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

Child and Maternal Health Profile

WA Country Health Service

Planning and Evaluation Unit

April 2017






Healthier country communities through partnerships and innovation | **Values** Community | Compassion | Quality | Integrity | Justice

Use of the term Aboriginal

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

Tables

Tables are formatted based on statistical significance.

If the standardised rate ratio (SRR), which is a comparison to the state, is significantly higher than the state (>1.5) then the cell is coloured red.

Prepared by the WACHS Planning and Evaluation Unit

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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.

Executive Summary

This report presents an overview of the health of children and young people aged 0-19 and birthing mothers living in WACHS regions to support evidence-based planning and review of health services for these groups.

Children and young people aged 0 – 19 make up 26 per cent of the total population across the WA Country Health Service (WACHS) catchment area, similar to the proportion in the metropolitan area of 25 per cent.

Children and young people living in the WACHS area are more disadvantaged on most measures compared to their counterparts living in the Perth metropolitan area. They are more likely to be living in more remote areas of the state, in lower socioeconomic areas, and have a greater reliance on the public health system due to lower private health coverage.

They are also more likely to have a notifiable disease, have higher occasions of service for mental health conditions and are more likely to be hospitalised due to injury or poisoning. They are also more likely to have potentially preventable hospitalisations, more Emergency Department attendances, and both more avoidable deaths. Of these WACHS young people, 17 per cent are Aboriginal, compared to three per cent in the metropolitan area, increasing to 66 per cent in the Kimberley region.

Even if Aboriginal children are excluded from the analysis, non-Aboriginal children still have the same disadvantages previously mentioned compared to their metropolitan counterparts.

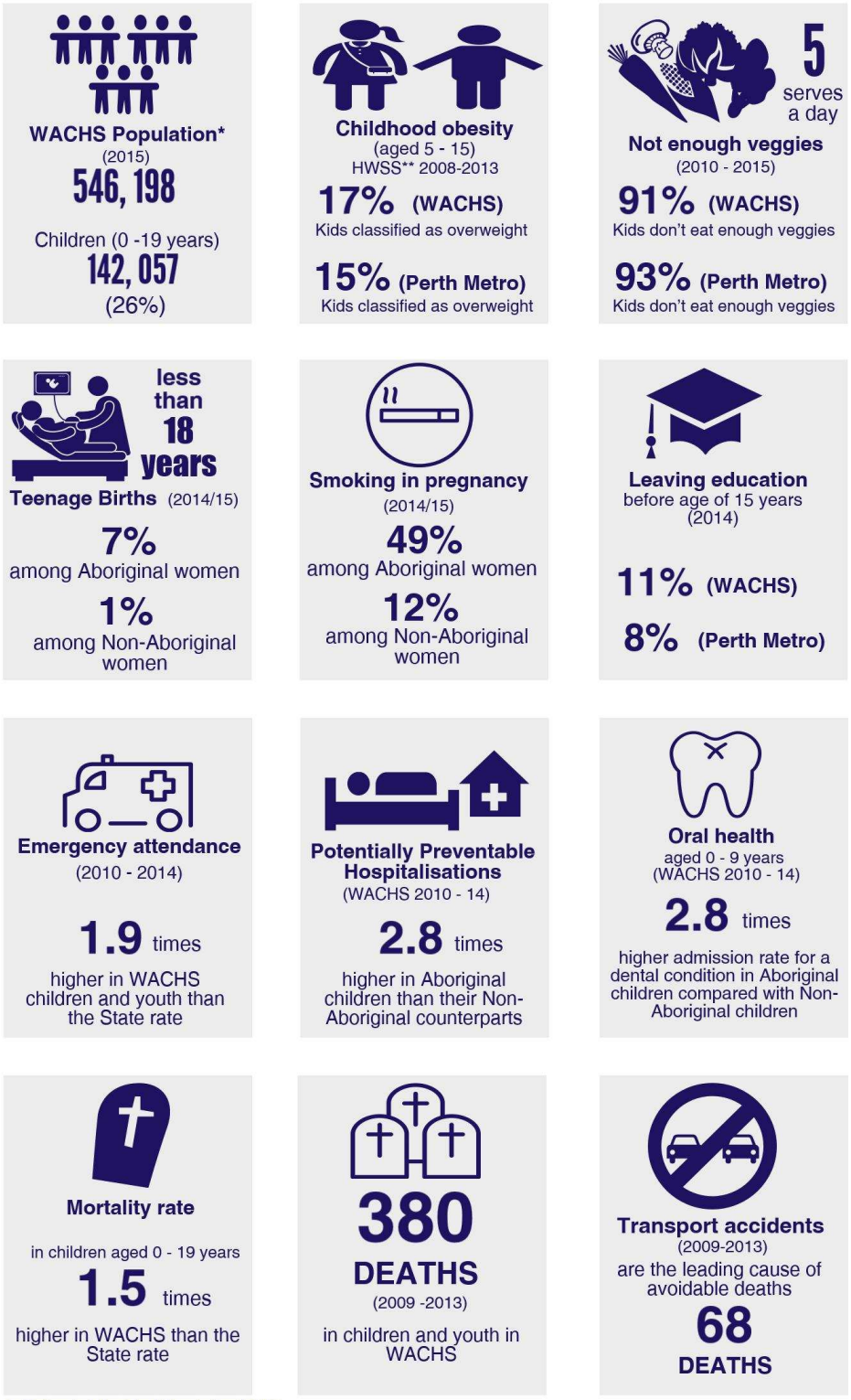
Birth rates are higher for women in WACHS when compared with both Metro and State levels.

Smoking in pregnancy has consistently been around 50 per cent for Aboriginal women but for non-Aboriginal women there has been a gradual trend downwards to 12 per cent in 2014/15 over the last eight years.

Challenges not limited to children and youth in WACHS include inadequate fruit and vegetable intake, obesity and reduced access to preventative and primary health services.

There is an opportunity to effect real change in the lives of children and youth in country areas in Western Australia, by using the information provided in this report to assist with identifying areas where improvements could be targeted to reach children and youth who are experiencing the greatest need, in the greatest numbers,

Key health issues for WACHS children and youth (aged 0 – 19 years)



* Estimated Resident Population (ERP)
** WA Health and Wellbeing Surveillance System

Detailed Summary

The following areas are recommended for consideration in the planning of primary health services.

Population

- WACHS had an Estimated Resident Population (ERP) of 546,198 in 2015, with 142,057 children and young people aged 0-19. This is just over one quarter (26%) of the total population in WACHS, compared with 25 per cent (n = 515,931) in the metropolitan area.
- Of these WACHS young people aged 0-19, 17 per cent are Aboriginal, compared to 3 per cent in the metropolitan area. The Kimberley region has the highest proportion (66%) of Aboriginal children.
- The total Aboriginal population in WACHS accounts for 10 per cent of the total population compared with only two per cent of the population in the metropolitan area.
- Based on *WA Tomorrow 2015* Department of Planning projections, Band C, the resident child population is projected to increase at a rate of one per cent per annum between 2016 and 2026, with the age group 15-19 experiencing the highest annual growth of 1.4 per cent.

Economic, demographic and social factors

Based on the 2011 census, 0-19 year olds in WACHS are characterised by:

- A greater proportion living in lower socio-economic areas, with 14 per cent of 0-19 year olds living in the lowest socio-economic areas, compared to 6 per cent in the Perth metropolitan area.
- A lower proportion living in higher socio-economic areas, with one per cent of 0-19 year olds in the highest socio-economic areas, compared to 12 per cent in the metropolitan area.
- A less mobile population, with a smaller percentage of people changing their addresses in the past 5 years, than in the metropolitan area.
- More people who left school under the age of 15 compared to the metropolitan area (11% versus 8%).

Maternal Health

- In 2014/15, two per cent of births were to WACHS women aged less than 18 years. This was similar to the State rate. For Aboriginal women in WACHS, seven per cent of Aboriginal births were to women less than 18 years.
- In 2014/15, 49 per cent of Aboriginal and 12 per cent of non-Aboriginal women from WACHS who gave birth reported smoking during pregnancy. The reported Aboriginal rate has remained around 50 per cent since 2008/09 but the non-Aboriginal rate has dropped from 17 per cent.

Child and adolescent developmental vulnerability and health

- In 2015, the proportion of WACHS children rated as developmentally vulnerable on one or more domains ranged from 22 per cent in the Great Southern to 44 per cent in the

Kimberley. Children vulnerable on two or more domains ranged from 11 per cent in the Great Southern to 28 per cent in the Kimberley.

- In 2015, WACHS had 93 per cent of children aged 12 to less than 15 months fully immunised, 90 per cent of children aged 24 to less than 27 months fully immunised, and 93 per cent of children aged 60 to less than 63 months fully immunised.
- For 2010-2015, 91 per cent of children aged 5-15 did not eat five serves of vegetables daily and one in six (17%) were classified as overweight, compared to 93 per cent of children in the metropolitan area not eating five serves of vegetables and one in seven (15%) classified as overweight.
- One in five (21%) children aged 0-15 reported an injury requiring treatment in the previous year, which is similar to the metropolitan area (21%). Ten per cent of children in WACHS reported having asthma, compared to nine per cent in the metropolitan area.
- The rate of potentially preventable hospitalisations (PPH) in WACHS children and youth was statistically significantly higher (State rate ratio - SRR 1.28, Age adjusted rate - AAR 2,407, n = 17,445) compared to the state (SSR is always 1.0) (AAR 1,883, n = 59,997). Ear, nose and throat (ENT) infections and dental conditions contributed to 11.6 per cent of PPH.
- For 2010-2014, injury and poisoning hospitalisation rate was significantly higher (SRR 1.23, AAR 2,412, n = 16,645) compared to the state. Leading causes were accidental falls, mechanical forces and transport accidents, together contributing 64 per cent of all injury and poisoning hospitalisations for children aged 0-19 years.

Children aged 0-4

- The leading emergency presentations were respiratory system illness (SRR 1.8, n = 56,024), ENT illness (SRR 2.54, n = 39,053), illness of the skin (SRR 2.87, n = 30,446) and injury (SRR 2.27, n = 25,977). A key emergency presentation that was over four times the state rate was social problems (SRR 4.15, n = 13,640).
- The top PPH were ENT infections (SRR 1.31, n = 3,035), dental conditions (SRR 1.19, n = 1,608) and convulsions and epilepsy (SRR 1.24, n = 838) which were all significantly higher than the state rate.
- Children in WACHS have a significantly higher rate of notifiable diseases compared to the state (1.43 times). The Kimberley (4.83 times), Midwest (1.27 times) and Pilbara (1.83 times) were all significantly higher than the state rate. The metropolitan area has a significantly lower rate comparted to the state (0.87 times). The leading notifiable diseases in this age group include enteric infections (n = 1640), vaccine preventable diseases (n = 1138) and vector borne diseases (n=15).
- The leading causes of death for young children aged 0-4 years in 2009 – 2013 that were significantly higher than the state rate were abnormal findings/ill-defined conditions (SRR 1.97, n = 42) and transport accidents (SRR 2.61, n = 11). Other conditions included those originating in perinatal period (n = 42), congenital malformations (n = 19), unknown causes (n = 25), and accidental drowning (n = 15).
- The leading cause of avoidable deaths were complications of the perinatal period (n = 42) however these were similar to the state rate. Transport accidents (SRR 2.61, n = 11) were significantly higher, but accidental drownings (n = 7) were similar to the state rate.

Children aged 5-9

- The leading emergency presentations were ENT illness (SRR 2.7, n = 22,081), injury (SRR 1.98, n = 20,936), illness of the skin (SRR 3.14, n = 18,776), respiratory system illness (SRR1.97, n = 15,185), and digestive system illness (SRR 1.54, n = 11,491). A key emergency presentation that was four times the state rate was social problems (SRR 4, n = 5,194).
- The top PPH were dental conditions (SRR 1, n = 2,234), ENT infections (SRR 1.29, n = 781), asthma (SRR 1.25, n = 740), cellulitis (SRR 2.02, n= 389), and convulsions and epilepsy (SRR 1.18, n = 271). All except dental conditions were higher than the state rate.
- Children in WACHS have a significantly higher rate of notifiable diseases compared to the state (1.18 times). The Kimberley (2.47 times), Great Southern (1.35 times) and the South West (1.18 times) were all significantly higher than the state rate. The metropolitan area has a significantly lower rate compared to the state (0.94 times). The leading notifiable diseases in this age group include whooping cough (SRR 1.31, n = 504), influenza (SRR 1.06, n = 368) and chicken pox (SRR 1.34, n = 220). Both whooping cough and chicken pox were significantly higher than the state rate.
- For 2009-2013, the leading cause of death is transport accidents, with a significantly higher rate (SRR 2.84, n = 9) compared to the state. The metropolitan area had a lower rate that was similar to the state rate (SRR 1.06, n = 8).
- The leading cause of avoidable deaths for this age group was transport accidents (SRR 2.84, n = 9) which was significantly higher than the state rate.

Children aged 10-14

- The leading emergency presentations were injury (SRR 1.73, n=26,865), musculoskeletal (SRR 2.98, n=13,932), illness of the skin (SRR 3.19, n = 12,824), ENT illness (SRR 2.96, n=12,631), and digestive system illness (SRR 1.44, n = 7,262). All of these were significantly higher than the state rate.
- The top PPH were dental conditions (SRR 0.84, n=413), ENT infections (SRR1.64, n=343), cellulitis (SRR 2.04, n=307), asthma (SRR 1.22, n=252) and diabetes complications (SRR1.15, n=193). All except dental conditions and diabetes complications were significantly higher than the state rate.
- Children in WACHS have a significantly higher rate of notifiable diseases compared to the state (1.53 times). The Kimberley (5.66 times), Pilbara (1.69 times), Midwest (1.27 times) and the South West (1.26) were all significantly higher than the state rate. The metropolitan area has a significantly lower rate compared to the state (0.84 times). The leading notifiable diseases in this age group include whooping cough (SRR 1.48, n = 595), chlamydia (SRR 2.33, n=386) and gonorrhoea (SRR 3.74, n = 298), all of which were significantly higher than the state rate.
- For 2009-2013, the leading cause of death is transport accidents (n = 7) however this is not significantly higher than the state as the confidence intervals are too broad. There were eight deaths due to transport accidents in the metropolitan area for this age group.
- The leading cause of avoidable deaths for this age group was transport accidents (SRR 1.96, n = 7), which was also not significantly higher than the state as the confidence intervals are too broad.

Children aged 15-19

- The leading emergency presentations were injury (SRR 2.27, n=30,471), illness of the skin (SRR 3.68, n=14,617), musculoskeletal (SRR 3.8, n=14,379), digestive system illness (SRR 1.9, n=12,564), and ENT illness (SRR 3.4, n=12,467). All of these were significantly higher than the state rate.
- The top PPH were ENT infections (SRR 1.52, n=471), cellulitis (SRR 2.32, n=424) and urinary tract infections (SRR 1.25, n=383), all of which were significantly higher than the state rate.
- Children in WACHS have a significantly higher rate of notifiable diseases compared to the state (1.76 times). The Kimberley (7.52 times), Pilbara (2.41 times), Goldfields (2.24 times) and the Midwest (1.99 times) were all significantly higher than the state rate. The metropolitan area has a significantly lower rate compared to the state (0.84 times). The leading notifiable diseases in this age group include chlamydia (SRR 1.61, n = 4,800), gonorrhoea (SRR 3.64, n=1,670) and influenza (SRR 1.25, n=203), all of which are significantly higher than the state rate.
- For 2009-2013, the leading cause of death is intentional self-harm, followed by transport accidents, accidental poisoning, exposure to mechanical forces, and assault.
- The top causes of avoidable deaths for this age group were suicide and self-inflicted injuries, transport accidents, accidental poisoning, exposure to inanimate mechanical forces, and assault.

Mental Health, Drug and Alcohol

- Males had a higher rate of occasions of service in 2010-2014 compared to the state (1.18 times), whereas females were similar to the state. Overall, children and youth living in WACHS had a higher rate of mental health occasions of service compared to the State (1.07 times).
- The leading mental health conditions were organic disorders (SRR 1.51, n = 573: Females SRR 2.22, n=378) and substance abuse disorders (SRR 1.78, n=2,216).

