate of some notifiable diseases in the Aboriginal compared with non-Aboriginal populations. Table 18 demonstrates the South West STI and Blood-borne virus notification rates. [vi]

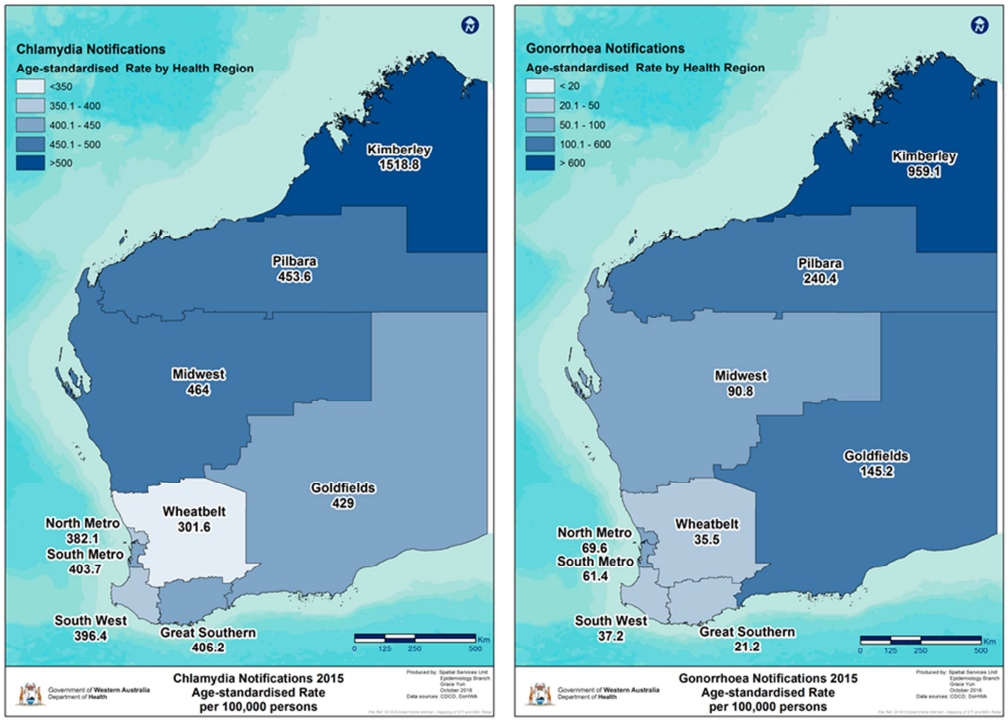
Table 18: South West notifiable disease by Aboriginality 2006-2015

	Aboriginal		Non-Aboriginal	
	No.	ASR	No.	ASR
Sexually Transmitted Infections (STI)				
Chlamydia	213	410.8	3,019	230.6
Gonorrhea	34	68.1	211	15.6
Blood Borne Virus (BBV)				
Hepatitis B	5	N/A	139	9.9
Hepatitis C	90	253.6	628	43.5

Notes: includes newly acquired and unspecified.*
ASR = Age-standardised notification rate per 100,000 population.
Source: DoH Health Tracks[vi]

Chlamydia is the first and gonorrhoea is the second most commonly notified STI in WA. There was no significant change in the chlamydia notification rate for the South West region between 2011 and 2015. During this time period, the State notification rate for chlamydia decreased significantly. Gonorrhoea notification rate increased significantly in the five year period for South West residents. The Hepatitis B and C notification rates for South West have remained steady between 2011 and 2015. [vi]

Figure 19: WA Health Service Provider Notification Rate of Chlamydia and Gonorrhoea 2015



Source: The Epidemiology of Notifiable Sexually Transmitted Infections and Blood-Borne Viruses in Western Australia 2015[xxx].

Implications for health service planning:

When planning health promotion programs and screening opportunities aimed at reducing notifiable diseases, and particularly STIs, the number of diseases and trends need to be considered. Notification rates for STIs are higher in the younger population and Aboriginal people. Opportunistic screening may help to reduce the spread of notifiable diseases.

Health regions could consider the recommendations and five key strategies of the "Third National Transmissible Infections Strategy 2014-2017" when planning targeted programs for this population[xxix].

The Environmental Health Directorate's management of mosquito control across WA was recognised at the Mosquito Control Association of Australia Conference 2014, coordinated with local government programs getting significant assistance and support from the WA Department of Health and Research Institutions. WA is seen as taking a lead role in the management of mosquitoes and mosquito borne disease.

http://www.public.health.wa.gov.au/cproot/6278/2/Environmental%20Health%20Yearbook%202014-15.pdf

Cancer Incidence, 15-64 years

Cancer is a leading cause of disease burden and contributed to one in five cases of the total disease burden in Australia in 2011. Many cancers have high survival rates, yet 94 per cent of cancer burden was due to premature death. People living in very remote and remote areas across Australia have the highest cancer death rates. The five most commonly diagnosed cancers in 2017 were breast, melanoma, prostate, colorectal, and lung cancers. [xxxi & xxxi]

Table 19 shows a summary of the leading cancer incidence in the South West. The melanoma (skin) cancer rate in the South West was significantly higher (1.4 times) than the State rate for the period 2011-2015. [vi]

Table 19: South West Cancer incidence 15-64 years 2011-2015

Rank	Condition	N	% all cases (15-64yrs)	SRR
1	breast	383	18%	1.1
2	melanoma (skin)	329	16%	**1.4**
3	prostate gland	323	16%	1.1
4	colorectal	178	9%	1.0
5	lung, bronchus & trachea	98	5%	0.8
All cancer incidence (15-64 yrs)		**2,080**	**100%**	1.1

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.
Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.
Source: DoH, Health Tracks[vi]

Mental Health, 15-64 years

Youth Suicide, 15-24 years

Table 20 shows the youth suicide rates for males and females between 2006 and 2015 and that suicide was the leading cause of death in the South West 15-24 year olds causing 19 deaths in 2011-2015 in the region (1.4 times the State rate). The suicide rate for males aged 15-24 years in the South West region was 22.3 per 100,000 persons and for females it was 6.6 per 100,000 persons.[vi]

Table 20: South West youth suicide rates by gender 15-24 years 2006-2015

Youth suicides (per 100,000 persons)* 2006-2015	South West Health Region	Metro	State
Males (15-24 years)	22.3	15.1	19.6
Females (15-24 years)	6.6	6.4	7.7

** These rates have been age-standardised to the Australian 2001 population.*

Source: DoH, Health Tracks[vi]

Mental Health, 16 years and over

For the period 2013-2016, HWSS found that one in seven (14%) South West adults aged 16 years and over reported having a current diagnosed mental health problem, with the prevalence of 17 per cent among females and 11 per cent for males. However, only eight per cent reported having used a mental health care service in the last year. These figures were similar to the State. [vi]

HWSS collects information regarding psychological distress and perceived lack of control, which are both related to mental health and can have adverse effects on health. Eight per cent of South West adults reported high or very high psychological distress, while four per cent reported lack of control over their life in general. These figures were similar to the State. [vi]

Whilst this information is not available for the South West Aboriginal population, the Aboriginal population aged 15 years and over has been found reporting higher levels of psychological stress than their non-Aboriginal counterparts with 36 per cent of State Aboriginal and Torres Strait Islander people reporting high or very high psychological distress.[xxxii]

Community Mental Health Activity, 15-64 years

For the period 2011-2015, South West residents aged 15-64 years accessed community mental health services at a significantly lower rate compared with the State and they had 172,959 occasions of service. The South West Aboriginal residents aged 15-64 years accessed community mental health services 2.2 times the rate of non-Aboriginal residents. [vi]

Nearly half of the occasions of service (48%) were for the 25-44 year old age group. The leading cause for were schizophrenia schizotypal and delusional disorders and the rate was significantly lower than the State. This was followed by disorders of adult personality and behaviour (1.4 times), substance abuse disorders (1.8 times) and mental retardation (1.8 times) had higher rates than the State. [vi]

Mortality, 15-64 years

Mortality is an important indicator of the health of the population. Knowledge of the reasons for mortality can help to focus primary and community care services to prevent avoidable mortality.

Although the overall mortality rate for 15-64 year olds in the South West for the period 2011-2015 was similar to the State rate, the leading cause of mortality, which was intentional self-harm, was significantly higher (1.2 times) than the State rate for this age group. Two thirds of these deaths occurred in the 25-54 year old age group. The second leading cause was ischaemic heart disease and most of these deaths (88%) occurred in the 50-64 year old age group. [vi]

Alcohol and tobacco related mortality, 15-64 years

For the period 2011-2015, South West residents aged 15-64 years had a similar mortality rate due to alcohol consumption (23 per 100,000 persons) and tobacco consumption (21 per 100,000 persons) compared with the State rates. South West Aboriginal residents had a 3.6 times higher mortality rate for tobacco-related causes in this age group compared with their non-Aboriginal counterparts. [vi]

Avoidable Mortality, 15-64 years

Avoidable mortality is defined as deaths before the age of 75 years from conditions which are potentially avoidable given the present health system, available knowledge about social and economic policy impacts and health behaviours.

Categories are identified using underlying cause of death ICD–10 codes in the WA cause of death database as defined by the Australian Institute of Health and Welfare, National Healthcare Agreement: PI 16-Potentially avoidable deaths, 2015.[xxxiii]

The rate of avoidable deaths for 15-64 year olds in the South West region was significantly higher (1.1 times) than the State. The top five leading causes of avoidable deaths were suicide and self-inflicted injuries (1.2 times), ischaemic heart disease (similar to the State rate), transport accidents (1.8 times), accidental poisoning and breast cancer (similar to the State rates). These five conditions contributed to three in eight (37%) of all deaths in this age group.
[vi]**Error! Bookmark not defined.**

Implications for health service planning:

Suicide and self-inflicted injuries, ischaemic heart disease and transport accidents were leading causes of avoidable mortality in South West adults.

Better access to services that better support the management of mental illnesses, combined with active community engagement, can lower the suicide and self-harm rates.

Heart disease can be avoided through the use of primary and therapeutic interventions. The higher rate of transport accidents also highlights need for broad public intervention programs in partnership with other agencies.

Health Status of Older People

Vaccinations, 65 years and over

Annual flu vaccinations and five yearly pneumonia vaccinations are recommended for people aged 65 years and over and are an important primary health intervention.

Influenza vaccinations

In 2015 for South West, 58 per cent of adults aged 65 years and over received the flu vaccination since 1st of March of the previous year. The influenza vaccination rate for the State was also 58 per cent.

Pneumonia vaccinations

In 2015 for South West, 39 per cent of adults received the pneumonia vaccination within the past 5 years. The pneumonia vaccination rate for the State was 40 per cent.[xxxiv]

Hospitalisations, 65 years and over

South West residents aged 65 years and over had 122,989 hospitalisations between 2011 - 2015. The rate was significantly lower than the State rate for this age group. The leading cause of hospitalisation was renal dialysis (12 per cent in this age group) followed by eye diseases and chemotherapy. Leading causes of hospitalisations for South West residents that had higher rates than the State were arthropathies and ischaemic heart diseases. [vi]

Table 21: South West leading causes of hospitalisation 65 years and over 2011-2015

Condition	N	% all hosp. (65 years and over)	SRR
Dialysis	14,185	12%	**0.6**
Diseases of the eye & adnexa	10,608	9%	**0.9**
Chemotherapy	9,525	8%	**0.8**
Arthropathies	4,871	4%	**1.2**
Persons encountering health services for examination & investigation	3,930	3%	**1.1**
All hospitalisations (65 yrs and over)	**122,989**	**100%**	**0.9**

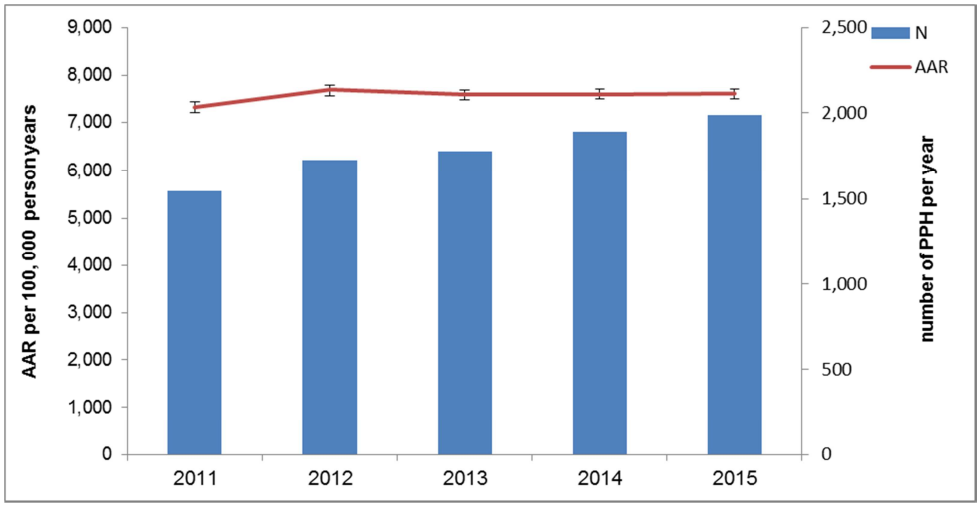
Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.
Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.
Source: DoH, Health Tracks [vi]