Emergency Presentations

- Emergency attendances for children and youth in WACHS for 2010-2014 were significantly higher than the state rate (1.86 times).
- The rate of emergency presentations for Aboriginal males aged 0-19 years was significantly higher than non-Aboriginal males (1.7 times). It was also significantly higher for females

Hospitalisations

- Hospitalisations for children and youth in WACHS were higher than the state rate for 2010-2014 (1.13 times) and were also higher for both males (1.1 times) and females (1.16 times).
- Compared to the state, females in the country aged 0-19 had a significantly higher rate of PPH (1.29 times).

- The rate of all cause PPH was significantly higher (2.8 times) for Aboriginal children and youth aged 0-19 compared to their non-Aboriginal counterparts. It was also significantly higher for aboriginal males (2.7 times) and females (2.9 times).
- The leading PPH were ENT infections (SRR 1.35, n = 4,639), dental conditions (SRR 1.04, n = 4,606) and cellulitis (SRR 1.96, n = 1,801). PPH are relatively similar for aboriginal and non-aboriginal children for the first 9 years of life, then for the 10-14 and 15-19 year age groups there is a divergence.. For non-aboriginal children, dental conditions and ENT infections are the leading causes, whereas for aboriginal children cellulitis, ENT infections, convulsions and epilepsy, asthma, rheumatic heart disease and urinary tract infections are the leading causes.
- For Aboriginal children the progression of PPH through the age groups is consistent for the 0-4 and 5-9 age groups, but there is significant variability in the leading PPH condition in Aboriginal children for the 10-14 and 15-19 age groups.

Mortality

- For 2009-2013, the mortality rate of children and youth aged 0-19 years in WACHS was significantly higher (1.53 times) than the State rate.
- Avoidable deaths in WACHS were significantly higher compared to the state (1.69 times) for both males (1.84 times) and females (1.45 times). For aboriginal children and youth, the rate of all-cause avoidable deaths was significantly higher than the non-aboriginal rate (3.6 times).
- The leading causes of avoidable death were transport accidents (SRR 2.49, n=68) and intentional self-harm (SRR 2.35, n=54).

Introduction

Good health in pregnancy and childhood can set you up for life – healthy children are more likely to be healthy adults[i]. However, not all Western Australian children experience the same level of health, and identifying areas for improvement can help to direct efforts towards making gains in child health.

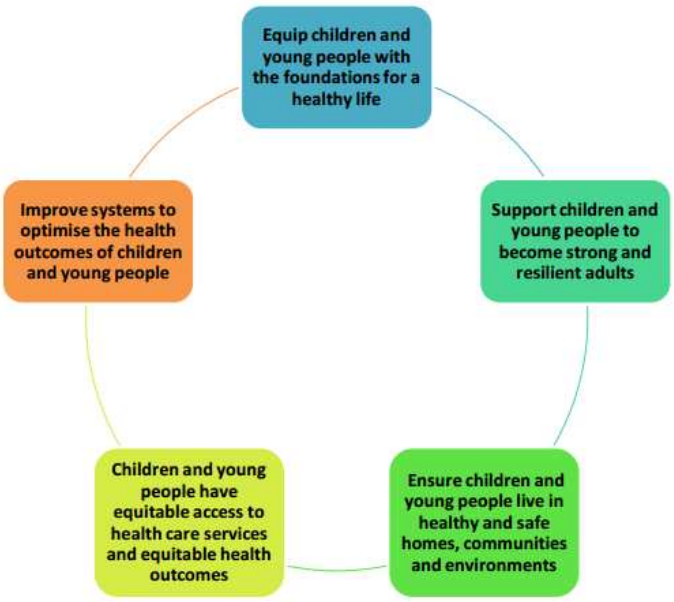
This profile includes regional information on the population, demographics, determinants of health and health statistics such as immunisation rates, mortality and hospitalisation rates for children and youth (0 – 19) residing in the WACHS area. Where practicable the information is provided in the sequence of maternal health through to the separate age groups of 0-4, 5-9, 10-14 and 15-19 years. Where available, data has been delineated into Aboriginal and non-Aboriginal as there are significant differences between these children and young people. There is a focus on vulnerable children as well as potentially preventable conditions, to aid in future strategies and workforce planning.

The information in this report reflects that there are many factors influencing child health; however some factors such as genetics, biology, and the environment and cross sectoral partnerships or the lack thereof are not specifically addressed in this report.

The information can be used to support service strategy development, planning, business cases and to focus services where they can best affect a positive outcome. These regional profiles have been endorsed for public viewing and can be utilised by WACHS staff and key regional stakeholders to inform planning and service development.

The *National Strategic Framework for Child and Youth Health, 2015* outlines five Strategic Priorities aimed at ensuring children and young people are health, safe and thriving (Figure 1). Information in this report can be used to address some of these priorities.

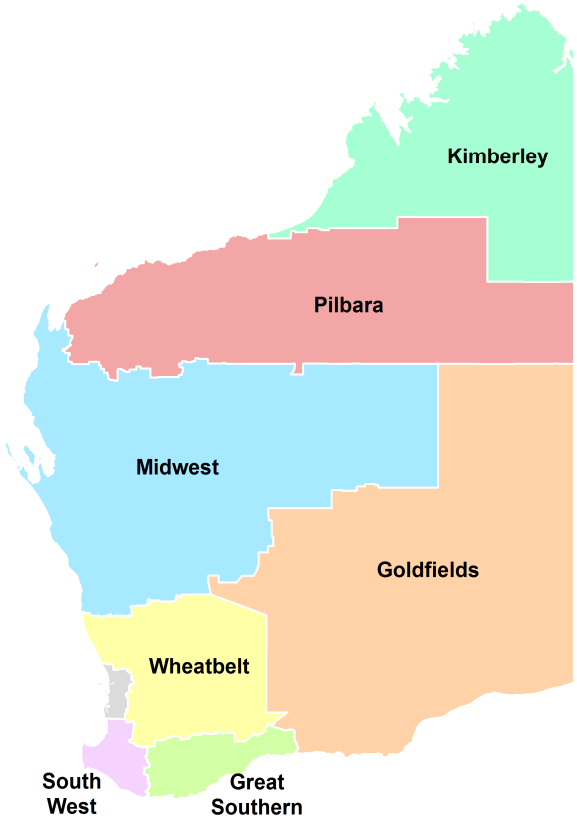
Figure 1 – Strategic Priorities of the National Strategic Framework for Child and Youth[ii]



Overview of WACHS

In 2015, Western Australia had an estimated total population of 2.6 million people, with a total area of 2.55 million square kilometres. WACHS services 22 per cent of the WA population but covers 99 per cent of the total land area. Providing services, including via videoconferencing and e-health modalities, to the far reaches of Western Australia, from Esperance to Carnarvon to Wyndham, is essential to the health of West Australians so consumers can access the right services, in the right place, to meet their needs.

Figure 2 – WACHS Health regions



The demographics of the country vary not only compared to the metropolitan area, but also between country regions.

- Aboriginality
  - 17 per cent of 0-19 year olds in the country are Aboriginal, compared to 3 per cent in the metropolitan area
- Remoteness
  - 30 per cent of children in WACHS are in Remote or Very Remote areas, with no children in the metropolitan area experiencing the same level of accessibility issues
- Socio-demographics
  - five per cent of families in WACHS have annual income of less than $20,800 compared to four per cent in the metropolitan area
  - 11 per cent of children leave school before 15 years of age

Variations in disease, death and hospitalisation rates and health risk prevalence may be attributed to socio-economic factors such as education, employment and income. Generally, there are less people in the country with a tertiary qualification and a greater proportion of people who left school aged less than 15. There are a lower proportion of people in WACHS who were born overseas, or people that do not speak English at home, when compared to the metropolitan area.

Immunisation rates for children are higher in country areas than in the metropolitan area, birth rates are higher in country areas, as are teenage births.

Level of remoteness

Residents of rural or remote areas generally have poorer health outcomes, coupled with higher health need, compared to people living in major cities. Access to health services in the country is vastly different compared to metropolitan areas and despite a higher need, residents in rural or remote areas are less likely to access health services.

The Accessibility/Remoteness Index of Australia (ARIA) is a systematic approach by the Australian Bureau of Statistics (ABS) to classify areas of Australia according to level of remoteness. Within this classification system there are five categories ranging from Highly Accessible to Very Remote.

Figure 3 - Accessibility and Remoteness Index (ARIA)

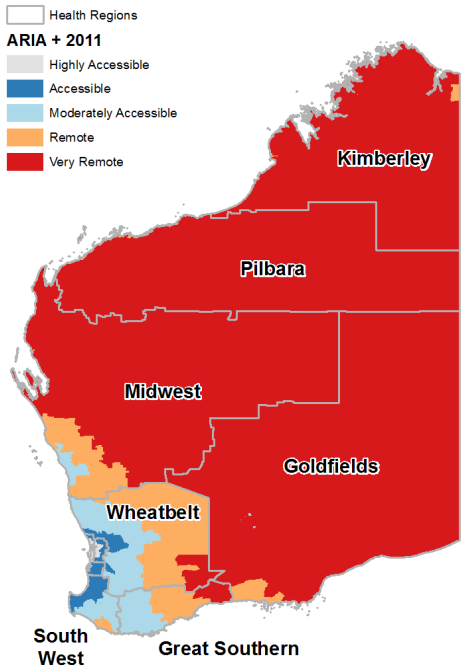
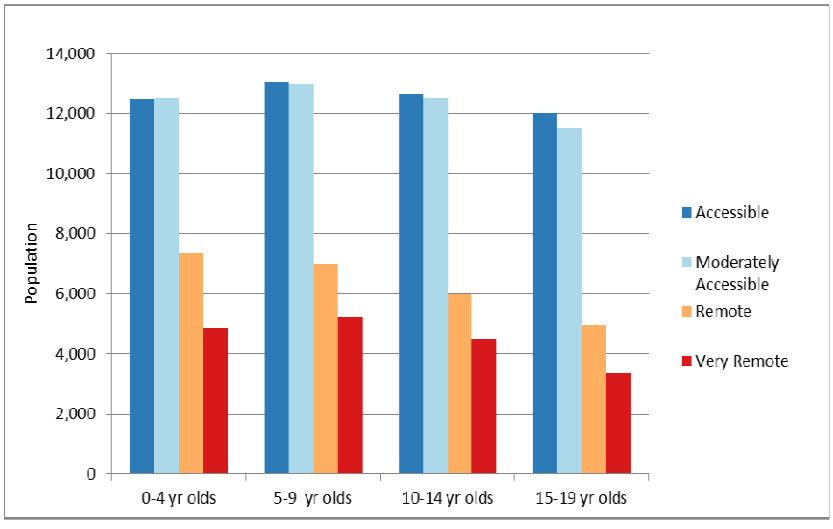


Figure 4 - Remoteness of children in WACHS



According to the ARIA classification, in WACHS 30% of children aged 0-19 are in Remote (18%) or Very Remote (12 %) areas, with 70 per cent of children in Accessible or Moderately Accessible areas, with no children in Highly Accessible areas.

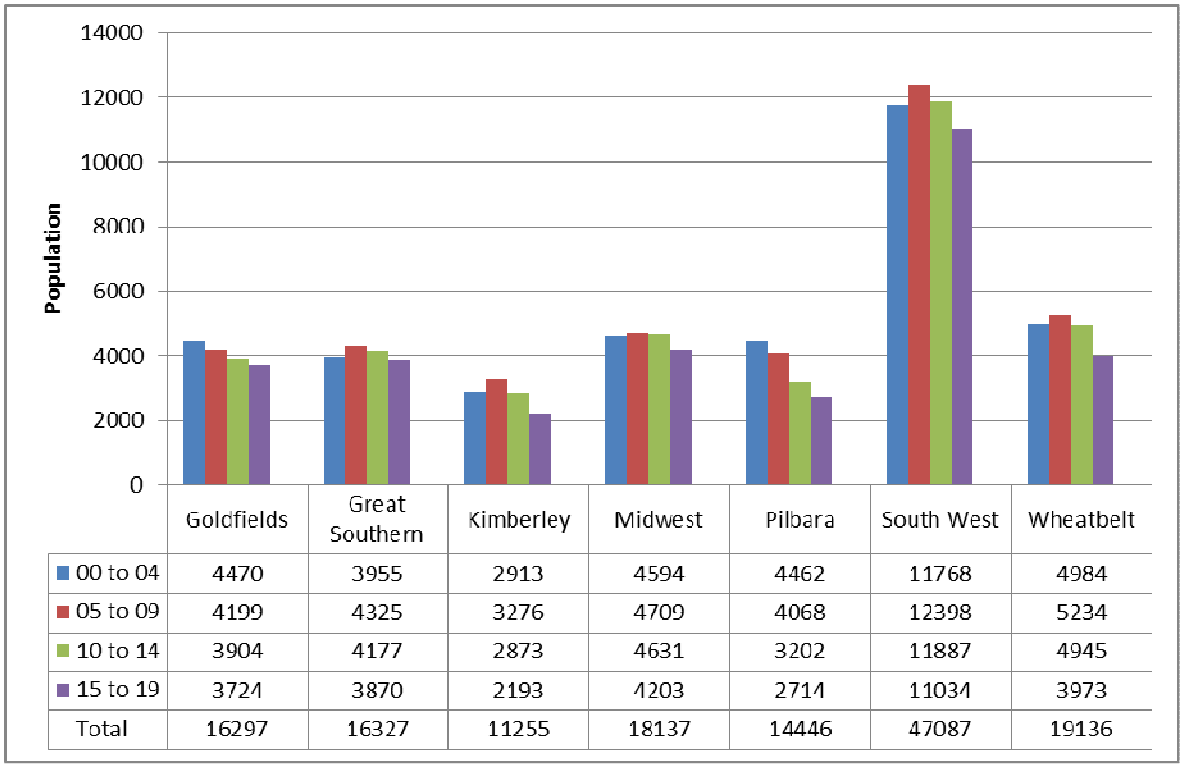
By comparison, in the Perth metropolitan area all children are in Highly Accessible (95%), Accessible (4%) or Moderately Accessible (1%) areas.

Population

Current population

Based on ABS 2015 Estimated Resident Population (ERP), there was 142,057 people aged 0-19 years old in WACHS, which is 26 per cent of the total WACHS population[iii]. This is similar to the State percentage, with 25 per cent of the population (515,931) in this age group.

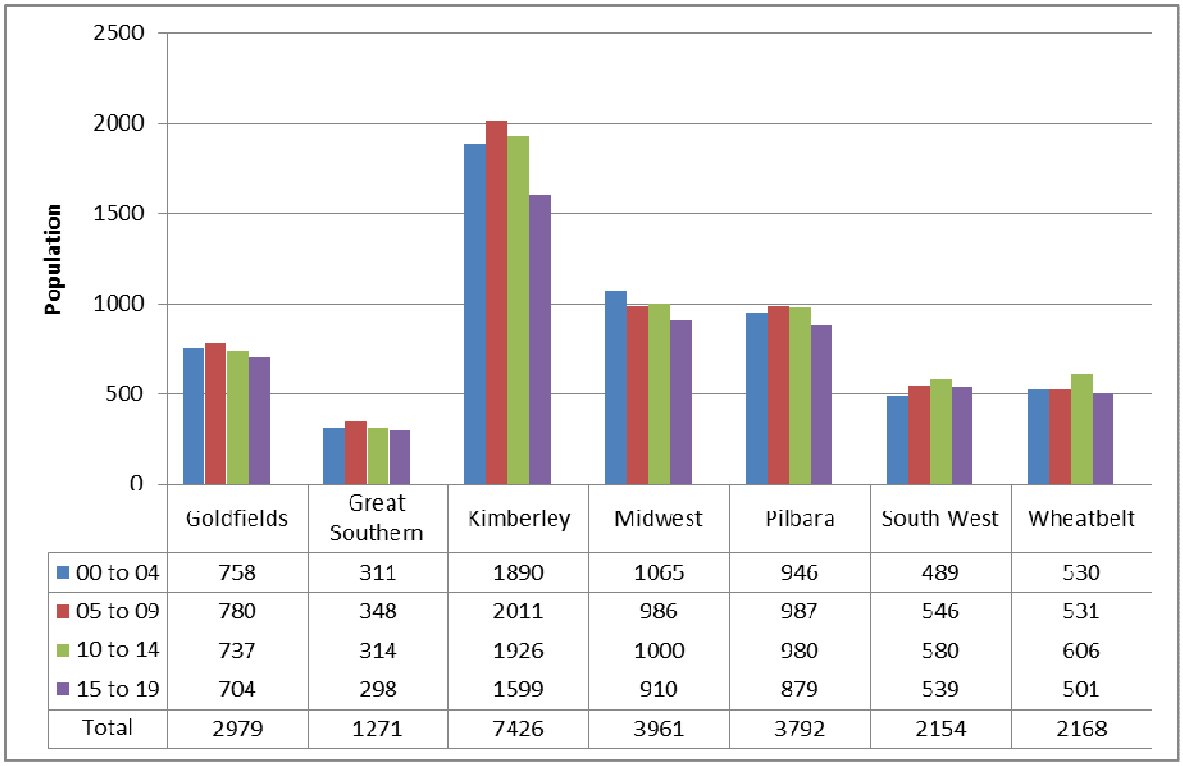
Figure 5: 0 – 19 years population by Region



	Goldfields	Great Southern	Kimberley	Midwest	Pilbara	South West	Wheatbelt
00 to 04	4470	3955	2913	4594	4462	11768	4984
05 to 09	4199	4325	3276	4709	4068	12398	5234
10 to 14	3904	4177	2873	4631	3202	11887	4945
15 to 19	3724	3870	2193	4203	2714	11034	3973
Total	16297	16327	11255	18137	14446	47087	19136

All WACHS regions follow a similar pattern, with declining populations and proportions from through the 5-9, 10-14, and 15-19 age groups. This may be attributed to families moving to Perth for their childrens' schooling or young adults moving to Perth for work opportunities or tertiary education.