Potentially Preventable Hospitalisations, 65 years and over

For the period 2011-2015, PPH accounted for 8,930 hospitalisations of South West people aged 65 years and over (7% of all hospitalisations in older people). The rate of all PPH for South West residents aged 65 years and over was similar to the State rate for this age group. **Error! Bookmark not defined.**

Figure 20 shows the trend between 2011 and 2015 for PPH for South West residents aged 65 years and over. While the PPH events are steadily increasing throughout the years, the PPH rate increased in 2012 and then remained steady through the next four years.

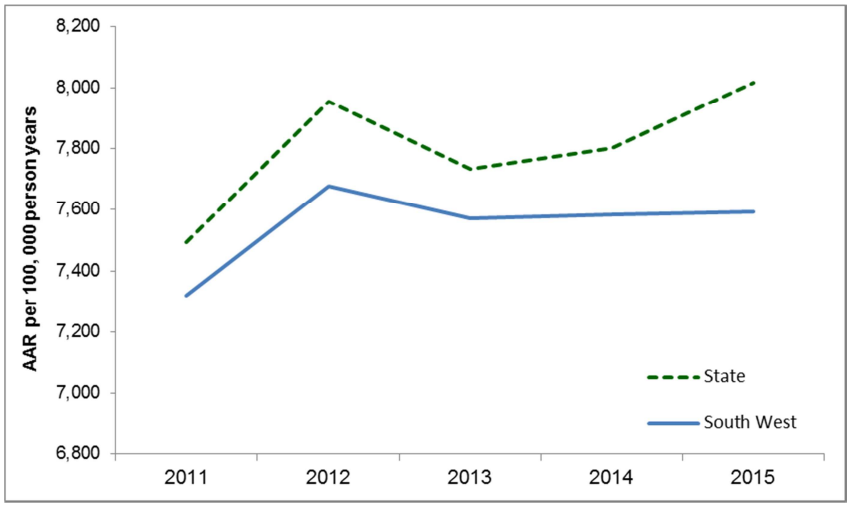
Figure 20: South West PPH 65 years and over 2011-2015



Notes: The error bars represent the 95% confidence interval of the proportion; Source: DoH, Health Tracks[vi]

Figure 21 compares age-adjusted rates of PPH from 2011 to 2015 for the South West and State.

Figure 21: South West vs. State PPH 65 years and over 2011-2015



Source: DoH, Health Tracks ***Error! Bookmark not defined.***

For the period 2011-2015 the leading PPH condition for South West people aged 65 years and over was congestive cardiac failure (CCF) as shown in Table 22. In South West residents aged 65 years and over CCF accounted for 19 per cent of all PPH. The next leading PPH condition was COPD at 18 per cent of all PPH. These rates were significantly higher than the State rates in this age group. South West residents aged 65 years and over had a significantly lower rate of PPH for urinary tract infections than the State from 2011 to 2015.**Error! Bookmark not defined.**

Table 22: South West leading PPH 65 years and over 2011-2015

Condition	PPH	% all PPH (65 years and over)	SRR
congestive cardiac failure	1,685	19%	**1.1**
chronic obstructive pulmonary disease	1,600	18%	**1.1**
angina	1,213	14%	**1.3**
urinary tract infections, including pyelonephritis	1,031	12%	**0.8**
diabetes complications	705	8%	**1.01**
All PPH (65 yrs and over)	**8,930**	**100%**	**1.0**

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.

Source: DoH, Health Tracks[vi]

Mental Health, older people

Community Mental Health Activity, 65 years and over

For the period 2011-2015 there were 17,376 occasions of service for mental health in those aged 65 years and over in the South West. The rate of mental health occasions of service for South West residents aged 65 years and over was significantly lower than the State rate.**Error! Bookmark not defined.**

Implications for health service planning:

High levels of respiratory hospitalisations in the older age groups suggest a need to ensure influenza and pneumonia vaccinations are available and promoted. Strengthening partnerships with all primary care providers, including local GPs and Aboriginal Community Controlled Health Services will assist in managing these conditions in the community.

The high rates of chronic conditions in the community may indicate increased frailty, disability and functional decline.

Disability and Carers

In the South West region, 3.9 per cent of residents had a core need for assistance in activities of daily living while 7.8 per cent provided unpaid care to a person with a disability, as shown in Table 23.

Overall, the South West has a significantly higher proportion of people needing assistance (3.9%) compared to WACHS (3.5%) however, South West residents aged 65-74 years had a significantly lower proportion (6.6%) compared to WACHS (7.5%).

In the South West, 7.8 per cent of residents provided unpaid care. This was significantly higher than WACHS (7.2%). The main age group providing the care was the 45-64 year age group followed by 65-74 year olds.[xxxv]

Table 23: South West residents with a core need for assistance, or who provide unpaid care to a person with a disability

	Have Core Need for Assistance	%	WACHS %	Provide Unpaid Care	%	WACHS %
0-14 years	541	1.6%	1.6%	-	-	-
15-44 years	884	1.5%	1.3%	4,065	7.0%	7.0%
45-64 years	1,460	3.5%	3.4%	5,938	14%	12%
65-74 years	801	6.6%	7.5%	1,308	11%	11%
Over 75 years	2,289	25%	25%	678	7.5%	7.3%
All ages	5,975	3.9%	3.5%	11,989	7.8%	7.2%

Source: ABS table builder, Census 2011[xxxv]