Figure 6: 0 – 19 Aboriginal Population by region[iii]



	Goldfields	Great Southern	Kimberley	Midwest	Pilbara	South West	Wheatbelt
00 to 04	758	311	1890	1065	946	489	530
05 to 09	780	348	2011	986	987	546	531
10 to 14	737	314	1926	1000	980	580	606
15 to 19	704	298	1599	910	879	539	501
Total	2979	1271	7426	3961	3792	2154	2168

The population distribution by region is quite different for Aboriginal and non-Aboriginal children. The Kimberley has a higher proportion of Aboriginal children with 66 per cent of children aged 0-19 year olds being Aboriginal. The second highest region is the Pilbara ranging between 21 and 32 per cent in different age groups. The Midwest and the Goldifields are both higher than the WACHS average of 17 per cent, and all country regions are higher than the Metro average of 2.5 per cent.

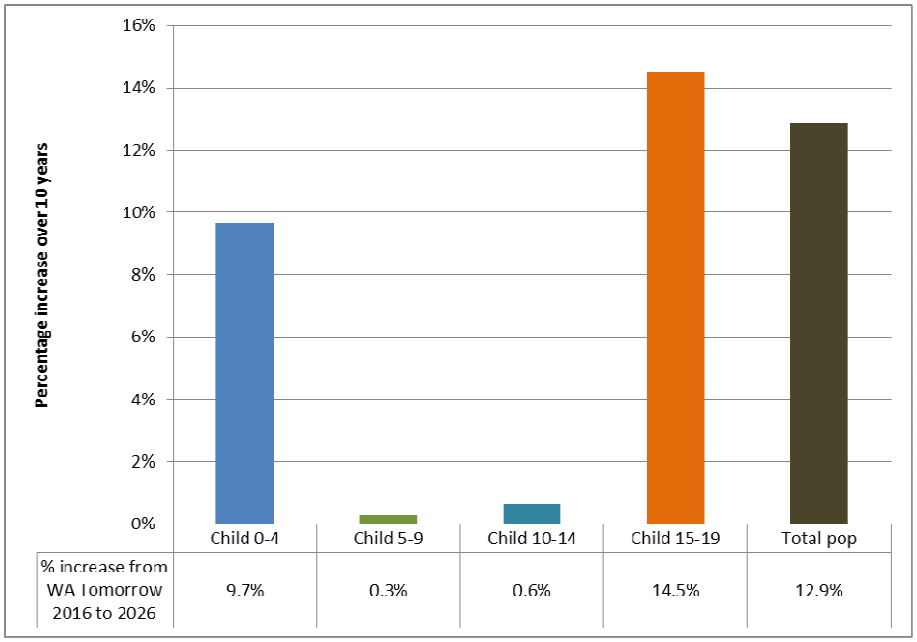
Table 1 - Aboriginal children as a percentage of the total population in each region[iii]

Region	0 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years	0 to 19 years
Goldfields	17%	19%	19%	19%	18%
Great Southern	8%	8%	8%	8%	8%
Kimberley	65%	61%	67%	73%	66%
Midwest	23%	21%	22%	22%	22%
Pilbara	21%	24%	31%	32%	26%
South West	4%	4%	5%	5%	5%
Wheatbelt	11%	10%	12%	13%	11%
WACHS	16%	16%	17%	17%	17%
Metro	2%	2%	3%	3%	3%
State	6%	6%	7%	6%	6%

Projected Population

The Department of Planning in WA projects populations into the future, based on the last census projections (known as WA Tomorrow or WAT). These projections are a best estimate based on fertility, mortality and migration trends for WA. The WAT 2015, the largest projected increase in population for WACHS between 2016 and 2026 is in the age group of 15-19 years old (15% over 10 years), and 0-4 years old (10% over 10 years).

Figure 7 - Projected increase in population from 2016 and 2026



Aboriginal populations cannot be projected due to small numbers but between 2009 and 2014 the Aboriginal population for 0-19 year olds in WACHS has increased by 1.8 per cent.

Implications for health service planning:

With populations projected to grow in the 0-4 year age group and 15-19 year age group, attention to services for these cohorts will be essential.

All WACHS regions have a higher proportion of Aboriginal children than Metropolitan areas, so culturally appropriate Models of Care are essential.

There are a higher proportion of children in WACHS living in lower socio economic areas, and areas which are remote or very remote with poor access to services. Both of these factors are closely tied to many health issues.

Economic, demographic and social factors

There are many aspects that influence a person's health, including genetics, lifestyle and environmental, economic and social factors[i]. The demographics within WACHS are very diverse. While long travel distances are a common issue, remote communities can differ in function and infrastructure. For example, a coastal fishing port and harbour will differ from a mining town or a desert Aboriginal community. The level of isolation and impact on health due to environmental conditions is often more marked for remote communities than those seen in rural and metropolitan communities.

In WACHS, there are a slightly higher proportion of families that have annual incomes of less than $20,800 compared to Metropolitan areas (5% vs 4%). The Kimberley (9%) and the Wheatbelt (7%) have the highest proportion of low income families. The Kimberley also has the highest proportion of single parent households, at 23 per cent, compared to 15 per cent for the State, and the highest proportion of people who do not speak English at home, at 18 per cent, compared to WACHS as a whole, at seven per cent.

Table 2 - Socio-demographic factors – income, single parent families, non-English speaking

Region	% of Families with annual income less than $20,800	% of one parent families	% of people who don't speak English at home
Goldfields	4.8	14.6	9.4
Great Southern	5.9	14.3	5.7
Kimberley	8.9	22.8	17.8
Midwest	5.5	15.8	5.8
Pilbara	3	10.4	11
South West	4.4	14.4	5.3
Wheatbelt	6.7	11.8	3.8
Country	5.1	14.1	7.1
Metro	3.9	14.7	17.1
State	4.2	14.5	14.5

The general educational trend shows similar proportions of the total population of primary school and secondary school children as in metropolitan areas, but with a greater proportion of the WACHS population leaving school aged less than 15 years. For metropolitan areas, only eight per cent of children left school before the age of 15 compared to 11 per cent in WACHS. The Kimberley (13%), Midwest (13%), and the Great Southern (12%) are areas of most concern.

Table 3 - Socio-demographic factors – Percentage of the population at Primary school, Secondary school, that have left school aged less than 15 years

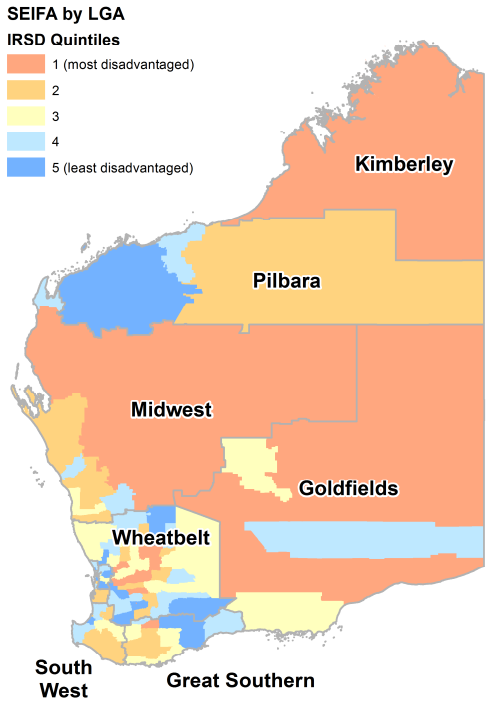
Region	% At Primary School	%At Secondary School	% Left school aged less than 15 years old
Goldfields	9.4	4.7	10.4
Great Southern	9.2	5.6	12
Kimberley	10.7	3.9	13.3
Midwest	9.1	5.4	12.7
Pilbara	7.5	2.8	6
South West	9.5	5.8	10.4
Wheatbelt	9.3	4.8	13
Country	9.2	5.1	10.6
Metro	8.2	5.7	8.1
State	8.4	5.5	8.7

Source: ABS Census 2011 results via DoH, Health Tracks

Socio-Economic Disadvantage

Socio-Economic Indexes for Areas (SEIFA) contain Index of Relative Socio-Economic Disadvantage scores which are calculated from responses to the five yearly Australian Bureau of Statistics (ABS) Census. There are several inputs that contribute to this SEIFA index, including people who do not speak English well, families with jobless parents, low household income, persons living in the area under 70 who have a long-term health condition or disability and need assistance with core activities, along with other factors[iv]. Socio economic status has a large impact on health status and healthy behaviours[v], and the disproportionate burden on WACHS compared to the metropolitan area is evident.

Figure 8 - Socio Economic Indexes For Area

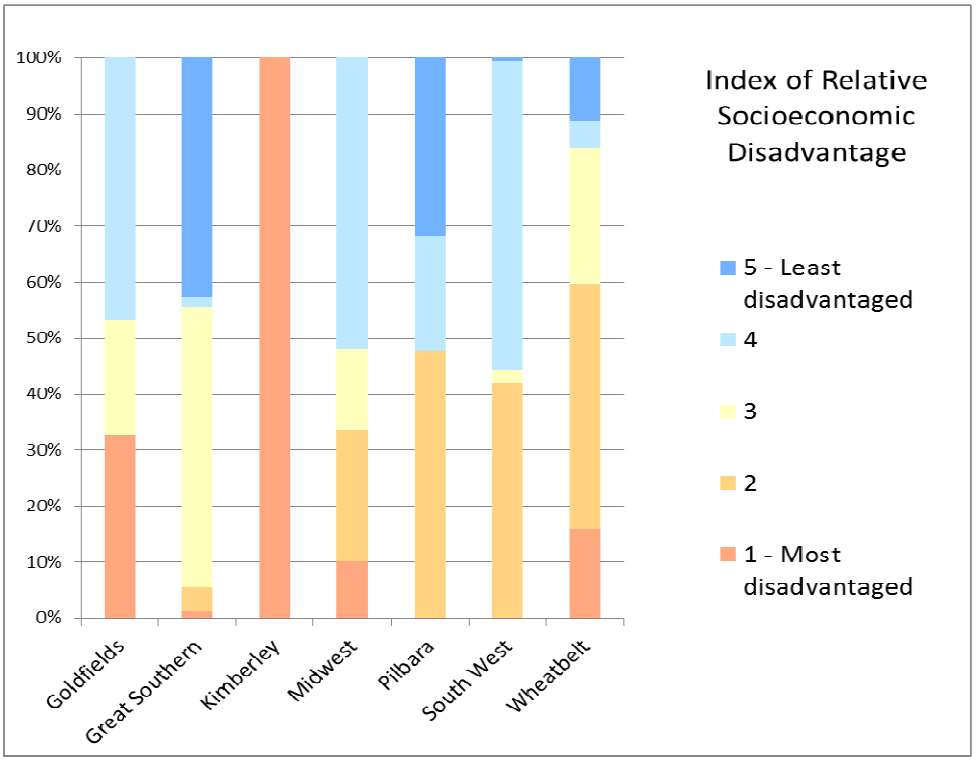


The socio-economic profiles for Country regions are different to the Perth metropolitan area.

In WACHS, 39 per cent of people live in Local Government Areas (LGA) of Least Disadvantage (Quintiles 4 and 5), compared to 54 per cent in Metropolitan areas. A greater proportion of people in WACHS live in more disadvantaged areas.

Two regions stand out due to comparative disadvantage. The Kimberley experiences the most disadvantage with all the population living in LGA's in the lowest quintile which experiences the greatest disadvantage; and 60 per cent of the Wheatbelt population live in LGA's in the two most disadvantaged quintiles.

Figure 9 - Proportion of 0-19 year olds living in each SEIFA quintile by LGA



The proportion of children living in different socioeconomic areas is markedly different across WACHS, ranging from all children in the Kimberley living in the most disadvantaged area to only one per cent of children in the South West living in the most disadvantaged area.

Implications for health service planning:

The SEIFA Index of Relative Socio-Economic Disadvantage shows that there is a wide range of socioeconomic disadvantage within WACHS, with a greater proportion of children in WACHS living in lower socio economic areas compared to the metropolitan area.

Services and programs may need to be targeted to the most disadvantaged areas, such as in the Kimberley and the Wheatbelt.

Cultural and Linguistic Diversity

One fifth of children who speak a language other than English at home have poor proficiency in English[vi]. When beginning school, proficiency in English is important to facilitate learning. Children who are not fully proficient in English when they start school are more likely to be developmentally vulnerable and may face greater social and health challenges[vii].

The AEDI also reported lower kindergarten attendance among children who speak another language at home. Therefore kindergarten attendance may offer a plausible and modifiable approach to improving outcomes at school entry for linguistically diverse children with poor English proficiency, due to increased exposure to the English language[vi].

In WACHS, only seven per cent of people do not speak English at home[vii], compared to 17 per cent in the metropolitan area. In WACHS, 87 per cent of Aboriginal people who speak an Indigenous Australian language at home speak English Well or Very Well, and 12 per cent speak English Not Well or Not At All. This is a similar pattern to the State; however, it is worth noting that only 13 per cent of the Aboriginal population are reported to speak an Indigenous Australian language at home.

Implications for health service planning:

WACHS is less linguistically diverse compared to the metropolitan area, so may have less issues arising due to English proficiency.

Lack of English proficiency in young children can make them more likely to be developmentally vulnerable, impacting on their health status. Encouraging attendance at kindergarten may assist in increasing English proficiency.

Private Health Coverage

Across Western Australia in 2010-2015, the Western Australia (WA) Health and Wellbeing Surveillance System indicates that children residing in WACHS are significantly more likely to have no form of private health insurance (Hospital, Ancillary or both) compared with children residing in metropolitan Perth (31% compared to 24%), and only 62 per cent of WACHS children have both Hospital and Ancillary private health insurance compared to 67 per cent in metropolitan Perth[viii]. This indicates that a greater proportion of children in the country are dependent on the public health system[viii].

Socioeconomic status can impact upon private health insurance coverage. In 2010-2011, only 33 per cent of people in the most disadvantaged socioeconomic quintile (Index of Relative Socioeconomic Disadvantage) aged 18 and over had private health insurance. This is less than half compared to the 79 per cent of people in the least disadvantaged quintile who had private health insurance[ix]. As parents purchase health insurance for children and most youth, this divide in socioeconomic status and private health insurance coverage is important to note.

Implications for health care service planning:

Socio economic status impacts on private health insurance coverage. As there is a greater proportion of people in WACHS living in lower socio economic areas, this affect rates of private health insurance coverage.

Children in WACHS are more likely to have no private health insurance and may be proportionally more reliant on the public health system for health care and services Children can access dental health care for free through the school dental health service and some allied health services through school and community health services through WACHS and Aboriginal Medical services.

Maternal Health Status

Births

From July 2008 to June 2015, 50,881 births (51.5% males) were recorded in Midwives Notification System for WACHS residents. The South West region had the highest number of births which is to be expected as it has the greatest total population (30% of total). The Kimberley region had lowest (9% of total) number of births. The average age of mothers ranged from 28.4 years in 2008/09 to 28.8 years in 2014/15.

Due to an incomplete dataset for 2014/15, an adjustment was applied based on the count of obstetrics admissions (birthing women) coded in the Hospital Morbidity Data System (HMDS). The number of births by region of residence has increased by 1.5 per cent from 2008/09 to 2014/15. The annual growth rate for WACHS births for the above period was 0.2 per cent.

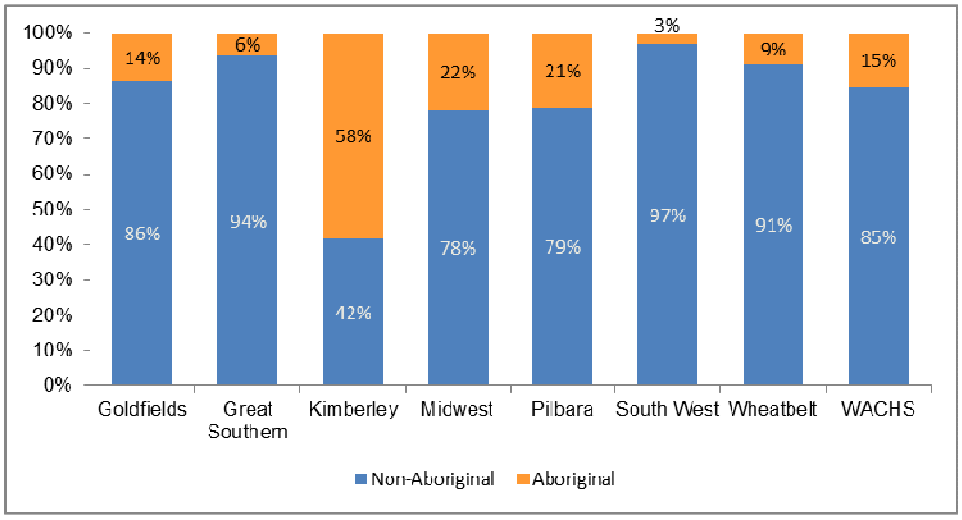
Table 4: Births by region by financial year

Health Region	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15 Projected*
Goldfields	1003	986	888	937	992	910	985
Great Southern	721	726	763	705	753	755	677
Kimberley	669	654	702	676	715	689	635
Midwest	966	945	988	903	931	883	917
Pilbara	822	846	866	895	864	910	953
South West	2055	2152	2055	2167	2196	2260	2213
Wheatbelt	962	959	958	921	944	980	927
Total	**7198**	**7268**	**7220**	**7204**	**7395**	**7387**	**7307**
Growth (from prev. year)	**n/a**	**1.0%**	**-0.7%**	**-0.2%**	**2.7%**	**-0.1%**	**-1.1%**

Source: Midwives Notification System and projection based on count of obstetrics admissions recorded in HMDS.

Out of total births, 15 per cent of births were by Aboriginal women (Figure 10). In WACHS, Kimberley had the highest proportion of Aboriginal births followed by Midwest and Pilbara. South West has the lowest proportion of Aboriginal births. In 2014/15, the mean maternal age was 25.5 years for Aboriginal and 29.4 years for Non-Aboriginal women.

Figure 10: Births by Aboriginality and health region

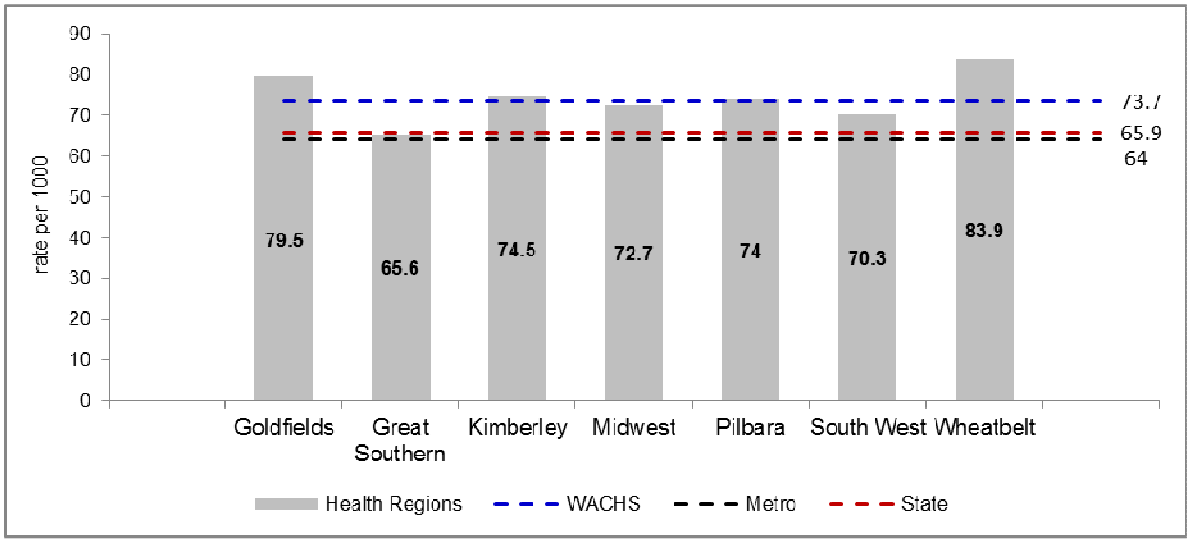


Source: Midwives Notification System (October 2016).

Maternity

In 2014, the overall WACHS age-specific birth rate per 1000 women aged 15-44 years was 73.7. This was higher than the overall State rate of 65.9 (Figure 11). There was not a great deal of variation between most of the regions. Wheatbelt had the highest (83.9) and Great Southern had the lowest (65.6) rate.

Figure 11: Age-specific birth rate (per 1,000 women aged 15-44 years, not having had Hysterectomy)

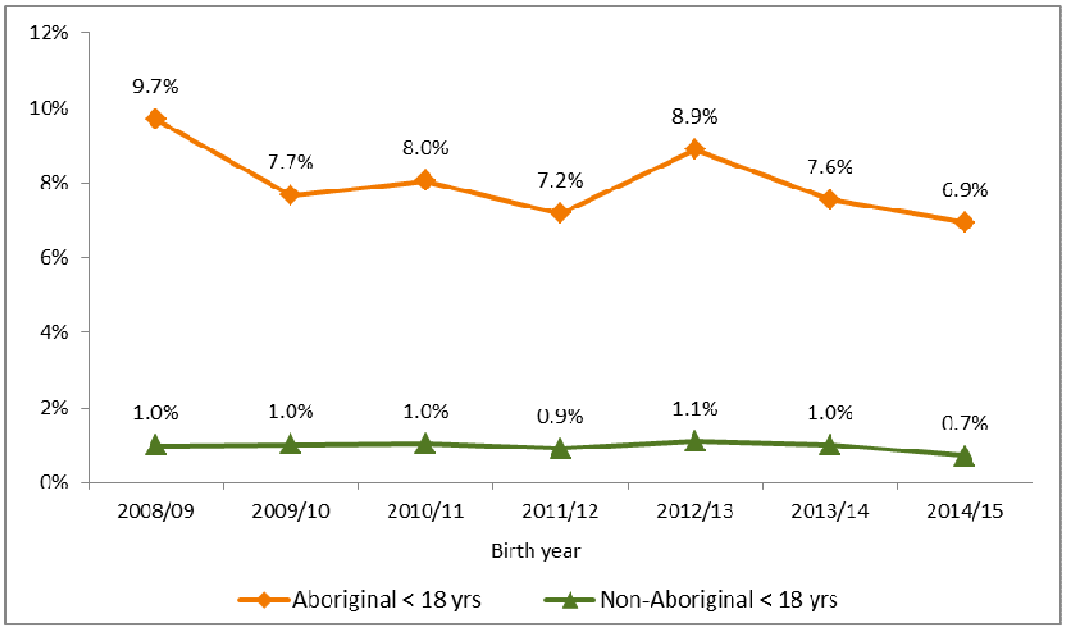


Source: DoH, Health Tracks (accessed January 2017)

Teenage mothers

Overall, in WACHS, the proportion of births to teenagers aged less than 18 years was 8 per cent for Aboriginal women, compared with 1 per cent for non-Aboriginal women.

Figure 12: Comparison of proportion of teenage (< 18 years) births by Aboriginality over time



Source: Midwives Notification System (October 2016)

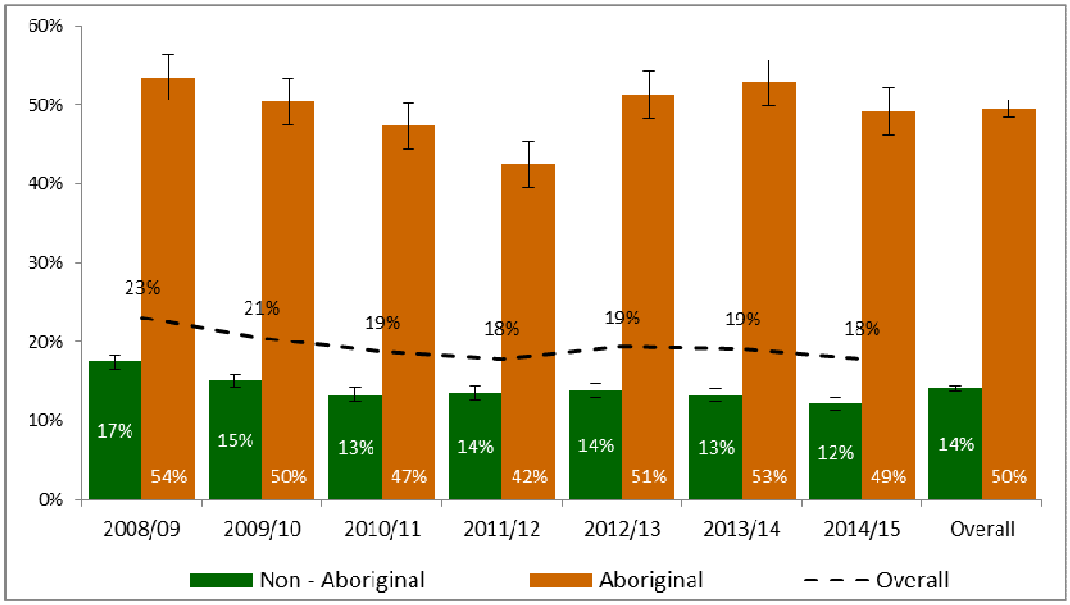
From 2008/09 to 2014/15, the proportion of teenage births among non-Aboriginal women has remained steady around one per cent, whereas the proportion of teenage births among Aboriginal women has shown an uneven trend but is generally on a decline from 9.7 per cent in 2008/09 to 6.9 per cent in 2014/15, (except in 2012/13 where the rate jumped up significantly from the previous year). By region, Pilbara (11% to 3%) and Goldfields (12% to 6%) have decreased by the largest proportion, from 2008/09 to 2014/15. However, due to small number of births, all the regions except South West have very uneven trends over the years and must be interpreted with caution.

Smoking in pregnancy

Smoking during pregnancy is associated with low birth weight, pre-term birth, placental complications and perinatal mortality. Overall, from 2008/09 to 2014/15, 50 per cent of Aboriginal women smoked while pregnant compared with 14 per cent of non-Aboriginal women.

In WACHS, the proportion of women smoking during pregnancy has declined from 23 per cent in 2008/09 to 18 per cent in 2014/15.

Figure 13: Proportion of women smoking during pregnancy



Notes: The error bars represent the 95% confidence interval of the proportion;
Source: Midwives Notification System (October 2016)

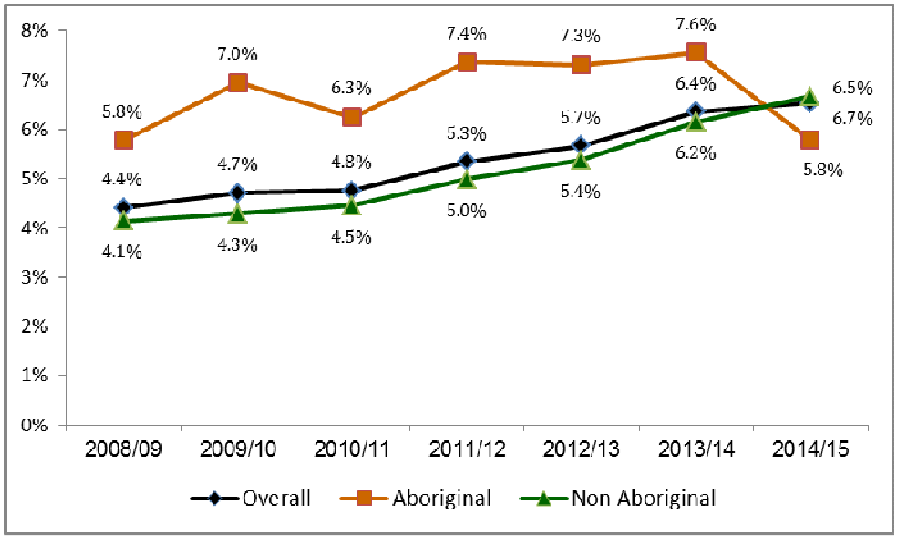
When broken down by ethnicity, the proportion of Non-Aboriginal women smoking during pregnancy has declined from 17 per cent in 2008/09 to 12 per cent in 2014/15. In contrast, the proportion of Aboriginal women smoking during pregnancy proportion decreased significantly from 54 per cent in 2008/09 to 42 per cent, in 2011/12, before increasing again in 2012/13 and ending just below 50 per cent in 2014/15.

Gestational Diabetes Mellitis

Gestational diabetes mellitis or GDM is a form of diabetes that occurs during pregnancy and usually subsides after the baby is born. It is the most common complication of pregnancy in Western Australia, and according to Diabetes Australia[x], GDM is becoming more common. Between five to ten per cent of pregnant women will develop GDM and this usually occurs around the 24th to 28th week of pregnancy. The risk is increased in women with obesity.

In 2010, AIHW released a report on diabetes in pregnancy that reviewed the impact on Australian women 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[xi].

Figure 14: Proportion of women diagnosed with gestational diabetes melitis during pregnancy



Overall, the prevalence of GDM in pregnant women residing in WACHS regions during 2008/09 to 2014/15 was 6.7 per cent, showing an increasing trend (Figure 14). Since 85 per cent of total births are for non-Aboriginal women, the prevalence of GDM among non-Aboriginal women closely follows the overall trend. However, the yearly trend for Aboriginal women is a little uneven ending with a sharp decline in 2014/15. Overall, Aboriginal women have higher prevalence of 6.7 per cent when compared with non-Aboriginal Women (5.2%). Although, in 2014/15, the prevalence among Aboriginal women went lower than non-Aboriginal women but being the last time period of data analyses, results should be interpreted with caution as most recent data can potentially be effected by lag in data coding.

Looking at the prevalence of GDM by region, overall, Great Southern has the lowest (3.9%) and Pilbara has the highest (6.5%) values. All the regions experience a positive annual growth rate with Goldfields having the highest (5.7%) and Pilbara with the lowest (1.5%) annual growth rates.

Implications for primary health care service planning:

Aboriginal women are more likely than non-Aboriginal women to be teenage mothers and to smoke during pregnancy suggesting the need for targeted and culturally appropriate health promotion strategies and antenatal services for these women.

Diabetes in pregnancy is on the increase and is a risk factor for all women. Strengthening partnerships with primary care providers, including local GPs and Aboriginal Medical Services is particularly important, given the high Aboriginal population compared to the metropolitan area.

Health Status - Child and Adolescent

Children in Care

Each year, over 19,000 child protection notifications are made to the Department of Child Protection and Family Support (DCPFS) and these notifications are increasing at a rate of 13 per cent a year[xii]. From these, if it is determined that a child or young person cannot live with their family, they are placed in care.

Children can be in care for a range of reasons, ranging from neglect, abuse, and unsuitable living environment where there may be substance abuse. According to DCPFS, 28 per cent of children leave care within 6 months, and 66 per cent of children who leave care return to live with their families.

As at June 2016, there were over 4,600 children and young people in care in Western Australia. Of this, 36 per cent (n=1,687) of these children are in the country and 73 per cent of country children in care are Aboriginal (n=1,227). In comparison, in the Perth metropolitan area 42 per cent of children in care are Aboriginal. The Department for Child Protection and Family Support is currently concentrating on reducing the overrepresentation of Aboriginal children in care, with an ultimate goal of improving the life outcomes of children in care through providing safe environments in which to live.