Where South West Residents Accessed Emergency Care

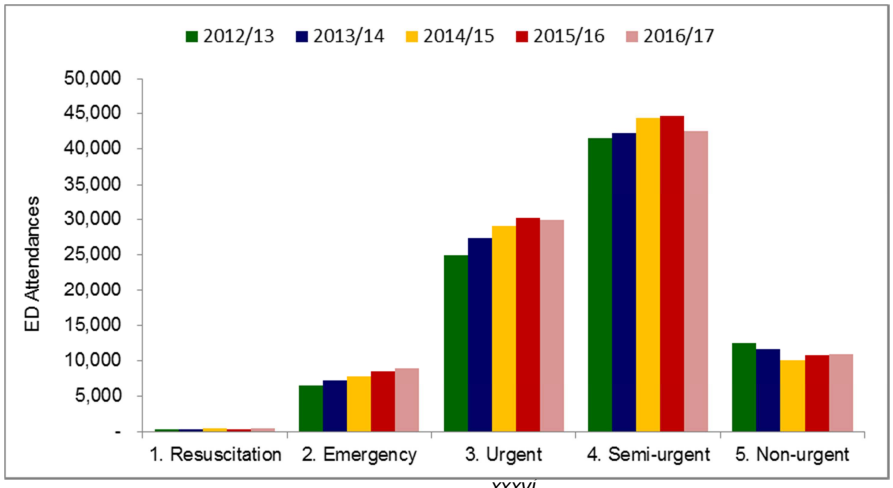
Emergency Department Attendances

South West Hospitals

In 2016/17, there were 92,887 Emergency Department (ED) attendances in South West hospitals. Of these attendances, 11 per cent were for patients who were not residents of the region. The average annual growth rate over the last five years showed an increasing trend of two per cent. [xxxvi]

In regional areas where workforce shortages and challenges can mean there are insufficient GPs, many residents use the hospital services for primary care. The ED attendances at hospitals within South West are shown by triage category in Figure 22.

Figure 22: South West hospitals, emergency attendances by triage category



Source: WACHS online ED pivot accessed 25/11/2015[xxxvi]

.

In 2016/17, the majority of attendances (58%) were classified as semi or non-urgent (triage 4 or 5), suggesting issues that could be dealt with by GPs and primary health care services. This was significantly lower than WACHS (66%).[xxxvi]

The leading causes for ED attendances to hospitals in South West for the period 2016/17 are shown in Table 24.

Table 24: South West hospitals emergency attendances by triage category 2012/13 - 2016/17

Major Diagnosis Category (MDC)	Number of ED Attendances	% of Total
Musculoskeletal system and connective tissue	13,813	15%
Injuries, poisonings and toxic effects of drugs	10,932	12%
Digestive system	10,096	11%
Skin, subcutaneous tissue and breast	8,047	9%
Ear, nose, mouth and throat	7,632	8%
Total ED Attendances	**92,887**	**100%**

Source: WACHS online ED pivot[xxxvi]

Aboriginal people were over-represented in the ED attendances, accounting for four per cent of all ED attendances in 2016/17, but only 2.6 per cent of the population in 2015.[xxxvi]

The South West Aboriginal Medical Service (SWAMS), is a Nyoongar Community Controlled Health Organisation, offers the delivery of best-practice and culturally appropriate holistic health services to the Aboriginal population of the South West region of Western Australia.

South West Residents

For the period 2011-2015, the proportion of ED attendances for triage 4 and 5 for South West residents was 61 per cent and for the State was 58 per cent. The proportion for triage 4 and triage 5 were significantly higher (1.3 and 1.6 times respectively) than the State proportions. [vi]

Implications for health service planning:

South West residents present at high rates to emergency departments compared to the metropolitan area, particularly in the semi and non-urgent attendances. This is usually an indication of a need for increased primary health services such as increased GP and population health services. The region also sees a high proportion of attendances from non-residents.

This indicates a need for the continuation of investments in primary health services as per the Southern Inland Health Initiative funded by Royalties for Regions to increase the GP Sector. Co-located and collaborative service models between GP primary care, other non-government health providers and WACHS is also strongly recommended.

Hospitalisations

For the period 2011-2015, the overall hospitalisation rate of South West residents was significantly lower than that of the State. [vi]

Table 25: South West hospitalisations residents 2011-2015

South West	Number	SRR	ASR per 100,000 persons
Males	159,829	**0.94**	36,481
Females	178,909	**1.0**	40,182
Persons	**338,738**	**0.96**	**38,164**

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.
Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.
Source: DoH, Health Tracks [vi]

For 2006-2015, in the South West the Aboriginal hospitalisation rate was significantly lower than the State Aboriginal rate. However, this rate was significantly higher (1.7 times) than the non-Aboriginal South West rate. The rate for South West non-Aboriginal residents was similar to the State non-Aboriginal rate. **Error! Bookmark not defined.**

Table 26: South West hospitalisations Aboriginals and non-Aboriginal residents 2006-2015

South West	Number	SRR	ASR per 100,000 persons
Aboriginal (2006-2015)	18,477	**0.6**	65,044
Non-Aboriginal (2011-2015)	327,473	**1.0**	37,506

Source: DoH, Health Tracks ***Error! Bookmark not defined.***

For the period 2011-2015, the leading cause of hospitalisation by major category for South West residents was 'digestive diseases' as it was for the State, accounting for 11 per cent of hospitalisations in South West residents. The second leading cause was for musculo-skeletal diseases (8%).[vi]

Table 27: South West residents leading cause of hospitalisation 2011-2015

Rank	Cause of Hospitilisation	Number	% of Total
1	Digestive diseases	38,426	11%
2	Musculo-skeletal diseases	26,689	8%
3	Ill-defined conditions	25,242	7%
4	Neoplasms	23,869	7%
5	Injury and Poisoning	22,509	7%
All Hospitilisations		**338,738**	**100%**

Note: Leading causes exclude 'Factors influencing health status' and 'contact with health services' and 'attending health services for examination and investigation', reproduction, specific procedures, and other circumstances, and potential health hazards related to communicable diseases, socioeconomic and psychosocial circumstances, family and personal history. This also includes renal dialysis.

Source: DoH, Health Tracks[vi]

Across the State for the period 2011-2015, the leading cause by minor category shows that across the State renal dialysis accounted for 658,317 separations (13% of total separations). South West residents had 28,498 separations for renal dialysis (8% of the total). Leading conditions for the South West after renal dialysis were chemotherapy (6%), eye diseases (4%), arthropathies (4%) and symptoms of digestive system and abdomen (3%)**Error! Bookmark not defined.**.

Renal dialysis was the leading cause of hospitalisation for both Aboriginal and non-Aboriginal South West residents. However, it accounted for 32 per cent of hospitalisations for Aboriginal residents and only seven per cent for non-Aboriginal residents. The period stated for Aboriginal in the South West is longer to provide more accurate data. [vi]

Alcohol and tobacco related hospitalisations

For the period 2011-2015, the hospitalisation rate for alcohol consumption was 755 per 100,000 person years for South West residents. This was similar to the State rate. The tobacco consumption hospitalisation rate was 794 per 100,000 persons which was significantly higher than the State (1.1 times).

Aboriginal South West residents had significantly lower rates than the State Aboriginal rate for alcohol-related hospitalisations. However, the South West rate was 3.6 times higher than the non-Aboriginal rate. The tobacco-related hospitalisation rate was also significantly higher than the State rate for South West non-Aboriginal residents (1.1 times). [vi]

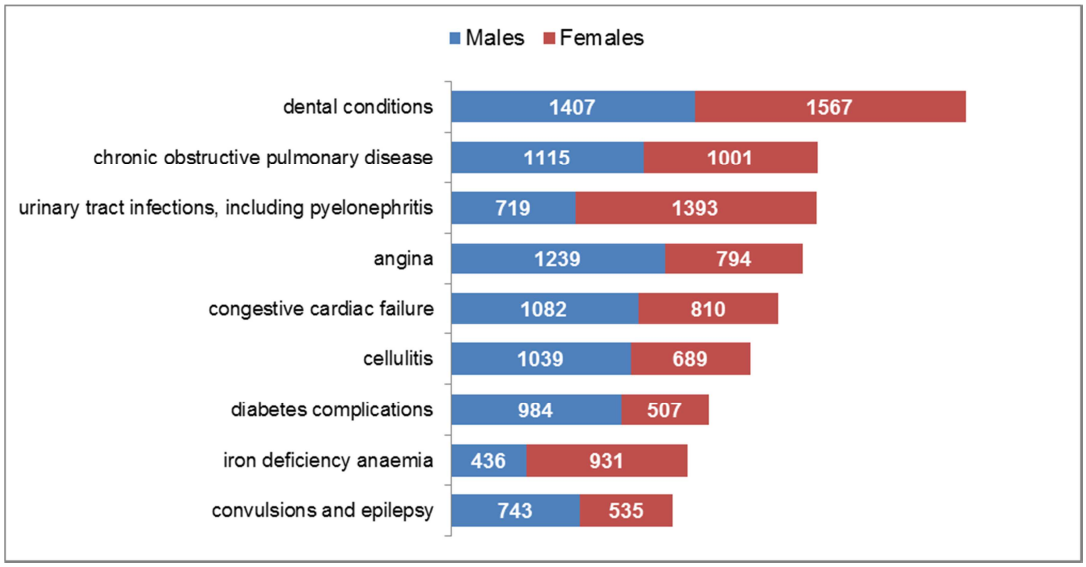
Potentially preventable hospitalisations (PPH)

Many hospitalisations result from conditions where hospitalisations could potentially be avoided using preventive care and early disease management. PPHs are grouped into three major categories as discussed in 'Health Status - Child and Adolescent' section.

For the period 2011-2015, PPH accounted for 20,831 hospitalisations of South West residents (6% of all hospitalisations). The hospitalisation rate of all PPH for South West residents was similar to that of the State, Specifically, the rates for vaccine preventable and acute conditions were significantly lower while the chronic condition rate was significantly higher (1.04 times) than the State rate.**Error! Bookmark not defined.**

The leading PPH condition for South West residents was dental conditions, which accounted for 14 per cent of PPH.

Figure 23: South West leading PPH by gender PPH 2011-2015



Source: DoH, Health Tracks[vi]

The iron deficiency anaemia PPH rate was significantly higher in females compared with males in South West residents (2 times). However, the iron deficiency PPH rate for females in the South West was similar to the State female rate. However, the PPH rates for diabetes complications, COPD, angina and epilepsy were significantly higher (1.1-1.2 times), than the State rates. [vi]

For non-Aboriginal people in the South West, four out of top ten PPH category rates were higher than the State rates with angina rate 1.3 times higher than the State. For Aboriginal people, only the PPH rate for convulsions and epilepsy (1.3 times) and angina (1.7 times) were higher than the State rate. Aboriginal rates for other leading causes were similar to or lower than the State rates.

Although South West Aboriginal people have a similar or lower rate to State Aboriginal people for majority of PPH, the rate is significantly higher (three times) than South West non-Aboriginal people.

Table 28: South West leading causes of PPH 2011-2015

Condition	Number	% all PPH	SRR
dental conditions	2,848	14%	0.9
chronic obstructive pulmonary disease	2,050	10%	1.1
urinary tract infections, including pyelonephritis	2,033	10%	0.9
angina	1,924	10%	1.3
congestive cardiac failure	1,858	9%	1.1
cellulitis	1,642	8%	1.1
diabetes complications	1,389	7%	1.0
iron deficiency anaemia	1,327	7%	0.9
ENT infections	1,105	6%	0.8
All Potentially Preventable Hospitilisations (PPH)	**19,785**	**100%**	**1.0**

Source: DoH, Health Tracks[vi]

Table 29: South West leading causes of PPH for Aboriginal residents 2011-2015

Condition	Number	% all PPH	SRR
convulsions and epilepsy	197	19%	1.3
dental conditions	126	12%	1.0
angina	109	10%	1.7
diabetes complications	102	10%	0.9
cellulitis	86	8%	0.4
urinary tract infections, including pyelonephritis	79	8%	0.6
ENT infections	72	7%	0.5
chronic obstructive pulmonary disease	66	6%	0.7
asthma	55	5%	0.7
All Potentially Preventable Hospitilisations (PPH)	**1,046**	**100%**	**1.0**

Source: DoH, Health Tracks[vi]

Where South West residents used hospital services

South West residents were hospitalised across the State. The proportion of resident hospitalisations in public hospitals that occur within the region is known as self-sufficiency. The South West public self-sufficiency was 84 per cent. The WACHS average was 77 per cent.[xxxvii]

Table 30: South West place of hospitalisation 2016/17

Place of Hospitalisation	Number	% of Total	Beddays
Augusta	227	<1%	1,312
Boyup Brook	89	<1%	455
Bridgetown	704	2%	2,367
Bunbury	19,469	49%	52,205
Busselton	5,241	13%	13,626
Collie	1,715	4%	5,798
Donnybrook	154	<1%	1,162
Harvey	258	<1%	1,479
Margaret River	1,311	3%	3,172
Nannup	32	<1%	169
Pemberton	175	<1%	626
SJOG Bunbury	9,755	24%	11,936
Warren (Manjimup)	896	2%	4,118
South West Hospitals Total	**40,026**	**84%**	**96,946**
Other WACHS	469	1%	1,094
Fiona Stanley Hospital	2,344	5%	11,819
Other Metropolitan	4,630	10%	17,623
South West Residents Total	**47,469**	**100%**	**127,482**