Table 5 - Children in care in 2016[xii]

Region	Non-Aboriginal		Aboriginal	
	Number	%	Number	%
Goldfields	19	15%	107	85%
Great Southern	89	45%	110	55%
Kimberley	< 10	<5%	> 340	>95%
Midwest	59	24%	190	76%
Pilbara	< 10	<5%	> 200	>95%
South West	182	59%	129	41%
Wheatbelt	101	42%	142	58%
WACHS	460	27%	1227	73%
Metro	1718	58%	1253	42%
State	2178	47%	2480	53%

In WACHS, two Health Regions have more than 300 children in care; the Kimberley (n > 340, > 95% Aboriginal), and the South West (n = 311, 42% Aboriginal).

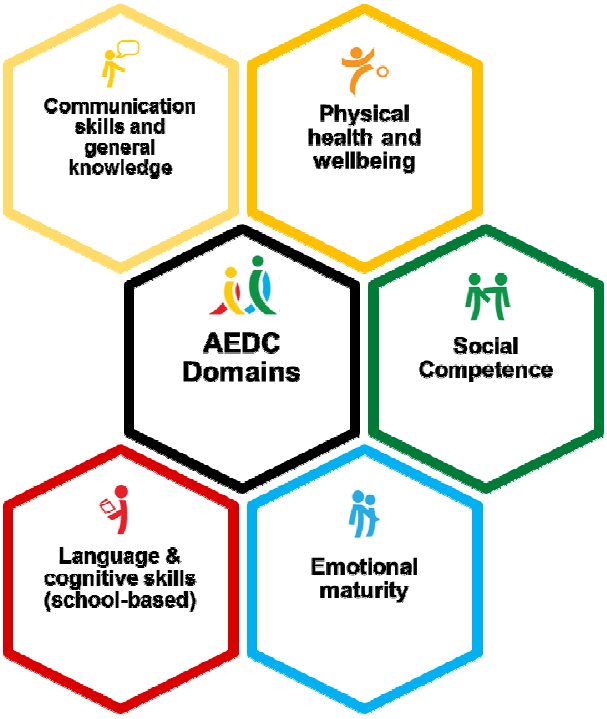
Implications for primary health care service planning:

In WACHS, 73% of the total children that are in care are Aboriginal compared to 42% in the metropolitan area and 53% in the State. More than 75% of children in care in the Kimberley, Midwest, Pilbara and Goldfields are Aboriginal.

Australian Early Childhood Development Census

The Australian Early Development Census (AEDC) measures how young children are developing when they first enter full time school. A teacher completes a checklist for each child and the scores of all children across Australia are ranked in each of the five areas (domains) of early childhood development. These domains are shown in the figure below.

Figure 15 - Australian Early Childhood Development Census Domains



Source: Australian Early Development Census (AEDC) - https://www.aedc.gov.au (accessed Feb 2017)

Children ranked in the bottom 10 per cent are classed as "developmentally vulnerable"; those in the top 75 per cent are classed as "on track" and those in between are classed as "at risk". Results are reported by child's community of residence.

Across Australia in 2012, 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[xiii].

Where children live has a significant impact on their development. Children that live in major cities are less likely to be developmentally vulnerable on one or more domains compared to those living in very remote areas – 21 per cent compared to 47 per cent of children. Additionally, developmental vulnerability is increasing for children in very remote areas, which is concerning for children in WACHS.

Socio-economic status also impacts on development, with children in areas of least disadvantage more likely to be on track according to the domains.

AEDC WA and WACHS – Developmentally vulnerable on one or more domains

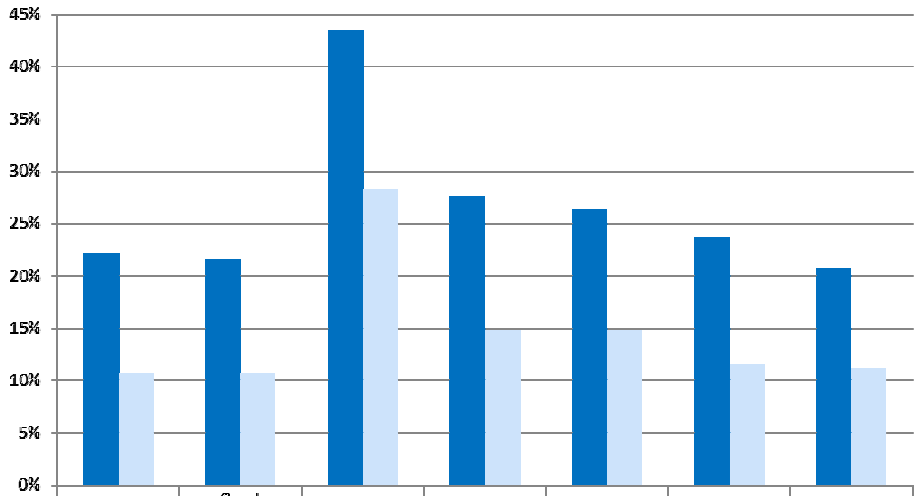
In Western Australia, 21 per cent of children were identified as developmentally vulnerable on one or more domains for 2015. Twenty-five per cent of children in WACHS were identified as developmentally vulnerable which was higher than the 20 per cent in the Perth metropolitan area.

Aboriginal children are twice as likely to be identified as developmentally vulnerable. In WACHS, 54 per cent of Aboriginal children were developmentally vulnerable on one or more domains, compared to 38 per cent of Aboriginal children in the metropolitan area.

The Kimberley showed the highest proportion of vulnerability on one or more domains for all children, with 44 per cent of children being identified as vulnerable, and the Wheatbelt showed the lowest proportion of vulnerability, at 21 per cent.

The Kimberley also showed the highest proportion of vulnerability for Aboriginal children, with 63 per cent of children being identified as vulnerable on one or more domains, and the Wheatbelt showed the lowest proportion of vulnerability, at 39 per cent.

Figure 16 - Percentage of children vulnerable on one or more or two or more domains[xiv]



	Goldfields	Great Southern	Kimberley	Midwest	Pilbara	South West	Wheatbelt
developmentally vulnerable on one or more domains	22%	22%	43%	28%	26%	24%	21%
developmentally vulnerable on two or more domains	11%	11%	28%	15%	15%	12%	11%

AEDC – Developmentally vulnerable on two or more domains

In Western Australia, 11 per cent of children were identified as developmentally vulnerable on two or more domains for 2015. In comparison, thirteen per cent of WACHS children and 10 per cent of metropolitan children were identified as developmentally vulnerable on two or more domains.

Aboriginal children are almost three times as likely to be identified as developmentally vulnerable on two or more domains, at 29 per cent for all of Western Australia. In WACHS, 35

per cent of children were vulnerable on two or more domains, compared to 20 per cent of children in the metropolitan area.

The Kimberley showed the highest proportion of vulnerability on two or more domains for all children, with 29 per cent of children being identified as vulnerable, and the Great Southern showed the lowest proportion of vulnerability, at 11 per cent.

The Kimberley showed the highest proportion of vulnerability for Aboriginal children, with 43 per cent of children being identified as vulnerable on two or more domains, and the Wheatbelt showed the lowest proportion of vulnerability, at 24 per cent.

AEDC – Spotlight on the Physical Health and Well-being domain

The Physical Health and Well-being domain measures several factors, and those falling into the developmentally vulnerable category exhibit characteristics such as a childs';

- physical readiness for the school day, such as being dressed appropriately, and not arriving at school hungry or tired;
- physical independence regarding their own needs, co-ordination; and
- gross and fine motor skills.

In 2015, 13 per cent of children in WACHS in total were identified as developmentally vulnerable in the Physical Health and Well-being domain, compared to nine per cent in the metropolitan area. It is interesting to note that the proportion of vulnerable Non-Aboriginal children is nine per cent i.e. same as the proportion for Non-Aboriginal children in metropolitan area and state. In contrast, the proportion of Aboriginal kids in WACHS vulnerable on Physical Health and Wellbeing domain is 30 per cent, which is much higher than 19 per cent in metropolitan areas.

Table 6 - Percentage of children vulnerable on the Physical Health and Wellbeing domain[xiv]

Region	Non-Aboriginal	Aboriginal
Goldfields	6%	25%
Great Southern	9%	25%
Kimberley	4%	37%
Midwest	9%	30%
Pilbara	6%	28%
South West	11%	27%
Wheatbelt	10%	23%
WACHS	9%	30%
Metro	9%	19%
State	9%	29%

The Kimberley showed the highest proportion of vulnerability for all children, with 25 per cent of children being identified as vulnerable, and the Goldfields showed the lowest level of vulnerability, at nine per cent.

In 2015, for Aboriginal children in WACHS, 30 per cent were identified as vulnerable in the Physical Health and Well-being domain, compared to 19 per cent in the metropolitan area.

The Kimberley showed the highest proportion of Physical Health and Wellbeing developmental vulnerability for Aboriginal children, with 37 per cent of children being identified as vulnerable, and the Wheatbelt showed the lowest level of Physical Health and Well-being vulnerability, at 23 per cent.

Table 7 - Number of children vulnerable on the Physical Health and Wellbeing domain[xiv]

Region	Non-Aboriginal	Aboriginal
Goldfields	46	33
Great Southern	68	21
Kimberley	8	137
Midwest	61	59
Pilbara	42	58
South West	269	33
Wheatbelt	74	30
WACHS	568	371
Metro	2,097	155
State	2,667	526

The South West has a high number of non-Aboriginal children that are vulnerable on the Physical Health domain (269), making it the region with the most children that are vulnerable.

Implications for primary health care service planning:

Aboriginal children are twice as likely to be identified as developmentally vulnerable on one or more domains compared to non-aboriginal children, and three times as likely on two or more domains.

The AEDC results indicate the need for child development services including increased access in areas where there is high need to multidisciplinary teams made up of medical services, child health nurses, speech pathology, physiotherapy and occupational therapy, particularly in the Kimberley, Midwest and Pilbara.

Childhood Vaccinations

Immunisation against communicable disease is one of the most effective public health interventions, reducing the mortality and morbidity associated with vaccine preventable conditions. Australian vaccination coverage targets are greater than 90 per cent at two years of age and near 100 per cent at school entry age. However, a new national aspirational target of 95 percent has been set to create the 'herd' immunity necessary to stop the ongoing transmission of vaccine preventable diseases[xv].

The *Western Australian Immunisation Strategy 2016-2020* highlights several objectives in relation to vaccinations, some of which relate directly to child health. These include increasing vaccination coverage for children, adolescents, Aboriginal people, coupled with increasing support for immunisation providers, increasing workforce capacity and improving communication with stakeholders and the community[xvi].

In WA, a pilot project was undertaken by the Communicable Disease Control Directorate (CDCD) in WA Health[xvii] to determine why some children had no vaccination records on the Australian Immunisation Register (AIR). CDCD found that 44% had moved from overseas and were immunised in their home country but their immunisation records had not been recorded on AIR. The second most common reason for having no vaccination recorded (28%) was that the parent was a conscientious objector that had not registered with Medicare.

In 2015, WACHS recorded 93 per cent of children aged 12 to less than 15 months as fully immunised, 90 per cent of children aged 24 to less than 27 months as fully immunised, and 93 per cent of children aged 60 to less than 63 months as fully immunised[xviii]. This met the target of having 90 per cent of children vaccinated to create community immunity to stop the ongoing transmission of diseases; however, there was variation between regions.

Table 8 - Immunisation rates for 2015 [xviii]

Region	Non-Aboriginal			Aboriginal		
	12-<15 months	24-<27 months	60-<63 months	12-<15 months	24-<27 months	60-<63 months
Goldfields	94%	91%	93%	78%	92%	96%
Great Southern	93%	90%	92%	88%	82%	97%
Kimberley	94%	95%	97%	92%	91%	97%
Midwest	94%	90%	93%	81%	81%	87%
Pilbara	97%	92%	95%	87%	84%	95%
South West	91%	88%	89%	87%	80%	92%
Wheatbelt	96%	93%	96%	95%	91%	93%
WACHS	94%	90%	92%	87%	87%	94%
Metro	92%	88%	91%	78%	78%	88%
State	93%	88%	91%	83%	83%	92%

Immunisation in children aged 12 months to less than 15 months

In the age group of 12 to less than 15 months, all WACHS regions achieved the target of greater than 90 per cent. The regions with the lowest vaccination coverage are the South West (91 %), Midwest (91%) and Goldfields (92%)(Table 8).

For Aboriginal children, only the Wheatbelt (95%) and Kimberley (92%) surpassed the target of 90 per cent. The Great Southern (88%), Pilbara (87%), South West (87%), Midwest (81%), and Goldfields (78%) fell below the 90% target.

Immunisation in children aged 24 months to less than 27 months

There is a drop in immunisation coverage from the 12 to less than 15 months age group and the 24 to less than 27 months age group, with three of seven regions not achieving the target of 90 percent; those being the Great Southern (89%), Midwest (88%) and South West (87%) (Table 8).

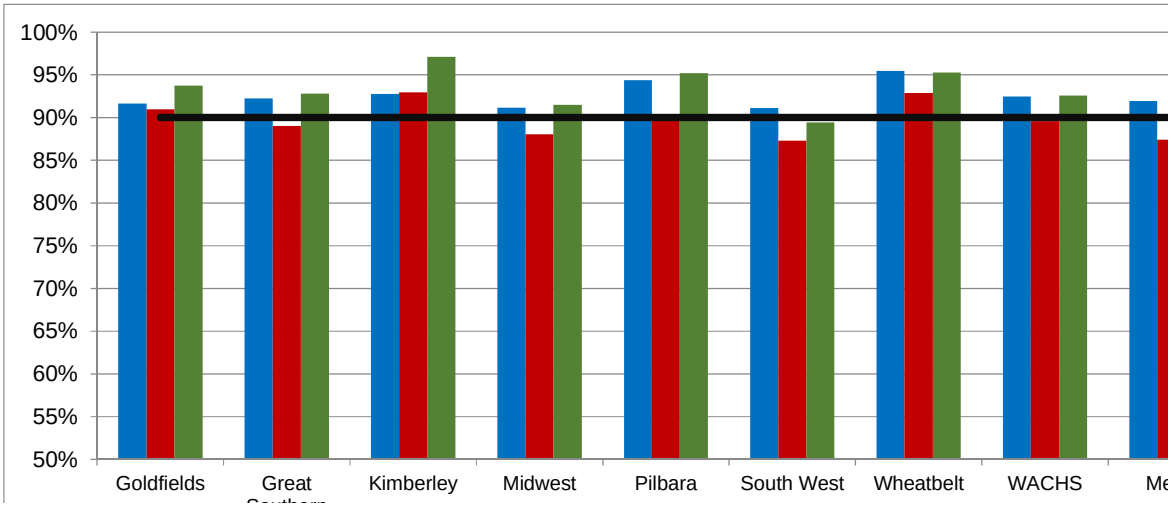
For Aboriginal children, the Goldfields (92%), and Kimberley (91%) regions achieved the target of 90 per cent. The remaining four regions did not meet the target of 90 per cent; Pilbara (84%), Great Southern (81%), Midwest (80%), and South West (79%).

Immunisation in children aged 60 months to less than 63 months

Immunisation in the 60 to less than 63 months age group only had one region – the South West (89%) - that did not achieve the target of 90 per cent (Table 8).

For Aboriginal children, six of the seven regions met the 90 per cent target, with the Midwest (87%) being the only region not achieving the target.