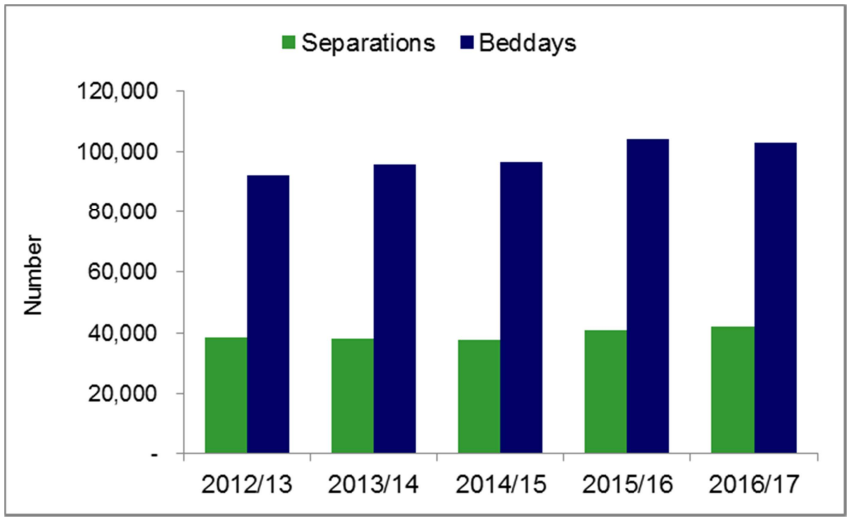
Note: Excludes unqualified neonates and boarders; Source: HMDS via Clinical Modelling Unit DoH Inpatient Pivot[xxxvii]

Hospitalisations within the region

Historic activity at hospitals within the South West region is shown in Figure 24. Between 2012/13 and 2016/17, hospital separations increased at an average of two per cent per year. Total bed days also increased over the period, by an annual average of two per cent.

The proportion of activity for non-residents of the region was around three per cent between 2012/13 to 2016/17.

Figure 24: South West hospitalisations 2012/13 - 2016/17



Note: Excludes unqualified neonates,boarders & Aged Care / NHT
Source: HCARe, webPAS & TOPAS via Data Extracts[xxxviii]

Implications for health service planning:

Aboriginal South West residents have a greater need for ED and inpatient services than non-Aboriginal residents. Culturally appropriate services and programs are necessary in partnership with the ACCHOs and other providers.

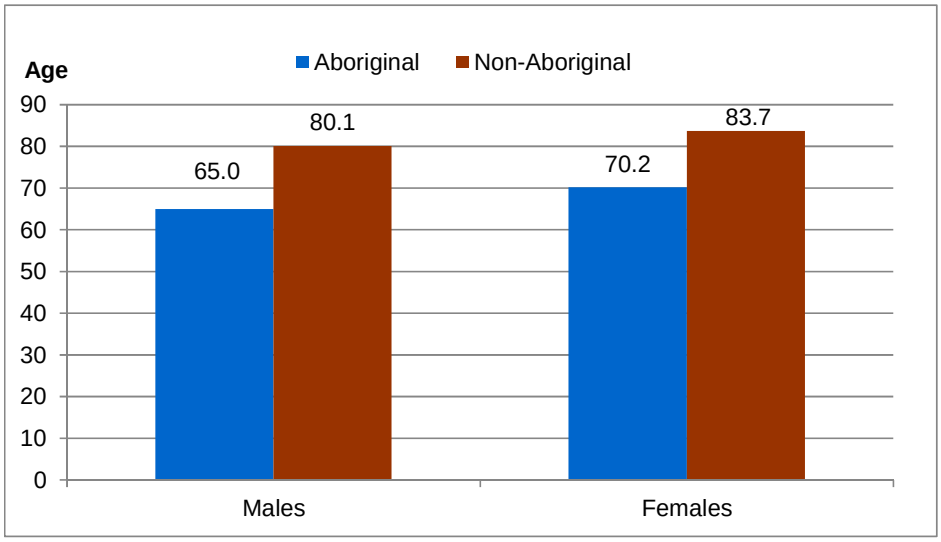
An increase in the GP sector, combined with co-located and collaborative service models between GP primary care, other non-government health providers (e.g. Silver Chain and Aboriginal organisations) and WACHS ED and population health/primary health services contribute to improved care.

Mortality

State level ABS data from 2013 to 2015 in Figure 24 shows life expectancy at birth has increased for the total population to 80.4 years for males but decreased to 84.5 years for females compared with the 2011 to 2013 figures of 80.3 years and 84.8 years respectively.[xxxix & xl]

Aboriginal people in Western Australia have a significantly lower life expectancy compared with their non-Aboriginal counterparts. The gap in 2010-2012 was estimated by ABS to be 15.1 years for males and 13.5 years for females.[xli]

Figure 25: Western Australian life expectancy at birth by Aboriginality and gender 2010-2012



Source: ABS Life Tables[xli]

Mortality rates have fallen state-wide and in Australia overall from 2005 to 2015. The Australian Aboriginal mortality rate however, remained steady during this 10-year period.[xlii]

Table 31: Australian standardised mortality rates 2005, 2014, 2015

Population	2005	2014	2015
Western Australia	5.9	5.3	5.3
Australia	6.1	5.5	5.5
Aboriginal (Australia)	10.0	9.8	9.8

Note: Deaths per 1,000 standard population. Standardised death rates use the age distribution of total persons in the Australian population at 30 June 2001 as the standard population.