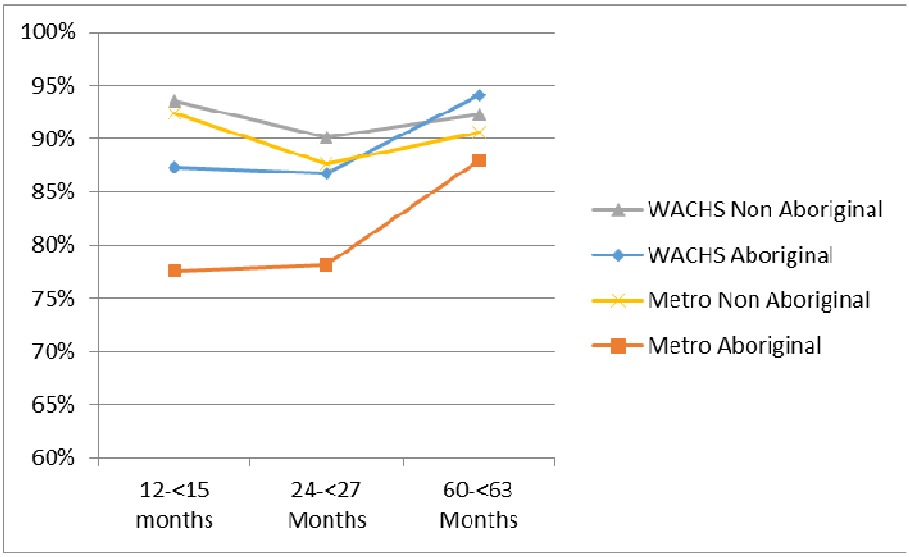
Figure 17 - Immunisation coverage by Age Group*



**2015 data[xviii], all quarters, meningococcal C (given at 12 months), and dose 2 measles, mumps, rubella (MMR) and dose 1 varicella (given as MMRV at 18 months) was included in the definition of fully immunised for the 24-27 month cohort. The inclusion of these immunisations to the coverage calculation has caused a drop in the 24-27 month coverage rates. The coverage rate has dropped because the criterion to be assessed as fully immunised now includes more vaccines. The more vaccines included in the assessment, the higher the likelihood of reduced coverage rates. This usually resolves over time as the changes become more routine.*

The dip in vaccination coverage for the 24 to 27 month age group (Figure 17) can be attributed to the change in the definition of fully vaccinated in late 2014, with three additional vaccines being added to the definition of "fully immunised". This has been steadily increasing for each quarter in 2015, with WACHS children overall meeting the 90 per cent goal.

Figure 18 - Percentage of children fully immunised, WACHS and metropolitan Perth[xviii]



Aboriginal children in WACHS are less likely to be fully immunised compared to non-Aboriginal children (Figure 18) for the ages 12 to less than 15 months (87.3% versus 93.5%) and 24 to less than 27 months (86.8% versus 90.1%), but have a higher coverage in the 60 to less than 63 month age group (94% versus 92.3%). This indicates that there should be a focus on improving vaccination in the two younger age groups for Aboriginal children, and a focus on improving vaccinations for non-Aboriginal children in the 60 to 63 month age group.

Human Papillomavirus (HPV) vaccination

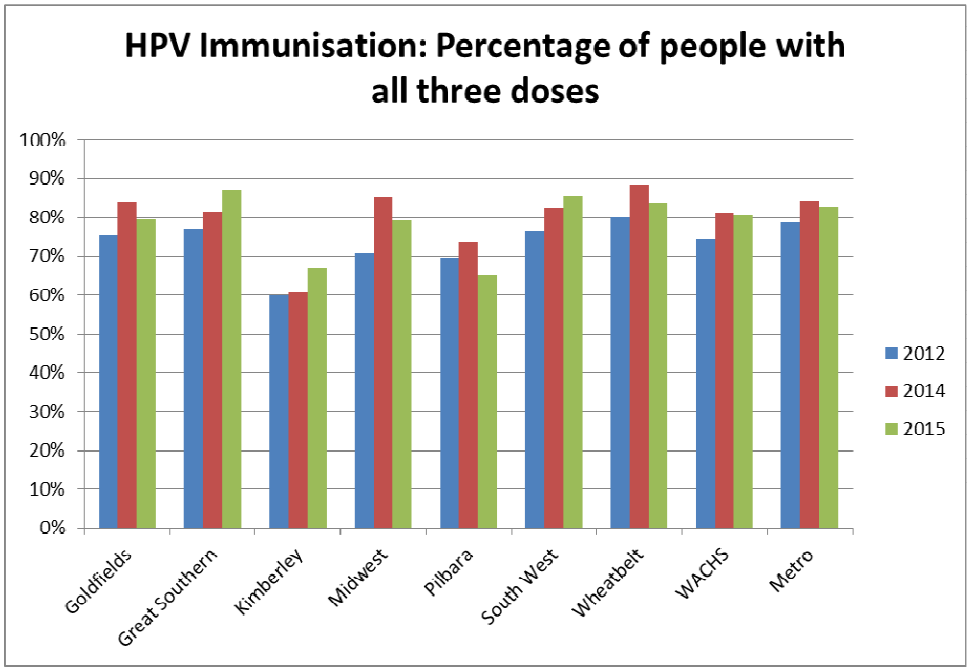
HPV is a virus that can cause changes to cells that can lead to a range of HPV-related cancers and other diseases, such as genital warts. It is spread through genital contact, with four out of five people who have ever had sex having had HPV at some point in their lives. HPV types 16 and 18 infections are responsible for 70 per cent of cervical cancer cases, 50 per cent of high-grade precancerous lesions and 25 per cent of low-grade lesions[xix].

There is currently no treatment for HPV, and the most effective time to vaccinate against HPV is before people are exposed through becoming sexually active, therefore this is an important vaccination for children. If a person is already infected the protection the vaccination affords against HPV-related cancers may be reduced.

In 2007, the National HPV Vaccination Program was initiated with the aim of vaccinating all Australian females aged 12-26 years. A complete course is three doses over a period of four to six months administered through school based programs for children aged 12-18 years, where vaccination is free. In 2013 the school based program was also extended to include males.

HPV vaccination is also important for males as cancers of the anus, mouth/throat and penis can result from HPV infections. In addition, vaccination in males is likely to benefit females by reducing the spread of HPV. Studies on the efficacy of the HPV vaccination program in Australia have shown that there was a moderate decline in annual treatment rates of penile warts in males from 2007-2011[xx], which reflects herd immunity effects, as this was before the HPV program was extended to males. In this same time period there was a significant decreasing trend of vulvar/vaginal warts in women, demonstrating the efficacy of this program.

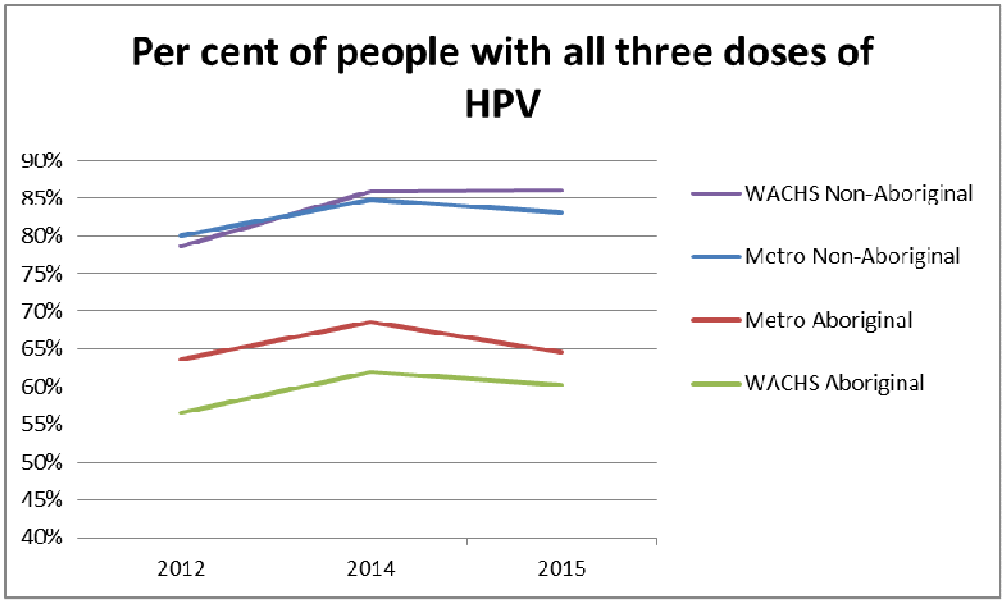
Figure 19 - Percentage of people with all three doses of the HPV vaccine[xxi]



In WACHS, the percentage of people with all three doses of HPV has remained steady at 81 per cent over the last two years (2014-2015)[xxi]. However, there is large variation between regions, with the Kimberley (ranging from 60% in 2012 to 67% in 2015) and the Pilbara (ranging from 69% in 2012 to 65% in 2015) having a lower percentage of adolescents completing the three dose schedule than the state average of 82 per cent in 2015.

Aboriginal people are less likely to complete the three dose schedule, with only 60 per cent being fully immunised in 2015, although Aboriginal people are just as likely or more likely to consent and begin the course. This is a larger gap compared to other forms of immunisation, and could be due to inappropriate educational resources for Aboriginal parents, as was demonstrated in a Victorian project that investigated cross-cultural responses to HPV[xxii]. For WACHS this gap is consistently around 20 per cent less compared to non-Aboriginal people.

Figure 20 - Comparison of WACHS and Metropolitan HPV vaccination[xxi]



The metropolitan and WACHS non-Aboriginal populations have similar rates of receiving all three doses of HPV, between 80 and 85 per cent. There is a broader gap between Aboriginal people in metropolitan Perth and WACHS receiving all three doses, ranging from 59 to 69 percent, which may be due to remoteness.

There is a large gap between non-Aboriginal and Aboriginal people getting all three doses of the HPV vaccine. In WACHS, rates of vaccination are 26 per cent less than non-Aboriginal people, compared to 18 per cent in the metropolitan area. The more remote areas such as the Kimberley, Midwest, Pilbara and Goldfields also experienced higher differences in vaccination rates.

Table 9 - Difference Aboriginal HPV Immunisation compared to non Aboriginal

Region	2012	2014	2015
Goldfields	-23%	-13%	-23%
Great Southern	-24%	-12%	-10%
Kimberley	-29%	-43%	-35%
Midwest	-23%	-25%	-30%
Pilbara	-13%	-20%	-29%
South West	-10%	-16%	-7%
Wheatbelt	-16%	-7%	-10%
Country	-22%	-24%	-26%
Metro	-16%	-16%	-18%
State	-20%	-21%	-22%

There is a consistent difference between Aboriginal and non-Aboriginal HPV rates, and the most significant differences for 2015 are in the Kimberley (-35% difference), Midwest (-30%

difference) and Pilbara (-29% difference). These are some of the more remote and socio-economically challenged areas of the state.

National statistics indicate that remoteness can influence the chance of being fully immunised, with 2012 data showing that 65 per cent of females in Very Remote areas were fully vaccinated compared to 74 per cent in Remote, Outer Regional and Inner Regional.[xxiii]. In Major Cities 77 per cent of females were fully immunised. This remoteness influence could contribute to the Pilbara (49%), Midwest (53%) and Kimberley (56%) regions having the lowest percentage of Aboriginal people being fully immunised for HPV.

Implications for primary health care service planning:

There should be a focus on improving childhood vaccination in the two younger age groups for Aboriginal children, and a focus on improving vaccinations for non-Aboriginal children in the 60 to 63 month age group.

Remoteness influences the likelihood of receiving all three doses of the HPV vaccine, so focus may be needed in more remote areas such as the Pilbara, Midwest and Kimberley regions.

There is currently a 26% gap between Aboriginal and non-Aboriginal people receiving all three HPV doses in WACHS. A focus on culturally appropriate resources and approaches may be required.

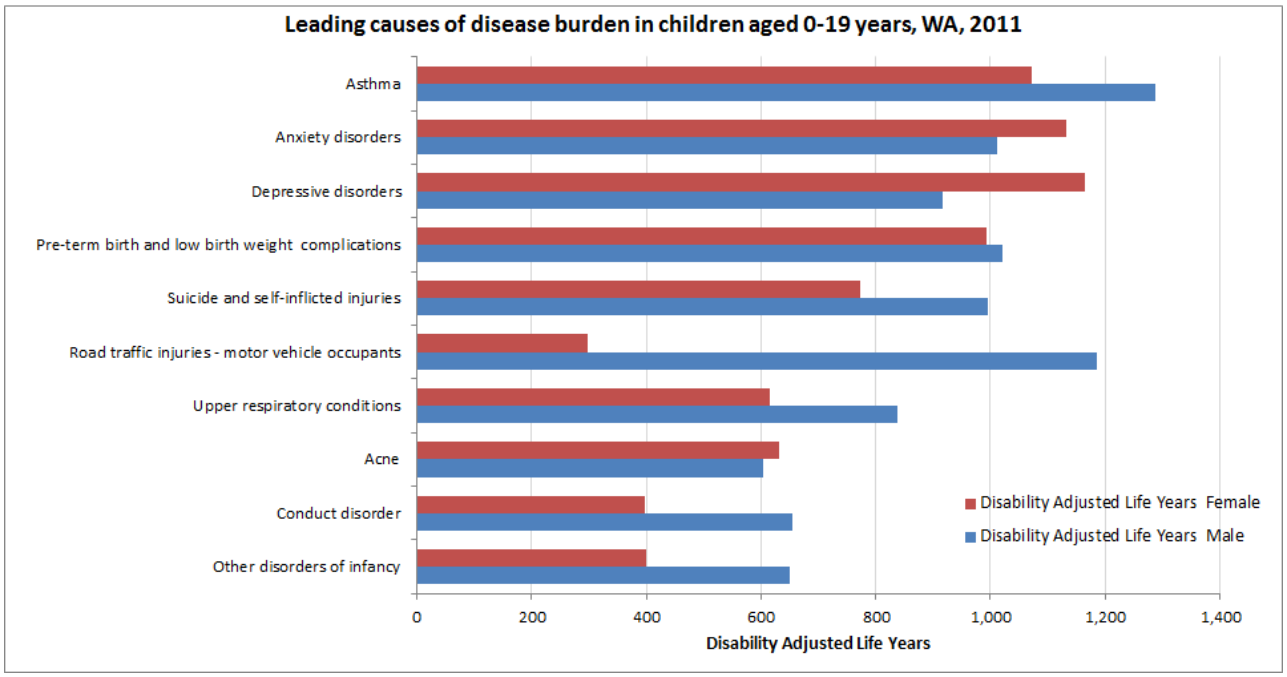
Burden of Disease

Burden of disease is the most comprehensive and comparable assessment of a population's health[xxiv]. It can improve understanding of the impact of certain diseases and risk factors on a community, which can help to better prioritise public health efforts. It also includes services undertaken outside of a hospital setting, such as community health, public health and general practice[xxv].

Burden of disease is measured using Disability Adjusted Life Years (DALY). This is the combination of Years of Life Lost (YLL) from premature deaths (fatal burden) and Years Lost due to Disability (YLD) such as living with an illness or injury (non-fatal burden).

Burden of disease data cannot be broken down into smaller geographical areas or by Aboriginality at this point, and as a result this data is for all children and youth in Western Australia, based on 2011 data. The burden of disease profiles are quite different for males and females for this age group, which can be seen in Figure 21.

Figure 21 - Leading causes of Disease Burden in children 0-19 years in Western Australia[xxv]



Asthma was the leading cause of disease burden in children aged 0-19 years in WA in 2011[xxvi] and was responsible for over 2,300 disability adjusted life years and accounted for six per cent of the total disease burden in this age group. Asthma was also the leading cause of disease burden for males, accounting for 1,288 disability adjusted life years and six per cent of the total disease burden, whereas for females asthma was the third leading cause.

Anxiety and depressive disorders were the next leading causes of disease burden representing over 4,200 disability adjusted life years or over ten per cent of total disease burden.

Males far outweighed females in road traffic injuries, accounting for 80 per cent of the disability adjusted life years with 1,186 and 5 per cent of the total disease burden. Road traffic injuries were not in the top ten leading causes for females.

Combined, asthma and road traffic injuries in males accounted for 11 per cent of the disease burden in this age group.

Depressive disorders were the leading cause of disease burden for females, accounting for over 1,165 disability adjusted life years and six per cent of the total disease burden, whereas for females asthma was the sixth leading cause.

Anxiety disorders were the second leading cause in females with six per cent of the total disease burden and 1,132 disability adjusted life adjusted years.

Combined, depressive and anxiety disorders in females accounted for 12 per cent of the disease burden in this age group.

Implications for health service planning:

Burden of disease can improve understanding of the impact of certain diseases and risk factors on a community, which can help to better priorities public health efforts. It also includes services undertaken outside of a hospital setting, such as community health, public health and general practice.

Self-reported Health Status

The WA Health and Wellbeing Surveillance System (HWSS) collects data on the health and wellbeing of Western Australians, including their self-assessed health status on an ongoing basis. This is a population based survey carried out by Computer Assisted Telephone Interview, which is designed to provide results and examine trends at a population level. Parents/guardians report on behalf of children aged 0-15 years[xxvii].

Self-reported ratings of health are used widely with poor health associated with increased mortality and psychological distress compared with excellent or very good ratings[xxviii].

While the information collected through the HWSS is representative of WA children as a whole, it is unlikely to be representative of minority groups such as Aboriginal children, children from non-English speaking backgrounds and children living in homes without telephones. Due to the high proportion of Aboriginal people in some areas in WACHS, consequently survey estimates for regions where the proportion of Aboriginal children is high may be affected.

The following summary represents data collected between 2010 and 2015.

Self-reported Health Service Utilisation

Primary health care services include services provided by medical specialists, general practitioners and community health nursing services. Primary health care utilisation during the last twelve months in WACHS was reported to be 79 per cent for children aged 0-15, which was statistically lower compared to metropolitan areas (84%), but for the 0-4 age group it was around the same as the State (91 % for WACHS compared to the 92% for the State).

In the Kimberley, for the age group of 0-15, the utilisation was lower (72%) compared to the State (81%) and the Goldfields it was 73 per cent. The Midwest had the highest primary health service utilisation for the 0-4 age group (98%) compared to the state (92%).

Limited access to GP and other primary health care services due to remoteness and workforce availability impact on service utilisation.

In WACHS, it was reported that 58 per cent of children aged 0-15 used a dental health care service in the previous twelve months. There was a significant increase in utilisation through the age groups from 0-4 (10%), 5-9 (76%) and 10-15 (83%).

Children aged 5-9 in the Great Southern used dental health services more than other children in WACHS and children aged 5-9 in the Kimberley used dental services less. This differs from hospitalisation data which shows Kimberley children are hospitalised for oral and dental procedures more than WACHS. This may be due to lack of access to dental health care services. (need to link with PPH section – coming later)

Allied health care services include opticians, physiotherapists, chiropractors, podiatrists, dietitians, nutritionists, occupational therapists or diabetes/ other health educators. For allied health care services, 26 per cent of children in WACHS aged 0-15 used an allied health care service in the last twelve months. There was a significant increase in utilisation of services through the age groups, from 17 per cent for 0-4 year olds, 26 per cent for 5-9 year olds, and up to 36 per cent for 10-15 year olds.

The prevalence for each of the National Health Priority Area Health Conditions and Injury, for WACHS children surveyed showed that:

- one in five children aged 0-15 (21%) reported an injury requiring treatment from a medical professional in the previous year
- one in ten children (10%) had asthma
    - children aged 10-15 in the Wheatbelt reported significantly higher prevalence of asthma at 19 per cent and children in the Goldfields for the same age group reported significantly lower prevalence of asthma (4%) compared to the State (10%) for that age group.

Self-reported Lifestyle factors

For WACHS, the HWSS also showed that for children:

- two thirds (69%) consume two serves of fruit daily*.
- only one in ten (9%) eat five serves of vegetables daily*.
- around half of children (48%) did not do sufficient physical activity#.
- one in four children (24%) were sedentary for more than two hours a day in WACHS, however children in the Wheatbelt aged 10-15 are less likely to be sedentary (21%) compared to the State. 33 per cent of children aged 5-15 in the Pilbara are sedentary for more than 2 hours a day, which is statistically higher when compared to the rest of WACHS.
- one in six children (17 %) reported height and weight measurements that classified them as overweight and one in fifteen children (7%) reported measurements that classified them as obese. The Pilbara had a significantly higher prevalence (20%) of children considered obese aged 5-9 when compared to the State (8%), as well as for children aged 5-15 (14%) when compared to the State (7%).
- 98% of households with children in WACHS were reported as smoke free, which is similar to the State (98%).

**The number of serves recommended for sufficient consumption varies dependent on age and sex, so this figure is not equivalent to 'sufficient intake'.*
#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.

Notifiable Infections

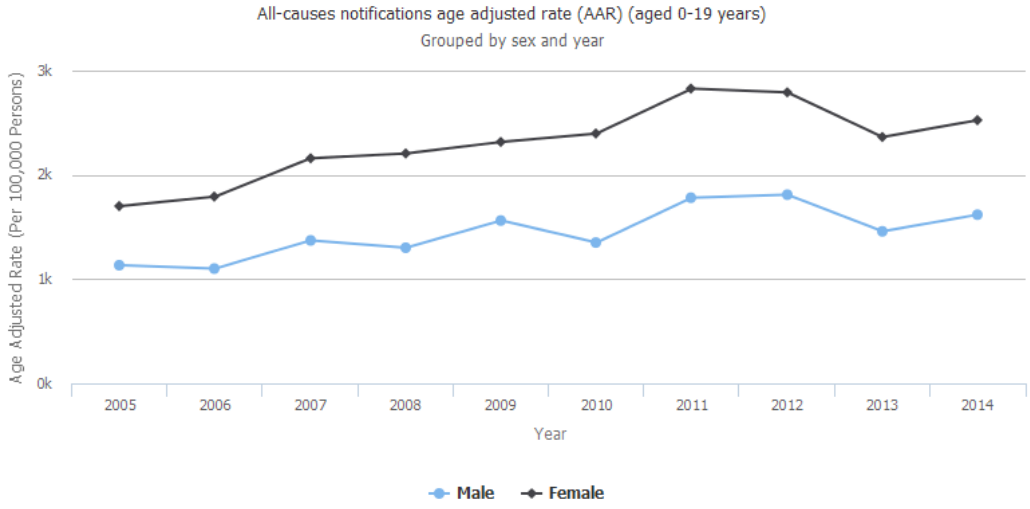
Death and illness resulting from communicable diseases are a major public health problem. Effective containment of many communicable diseases has occurred due to public health legislation requiring notifying of these diseases. 'Notifiable' diseases include a range of vaccine preventable diseases, vector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

Under the provisions of the Public Health Act 2016, 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. A complete list of the current notifiable diseases can be accessed at http://ww2.health.wa.gov.au/Improving-WA-Health/Public-health

For 2007-2011, there were 13,888 notifiable diseases in children and youth aged 0-19 years in WACHS[xxix]. The notification rate for notifiable diseases (2,069 per 100,000) was significantly higher (1.56 times) for WACHS children than for children in the State (1,311 per 100,000). The enteric disease notification rate (326 per 100,000) for WACHS children was significantly higher (1.45 times) than state children and includes conditions such as shigellosis, campylobacteriosis Hepatitis A, salmonellosis, cryptosporidiosis and rotavirus.

There has been an increase of the AAR between 2005 and 2014 for all-cause notifications in WACHS. The rate remained significantly higher (SRR 1.56, AAR 2,069, n = 12,888) than the State for 2010-2014 (AAR 1,311, n = 41,055). The State rate fluctuated throughout 2007 to 2014.

Figure 22 - All-cause notifications for notifiable diseases over time[xxix]



For children aged 0-4 years in WACHS, the rate of all notifications was significantly higher than the state (SRR 1.43, n = 2,818). The highest rates of notifiable diseases were for blood-borne diseases (SRR 2.32, n = 9) and sexually transmitted infections (STIs) (SRR 2.43, n = 5) however the numbers for these were so small that small fluctuations can have significant impact. The most cases of notifiable infections were enteric infections (SRR 1.67, n = 1,640) and vaccine-preventable diseases (SRR 1.19, n = 1,138). Both were higher than the state rate.

For children aged 5-9 years in WACHS, the rate of all notifications was significantly higher than the state (SRR 1.18, n = 1,600). The highest rates of notifiable diseases were for STIs (SRR 3.71, n = 8) however the numbers were so small that small fluctuations can have significant impact. The most cases of notifiable infections were vaccine-preventable diseases (SRR 1.17, n = 1,215) and enteric infections (SRR 1.19, n = 337). Both were higher than the State rate.

For children aged 10-14 years in WACHS, the rate of all notifications was significantly higher than the state (SRR 1.53, n = 2,074). The highest rates of notifiable diseases were for STIs (SRR 2.79, n = 685), which was significantly higher than the state rate. The most cases of notifiable infections were vaccine-preventable diseases (SRR 1.33, n = 1,121) and enteric infections (SRR 1.01, n = 195). Only the vaccine-preventable diseases were higher than the state rate, enteric infections were similar to the state.

For children aged 15-19 years in WACHS, the rate of all notifications was significantly higher than the state (SRR 1.76, n = 7,396). The highest rates of notifiable diseases were for sexually transmitted infections (SRR 1.88, n = 6,494), which was significantly higher than the state rate. Following this, the most cases of notifiable infections were vaccine-preventable diseases (SRR 1.21, n = 447) and enteric infections (SRR 1.19, n = 245). Both or these were higher than the state rate.

Implications for primary health care service planning:

Children in WACHS have higher rates of all notifiable diseases compared to the state, in all age groups. More detail by region and by Aboriginality can be provided upon request.

Potentially Preventable Hospitalisations

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

- Acute: This category includes dehydration and gastroenteritis, pyelonephritis (kidney infection), pelvic inflammatory disease, 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 2010-2014, PPH accounted for 16,639 hospitalisations of WACHS children and youth aged 0-19 years in both WACHS and Metropolitan hospitals. This was significantly higher (1.26 times) for WACHS children than for children in the state[xxix].

In WACHS, ENT infections and dental conditions are the two leading PPH across most age groups. Other conditions in the top five PPH are convulsions and epilepsy, urinary tract infections, cellulitis, asthma and diabetes complications.

Figure 23 - Top five PPH in WACHS by age group for all children and youth[xxix]

Ranking	0 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years
1st	ENT infections	Dental conditions	Dental conditions	ENT infections
2nd	Dental conditions	ENT infections	ENT infections	Urinary Tract Infections, including pyelonephritis
3rd	convulsions and epilepsy	Asthma	Asthma	Dental conditions
4th	Urinary Tract Infections, including pyelonephritis	Cellulitis	Cellulitis	Cellulitis
5th	Cellulitis	Convulsions and Epilepsy	Diabetes complications	Convulsions and Epilepsy

However, there are different leading conditions when PPH are broken down by region and by Aboriginality.

Leading conditions for PPH for non-Aboriginal Children and Youth

For non-Aboriginal children aged 0-19 in WACHS, the overall leading PPH for the period 2010-2014 is detailed below. The conditions that are statistically higher compared to the State rates are ENT infections (SRR 1.08, accounting for 5.1% of all cases), Asthma (SRR of 1.21, accounting for 2% of all cases) and Convulsions and Epilepsy (SRR of 1.11, accounting for 1.9% of all cases).

Table 10 - Leading PPH for WACHS for Non-Aboriginal children aged 0-19 years[xxix]

Condition	N	SRR	% all cases
Dental conditions	3,613	1	6.6%
ENT infections	2,808	1.08	5.1%
Asthma	1,069	1.21	2.0%
Convulsions and Epilepsy	1,054	1.11	1.9%
Urinary Tract Infections	918	0.98	1.7%

For non-Aboriginal children, the progression of PPH through the age groups is fairly even, whereas there is significant variability in the leading PPH condition in Aboriginal children, especially from the age of 10.

For 0-4 year old non-Aboriginal children in WACHS, ENT infections were the primary PPH, accounting for 3.2 per cent of all cases. The South West was the only region that had a different primary PPH condition – that being Dental conditions – accounting for 2.6 per cent of all cases.

For 5-9 year old non-Aboriginal children in WACHS, Dental conditions were the primary PPH, accounting for 3.2 per cent of all cases.

For 10-14 year old non-Aboriginal children in WACHS, Dental conditions were the primary PPH, accounting for 0.6 per cent of all cases. For the Goldfields, Asthma (0.6% of all cases) was the primary PPH, and for the Kimberley ENT infections (0.6%) were the primary PPH.

For 15-19 year old non-Aboriginal children in WACHS, ENT infections were the leading PPH at 0.7 per cent. The only WACHS region where this was not the case was the Kimberley where Dental conditions were the leading PPH for 0.8 per cent of all cases.

Figure 24 - Leading PPH by region and age group for Non-Aboriginal children, showing percentage of all hospitalisations or all PPHs[xxix]

Health Region	0-4	5-9	10-14	15-19
Goldfields	ENT infections (4%)	Dental conditions (2.3%)	Asthma (0.6%)	ENT infections (0.9%)
Great Southern	ENT infections (3.2%)	Dental conditions (2.5%)	Dental conditions (0.6%)	ENT infections (0.6%)
Kimberley	ENT infections (6.3%)	Dental conditions (2.3%)	ENT infections (0.6%)	Dental conditions (0.8%)
Midwest	ENT infections (2.3%)	Dental conditions (2.8%)	Dental conditions (0.7%)	ENT infections (0.7%)
Pilbara	ENT infections (6.7%)	Dental conditions (4.5%)	Dental conditions (0.6%)	ENT infections (0.8%)
South West	Dental conditions (2.6%)	Dental conditions (4%)	Dental conditions (0.6%)	ENT infections (0.5%)
Wheatbelt	ENT infections (3.1%)	Dental conditions (3%)	Dental conditions (0.7%)	ENT infections (0.7%)
WACHS	ENT infections (3.2%)	Dental conditions (3.2%)	Dental conditions (0.6%)	ENT infections (0.7%)
Metro	ENT infections (3.3%)	Dental conditions (3.3%)	Dental conditions (0.8%)	Dental conditions (0.7%)
State	ENT infections (3.3%)	Dental conditions (3.3%)	Dental conditions (0.7%)	Dental conditions (0.7%)

Leading conditions for PPH for Aboriginal Children and Youth

For Aboriginal children and youth aged 0-19 in WACHS, the leading PPH for the time period 2010-2014 is detailed below. The conditions that are statistically higher compared to the State were ENT infections (SRR of 1.32, accounting for 7.6% of all cases), Cellulitis (SRR of 1.14, accounting for 4% of all cases), Convulsions and Epilepsy (SRR o 1.13, accounting for 2.4% of all cases) and Urinary Tract Infections (SRR of 1.23, accounting for 2% of all cases).

Table 11 - Leading PPH for WACHS for Aboriginal children aged 0-19 years[xxix]

Condition	N	SRR	% all cases
ENT infections	3,039	1.32	7.6%
Dental conditions	1,807	1.03	4.5%
Cellulitis	1,615	1.14	4.0%
Convulsions and Epilepsy	962	1.13	2.4%
Urinary Tract Infections	795	1.23	2.0%

For Aboriginal children, the progression of PPH through the age groups is consistent for the 0-4 and 5-9 age groups, but there is significant variability in the leading PPH condition in Aboriginal children for the 10-14 and 15-19 age groups.

For 0-4 year old Aboriginal children in WACHS, ENT infections were the primary PPH, accounting for 5.3 per cent of all cases. The South West was the only region that had a different primary PPH condition – that being Dental conditions – accounting for 3.8 per cent of all cases.

For 5-9 year old Aboriginal children in WACHS, Dental conditions were the primary PPH, accounting for 2 per cent of all cases.

For 10-14 year old Aboriginal children in WACHS, ENT infections were the overall primary PPH, accounting for 0.7 per cent of all cases. However, there was a lot of variability in this age group with Rheumatic Heart Disease being the primary PPH condition in the Goldfields (0.9% of all cases), Asthma (1.8% of all cases) in the Great Southern, Cellulitis (0.8% of all cases) for both the Midwest and the Pilbara. This is markedly different to non-Aboriginal children in this cohort.

For 15-19 year old Aboriginal youth in WACHS, Cellulitis (0.6% of all cases) and Urinary Tract infections (0.6% of all cases) were the joint leading PPH. This age group also typified a large amount of variability. Convulsions and Epilepsy were the leading cause of PPH in the Goldfields (0.6% of all cases), South West (1.1% of all cases) and in the Wheatbelt (1.4% of all cases). Cellulitis (0.7% of all cases) was the leading cause for both the Kimberley and Pilbara. Lastly, Asthma was the leading cause in the Great Southern (1.1% of all cases).