Source: ABS Deaths[xlii]

When considering mortality within a region, a longer time period is required to ensure anonymity and accuracy. For the period 2011-2015, there were 5,059 deaths for South West residents. The region's mortality rate was similar to the State. The five leading causes of mortality for the period 2011-2015 are shown in the Table 32. The leading cause of mortality for South West

residents was ischaemic heart disease. The second leading cause was cerebrovascular disease which was significantly higher (1.2 times) than the State rate. Rates for all other conditions were similar to the State rate.[vi]

For 2006-2015, there were 126 deaths for Aboriginal South West residents. The Aboriginal South West mortality rate was significantly lower than the State.[vi]

Table 32: South West leading cause of mortality 2011-2015

Condition	Deaths	% all deaths	SRR
Ischaemic heart diseases	616	12%	1.0
Cerebrovascular diseases	368	7%	1.3
Dementia (incl Alzheimers disease)	326	6%	0.9
Lung cancer	305	6%	1.0
COPD	217	4%	1.1
All deaths	**5,059**	**100%**	**1.0**

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.
Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.
.*Source: DoH, Health Tracks*[vi]

Alcohol and tobacco related mortality

For 2006-2015, alcohol-caused mortality rate in the South West region was 25 per 100,000 person-years and tobacco-caused mortality rate was 74 per 100,000 person-years. These rates were similar to the State rates.[vi]

Avoidable Mortality, 0 - 74 years

Avoidable mortality is defined as deaths before the age of 75 years from conditions which are potentially avoidable given the present health system, available knowledge about social and economic policy impacts and health behaviours, as described in 'Avoidable Mortality, 15-64 years' section.

For the period 2011-2015, just over half (52%) of the South West resident deaths under the age of 75 were classified as avoidable. The use of screening and primary prevention could potentially have reduced over half of avoidable deaths in South West residents and better treatment measures could potentially have reduced just under half of avoidable deaths.

Table 33 shows the leading causes of avoidable mortality for South West residents for the period 2011-2015. Ischaemic heart disease accounted for 19 per cent, followed by suicide and self-inflicted injuries (13%). The rate of avoidable mortality for transport accidents was significantly higher (1.6 times) than the State rate. [vi]

Table 33: South West leading cause of avoidable mortality 0-74 years 2011-2015

Persons, 2011 - 2015	Number	% of all deaths (<75 years)	SRR
Ischaemic heart disease	184	19%	1.0
Suicide and self-inflicted injuries	124	13%	1.2
Transport accidents	81	8%	1.6
Cerebrovascular diseases	68	7%	1.3
Colorectal cancer	61	6%	1.0
COPD	59	6%	1.04
Breast cancer	57	6%	0.9
Skin cancer	53	5%	1.3
Accidental poisoning by and exposure to noxious	43	4%	1.1
Diabetes	43	4%	0.9
All avoidable deaths (<75 years)	**977**	**52%**	**1.1**
All deaths (<75 years)	**1,887**	**100%**	**1.02**

Notes:

Note: The standardised rate ratio (SRR) is the ratio between a particular health region (or district) and the state. A ratio of 1 means the regional rate is the same as the state, a value of 2 indicates the regional rate is twice that of the state, and an SRR of 0.5 indicates the rate in a region is half that of the State population.

Note: Local rates are compared to the rate of all residents of the State using the SRR and the 95% confidence interval of the SRR. Those that are significantly different to the state rate (1.0) have black font, and those that are not significantly different to the state have white font. Those between 1 and 1.5 times the state rate are highlighted orange, higher than 1.5 times the state are highlighted red while those rates less than the state are highlighted green.

Source: DoH, Health Tracks ***Error! Bookmark not defined.***

Implications for health service planning:

Just over half of the deaths of South West residents under the age of 75 were classified as avoidable. Of these deaths, ischaemic heart diseases followed by suicide or self-inflicted were the leading causes of avoidable mortality. These conditions are avoidable through the use of primary and secondary interventions, this highlights the need for public health and mental health programs and screening.

Abbreviations

Abbreviation	Definition
AAR	Age Adjusted Rate
ABS	Australian Bureau of Statistics
ACCHS	Aboriginal Community Controlled Health Services
AEDC	Australian Early Development Census
ARIA	Accessibility/Remoteness Index of Australia
ASR	Age-standardised rate
ATSIC	Aboriginal and Torres Strait Islander Commission
BEACH	Bettering the Evaluation and Care of Health
BMI	Body Mass Index
CCF	Congestive Cardiac Failure
CI	95% Confidence Interval of a rate or proportion
COPD	Chronic Obstructive Pulmonary Disease
DoH	Department of Health WA
ED	Emergency Departments
ENT	Ear, nose and throat infections
ERP	Estimated Residential Population
GDM	Gestational Diabetes Mellitus
HMDS	Hospital Morbidity Data System
HWSS	Health and Wellbeing Surveillance System
ICD–10 codes	International Statistical Classification of Diseases and Related Health Problems *10th* Revision
LGA	Local Government Area
PID	Pelvic Inflammatory Disease
PPH	Potentially Preventable Hospitalisations
SEIFA	Socio-Economic Indexes for Areas
STA1	Statistical Area Level 1
STI	Sexually Transmitted Infection

SRR	Standardised rate ratio
WA Tomorrow, 2012	Department of Planning Population Projections from 2006 Census
WACHS	Western Australia Country Health Service
WAT	Western Australia Tomorrow 2015

Glossary

Term	Definition
Accessibility/Remoteness Index of Australia (ARIA)	A systematic approach to classification of areas of Australia according to levels of remoteness. Within this classification system there are five categories ranging from Major Cities to Very Remote.
Age Adjusted Rate (AAR)	Age-adjusted mortality rate per 100,000 person years. Direct standardisation using a range of age groups of 2001 Australian Standard Population in order to compare rates between population groups and different years for the same population group.
Chronic conditions	Long-term conditions that last for six months or more
Health and Wellbeing Surveillance System (HWSS)	The WA Health and Wellbeing Surveillance (HWSS) was established by the Department of Health in 2002 to monitor the health status of the general WA population. Each month, approximately 550 randomly selected households take part in a telephone survey.
ICD–10 codes	ICD-10 is the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases.
Statistical Areas	Are designed to maximise the spatial detail available for Census data. WA Health primarily uses SA2s in its epidemiology and mapping of health utilisation and areas. SA1s have a population of between 200 to 800 persons with an average population of approximately 400 persons. SA1s aim to separate out areas with different geographic characteristics within Suburb and Locality boundaries. In rural areas they often combine related Locality boundaries.

	SA2s generally have a population range of 3,000 to 25,000 persons, and have an average population of about 10,000 persons. SA2s are aggregations of whole SA1s. They are designed to reflect functional areas that represent a community that interacts together socially and economically.
Socio-Economic Indexes for Areas (SEIFA)	Is a product developed by the ABS that ranks areas in Australia according to relative socio-economic advantage and disadvantage. The indexes are based on information from the five-yearly Census.
Standardised Rate Ratio (SRR)	The SRR is derived by the regional AAR divided by the State AAR or alternatively the regional ASR divided by the state ASR. Ref: EM-CO-18-11746
Triage	The urgency of the patient's need for medical and nursing care, as represented by a code. Triage 1 (resuscitation) Triage 2 (emergency) Triage 3 (urgent) Triage 4 (semi-urgent) Triage 5 (non-urgent)

References

i Department of Health, Modelling Unit, via WA Department of Planning, Sept 2017.

ii WACHS South West intranet home page, http://wacountry.health.wa.gov.au/index.php?id=509#c1062 (accessed July 21, 2015)

iii South West Development Commission, http://www.swdc.wa.gov.au/ accessed July 21, 2015

iv DoHA, 2001.Measuring Remoteness: Accessibility/Remoteness Index of Australia (ARIA)

v Australian Bureau of Statistics (ABS), 3235.0 Population by Age and Sex, Regions of Australia

vi Department of Health WA, Health Tracks - Epidemiology Branch (PHI) in collaboration with the Cooperative Research Centre for Spatial Information (CRC-SI)

vii Department of Health WA, Rates Calculator - Epidemiology Branch (PHI) based on ABS ERP 2012

viii Western Australia Tomorrow, Population Report No. 10, Medium-term Forecasts for Western Australia 2014-2026 and Sub-regions 2016-2026

ix Department of Planning, Lands and Heritage, Western Australia Tomorrow 2017 via the Clinical Modelling Unit, Department of Health WA (Accessed September 2017).

x Radomiljac, Ali and Joyce, Sarah 2014. Health and Wellbeing of Adults in Western Australia 2013, Overview and Trends. Department of Health, Western Australia

xi ABS, 2008 Socio-Economic Indexes for Areas (SEIFA) - Technical Paper, 2006. Cat No. 2039.0.55.001

xii ABS, Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011 (cat. no. 2033.0.55.001).

xiii Midwives Notification System (via WACHS Safety, Quality and Performance)

xiv WACHS Online data – Obstetric Deliveries (HCARe, webPAS & TOPAS via Data Extracts)

xv Australian Institute of Health and Welfare 2012. A picture of Australia's children 2012. Cat. no. PHE 167. Canberra: AIHW.

xvi Raewyn CM, Watkins R and Bower C, 2014. Fetal alcohol spectrum disorders: Notifications to the Western Australian Register of Developmental Anomalies. Journal of Paediatrics and Child Health. doi: 10.1111/jpc.12746.

xvii Fitzpatrick J, Latimer J, Carmichael Olson H, Carter M, Oscar J, Lucas B, Doney R, Salter C, Try J, Hawkes G, Fitzpatrick E, Hand M, Watkins R, Tsang T, Bower C, Ferreira M, Boulton J, Elliott J 2017. Prevalence and profile of Neurodevelopment and Fetal Alcohol Spectrum Disorder (FASD) amongst Australian Aboriginal children living in remote communities. Research in Developmental Disabilities 65 (2017) 114-126 http://dx.doi.org/10.1016/j.ridd.2017.04.001

xviii Australian Indigenous HealthInfoNet: Australian Indigenous Alcohol and Other Drugs Knowledge Centre accessed 7 July 2017. http://www.aodknowledgecentre.net.au/aodkc/alcohol/fasd

xix Telethon Kids Institute https://www.telethonkids.org.au/our-research/brain-and-behaviour/disability/alcohol-and-pregnancy-and-fasd-research/3m-fasd-prevention-project/ (Accessed 16/10/2017).

xx Australian Early Development Census, 2015 http://www.aedc.gov.au/data accessed 31/8/2017

xxi 4813.0.55.001 - Occasional Paper: Vaccination Coverage in Australian Children - ABS Statistics and the Australian Childhood Immunisation Register (ACIR), 2001

xxii Australian Childhood Immunisation Register - Coverage Report. Communicable Disease Control Branch, Department of Health, Western Australia.

xxiii Epidemiology Branch, 2014, WA Country Health Region Child Health Profiles, HWSS 2008-2013, WA Department of Health: Perth.

xxiv ABS, 2013. Australian *Aboriginal and Torres Strait Islander Health Survey: First Results, Australia, 2012-13* cat. no. 4727.0.55.001 http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4727.0.55.001main+features12012-13

xxv WA Public Health Act 2016
https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_13791_homepage.html

xxvi Department of Health Notification of infectious diseases and related conditions.
http://ww2.health.wa.gov.au/Articles/N_R/Notification-of-infectious-diseases-and-related-conditions

xxvii ABS, 4714.0 – National Aboriginal and Torres Strait Islander Social Survey 2014-15. Table 23.3. Health risk factor indicators, by state/territory and remoteness area, persons ages 18 years and over – 2014-15, Proportion of persons. http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4714.02014-15?OpenDocument (Accessed June 2017)

xxviii Epidemiology Branch, 2017, Health Region Profiles, 2015. HWSS, WA Department of Health: Perth.

xxix Department of Health, July 2014, Third National Sexually Transmissible Infections Strategy 2014-2017 at http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-bbvs-sti: accessed December 2014. Australian Government. Canberra

xxx The Epidemiology of Notifiable Sexually Transmitted Infections and Blood-Borne Viruses in Western Australia 2012. Communicable Disease Control Directorate, Department of Health, Western Australia.

xxxi Australian Institute of Health and Welfare (AIHW) 2016. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. BOD 4. Canberra: AIHW.

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

xxxiii National Healthcare Agreement: PI 16-Potentially avoidable deaths, 2015, Australian Institute of Health and Welfare. http://meteor.aihw.gov.au/content/index.phtml/itemId/559036 Accessed 4 October 2017

xxxiv Epidemiology Branch, 2014, Pneumonia and Flu Vaccination Prevalence by Health Region, HWSS 2009-2013, WA Department of Health: Perth.

xxxv ABS, Census 2011 via Table Builder

xxxvi WACHS Business Intelligence Data Warehouse as at September 2017.

xxxvii Inpatient Modelling Data; Baseline 2014/15.

xxxviii HCARe, webPAS & TOPAS via Data Extracts (WACHS Online Pivot Tables: Inpatient Separation Details as at end July 2015)

xxxix ABS 3302.0.55.001 - Life Tables, States, Territories and Australia, 2011-2013

xl ABS 3302.5.55.001 - Life Tables, Western Australia, 2008-2010

xli ABS, 2013. Life tables for Aboriginal and Torres Strait Islander Australians, 2010–2012. ABS cat. no. 3302.0.55.003. Canberra: ABS.

xlii ABS 3302.0 - Deaths, Australia, 2013