Figure 25 - Leading PPH by region and age group for Aboriginal children, showing percentage of all cases[xxix]

Region	0 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years
Goldfields	ENT infections (4.7%)	Dental conditions (0.9%)	Rheumatic heart disease (0.9%)	Convulsions and epilepsy (0.6%)
Great Southern	ENT infections (6.7%)	Dental conditions (4%)	Asthma (1.8%)	Asthma (1.1%)
Kimberley	ENT infections (7%)	Dental conditions (2.1%)	ENT infections (0.8%)	Cellulitis (0.7%)
Midwest	ENT infections (4.4%)	Dental conditions (1.7%)	Cellulitis (0.8%)	ENT infections (0.8%)
Pilbara	ENT infections (3%)	Dental conditions (2%)	Cellulitis (0.8%)	Cellulitis (0.7%)
South West	Dental conditions (3.8%)	Dental conditions (2.9%)	ENT infections (0.9%)	Convulsions and epilepsy (1.1%)
Wheatbelt	ENT infections (4.8%)	Dental conditions (2.5%)	ENT infections (0.8%)	Convulsions and epilepsy (1.4%)
WACHS	ENT infections (5.3%)	Dental conditions (2%)	ENT infections (0.7%)	Cellulitis (0.6%) and Urinary Tract infections (0.6%)
Metro	ENT infections (3.5%)	Dental conditions (2.9%)	Cellulitis (0.9%)	Cellulitis (1.2%)
State	ENT infections (4.8%)	Dental conditions (2.2%)	Cellulitis (0.7%)	Cellulitis (0.8%)

Implications for health care service planning:

For Aboriginal children, there is a need to provide culturally competent healthcare and to be aware of the necessity to address the social determinants of health[1], as management in a typical health care setting can have long standing negative effects. It has been suggested that there needs to be a focus on working in partnership with local communities and to increase education[1].

Specific Conditions

Several specific conditions of interest to WACHS relating to PPH are:

- Growth failure
- Anaemia
- Skin conditions
- Acute post-streptococcal glomerulonephritis (APSGN)
- Ear disease
- Dental conditions
- Respiratory conditions
- Asthma
- Acute Rheumatic Fever and Rheumatic Heart Disease
- Gastrointestinal related conditions

Many of these conditions have similar risk factors including household overcrowding, socioeconomic status, remoteness and food insecurity.

Figure 26 - SEIFA by LGA

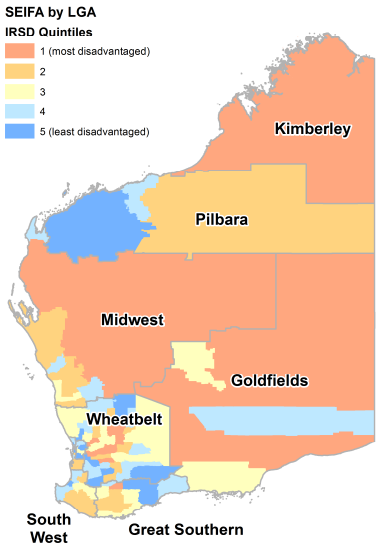
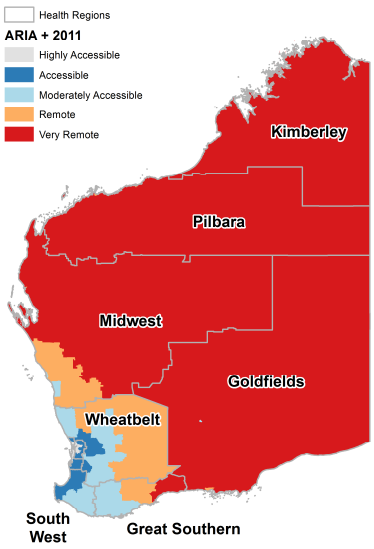


Figure 27 - Accessibility and Remoteness



Growth failure

Growth failure or failure to thrive is used to describe a rate of growth that is below the appropriate levels. It occurs at some stage in five per cent of children under five years old, with signs usually manifesting during first 15 months and diagnosis is usually made between 3 to 12 months of age[xxx]. Growth failure is classified as a potentially preventable hospitalisation.

There are many factors that can affect growth and development including genetics, environmental, chronic and acute conditions and it is important to take these into consideration

when developing a plan for children who are experiencing growth failure. Malnutrition is strongly linked to growth failure.

Growth failure in children has significant long term consequences including:

- obesity in childhood
- adult cardiovascular disease
- and increased risks for secondary disability including motor skills development, co-ordination and neurological conditions[xxxi].

Early intervention can help to prevent potential ongoing issues, however not all conditions can be prevented. Therefore, early intervention is a key goal which can be implemented through better access to food and health during pregnancy, promotion of breastfeeding and access to nutritious solids for infants.

In WACHS, for the years 2011-2015, there were approximately 200 children hospitalised for growth failure. Due to the small numbers data is not available for all regions. In addition, because the counts are small, small fluctuations can have significant impact on the rates.

Table 12 - Growth failure hospitalisations for 0-19 years[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	22	2.11	7	0.7
Great Southern	15	1.35	<5	N/A
Kimberley	7	2.83	56	2.39
Midwest	<5	N/A	14	1.08
Pilbara	5	0.7	5	0.4
South West	37	1.1	5	0.69
Wheatbelt	17	1.38	9	1.3

For non-Aboriginal children and youth, aged 0-19, the regions of most concern are the Goldfields and Kimberley as they both have significantly higher rates when compared to the State.

Statistically, for Aboriginal children, the Kimberley region stands out as being significantly higher than the state rate for growth failure, and the Pilbara region is of note for having a significantly lower rate of growth failure when compared to the State. Once again, it is important to note that these are very small numbers for all regions, except the Kimberley (56) so small fluctuations can have a large impact.

Anaemia

Anaemia occurs when haemoglobin concentrations are below acceptable cut-off levels and is associated with faltering growth, stunting and neurodevelopmental delay. Infants with this condition have been shown to have poorer cognitive, motor and socio/emotional function compared to healthy infants and poorer long term outcomes.

Risk factors can be classified into three categories;

- Maternal (medical complications, maternal anaemia, insufficient diet, multiple pregnancy);
- Child (premature and low birth weight, delayed solids introduction, faltering growth, chronic infections, cow's milk intake before 12 months); and
- Environmental (tropical environments, low socio-economic status, food insecurity/lack of access to iron rich foods) (ref below)[xxxii]. Anaemia is classified as a potentially preventable hospitalisation.

It is estimated that in Australia one third of children aged one to three have low iron stores. In WA, prevention of anaemia in children is focused around the promotion of a healthy iron rich diet for pregnant women, new mothers, infants and young children.

In 2012-2013, 7.6 per cent of Aboriginal adults were at risk of anaemia, which is almost twice as likely compared to non-Aboriginal people. It was also determined that the risk of anaemia was higher for Aboriginal people living in remote areas compared to non-remote (10.1% compared to 6.9%)[xxxiii].

Table 13 - Anaemia hospitalisations for 0-19 years[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	22	2.19	7	0.73
Great Southern	14	1.3	<5	N/A
Kimberley	7	2.93	55	2.47
Midwest	<5	N/A	13	1.05
Pilbara	5	0.73	<5	N/A
South West	37	1.14	5	0.72
Wheatbelt	17	1.43	9	1.37

In Western Australia, the Kimberley region experiences a higher rate of anaemia hospitalisations compared to the state for both Aboriginal and non-Aboriginal children. For non-Aboriginal children, the Goldfields also experiences a higher rate of anaemia compared to the state. It is important to note that these figures only recognise children hospitalised, and that community based treatment figures are not available.

The higher rates in the Kimberley and Goldfields may be attributed to socioeconomic status. The Kimberley has the highest proportion of its children (100%) living in the most disadvantaged

socioeconomic quintile (SEIFA by LGA, Index of Relative Socioeconomic Disadvantage), and the Goldfields has the second highest proportion of children (33%) living in the most disadvantaged socioeconomic quintile. Anaemia is closely linked to socio-economic measures so this can also account for the significantly higher rates.

Access to an iron rich diet for both pregnant mothers and young infants is key to the prevention of anaemia. Remoteness and access to food also plays a significant role in anaemia. Aboriginal people living in the Kimberley and the Goldfields are in some of the most remote areas of Western Australia. Studies have indicated that food insecurity (when people do not have physical or economic access to sufficient and nutritious foods to meet their dietary needs) is higher among Aboriginal people (24%) compared to non-Aboriginal people (5%)[xxxiv].

Food insecurity, remoteness and socioeconomic status, may explain the higher rates for anaemia in children in the Kimberley and the Goldfields.

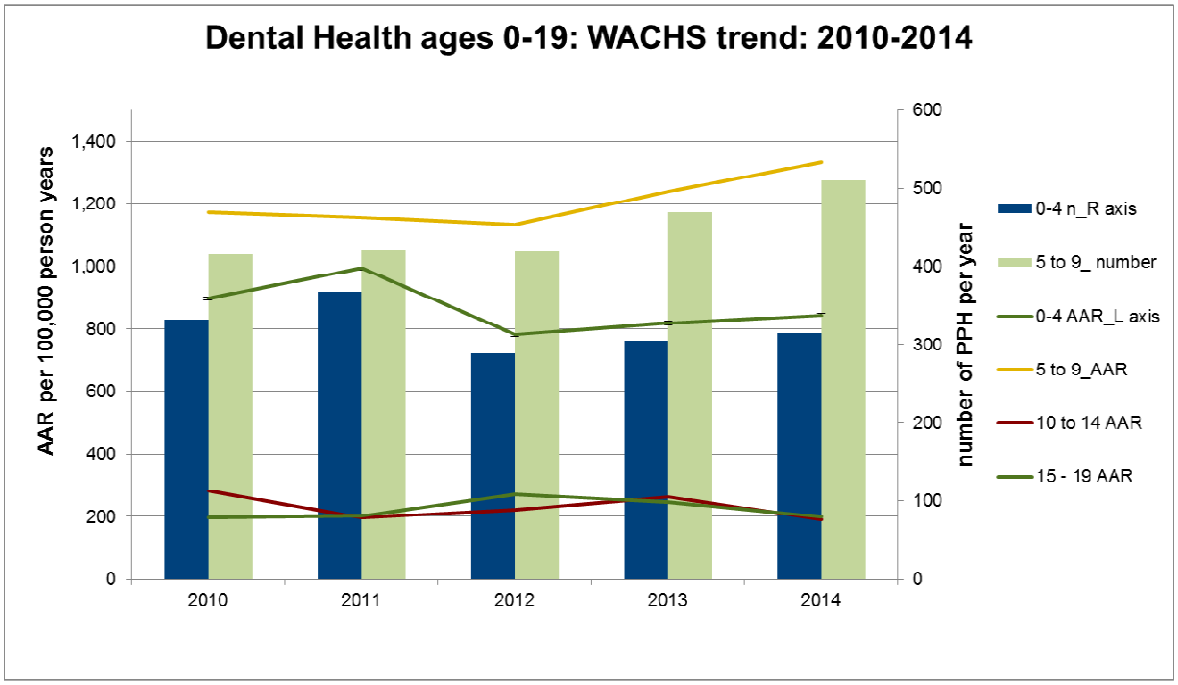
Oral Health

Diseases of the oral cavity, salivary glands and jaws are the 3rd highest reason for hospitalisation for 0-19 year olds in WACHS. They accounted for 9,176 hospitalisations in 2010-2014 which was approximately 1 per cent of all hospitalisations in this age range. Within this overall age range, the 0-4 age group has a significantly higher admission rate than the state. For the 5-9, 10-14, and 15-19 age groups diseases of the oral cavity, salivary glands and jaw is the number 1 reason for admission to hospital in WACHS.

The rates for WACHS are four percent higher (statistically significant) than the state rates. Specifically, the 0-4 age group is significantly greater than the state rate and the 10-14 age group is significantly lower than the state rate. The 5-9 age group is similar to the state rate but accounts for the highest number of hospitalisations for all these age groups.

Dental condition hospitalisations that are deemed to be preventable are shown in Figure 28. The age adjusted rates (AAR) for 0-4 and 5-9 are significantly higher than for 10-14 and 15 to 19 age groups. They are also significantly higher in 2014 than in 2012 for both age groups.

Figure 28 - Dental health Age Adjusted rates from 2010-2014



The numbers for age groups 10-14 and 15-19 are not shown as the overall number of admissions in these age groups is significantly lower than the younger two age groups.

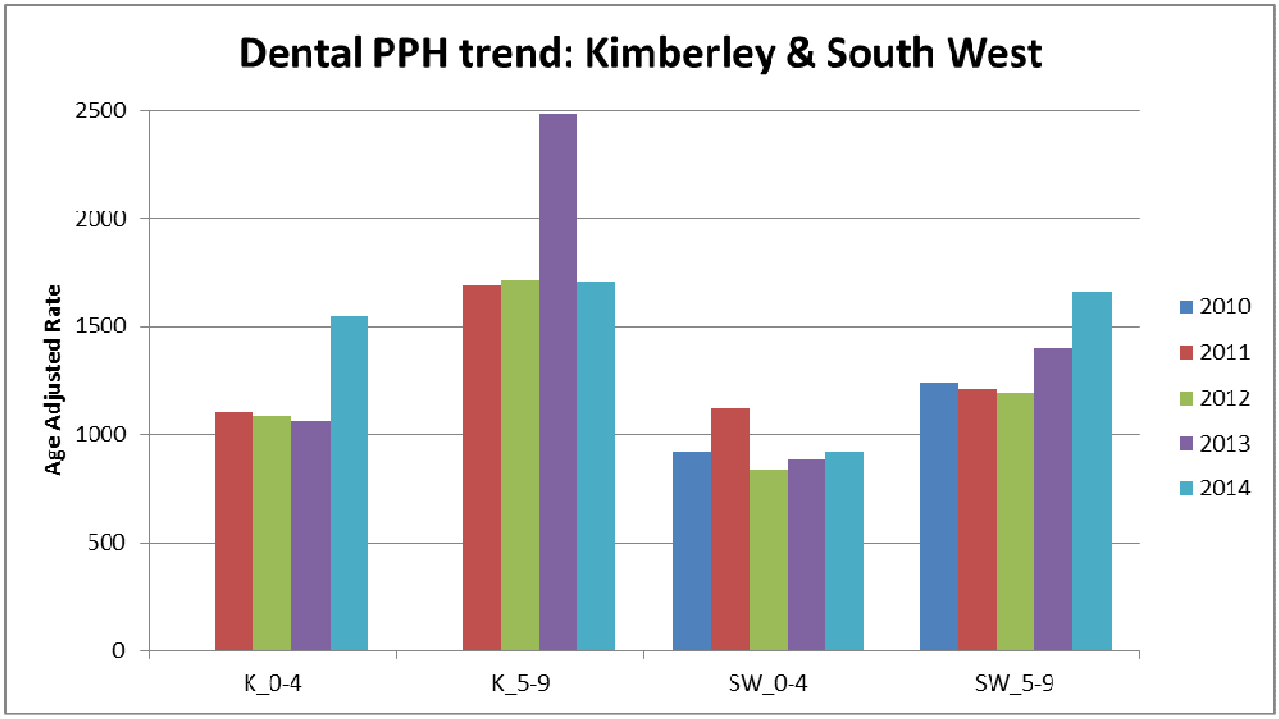
Within WACHS, the regions which contribute the most to the rate being higher than the state rate are Kimberley followed by South West and Wheatbelt; the Kimberley rate higher than the state rate (1.36 times).

Table 14 - Dental condition hospitalisations

Health Region	N	SRR	95% CI	AAR	95% CI
Goldfields	387	0.72	0.65-0.79	431.1	387.9-474.2
Great Southern	439	0.92	0.84-1.01	560.5	508.0-612.9
Kimberley	501	1.36	1.24-1.48	826	753.1-898.8
Midwest	580	1.04	0.96-1.13	632.1	580.6-683.6
Pilbara	486	1.01	0.92-1.10	608.2	553.4-662.9
South West	1,527	1.1	1.04-1.15	666.2	632.8-699.7
Wheatbelt	686	1.1	1.02-1.19	673.1	622.6-723.7
Country	**4,606**	**1.04**	**1.01-1.07**	**629.3**	**611.0-647.5**
Metro	**14,449**	**0.98**	**0.97-1.00**	**599.8**	**590.0-609.6**

The Kimberley and South West stand out with high rates of admission in the age groups of most concern, 0-4 and 5-9, the Kimberley and South West are the poorest performing regions. In the 0-4 age group the Kimberley worsened significantly between 2010 and 2014, and in the 5-9 age group the South West worsened significantly.

Figure 29 - PPH due to Dental conditions over time for Kimberley and South West regions



Aboriginal people are 2.5 times more likelihood of having an admission for a dental condition in these age groups than non-aboriginal people. This may account for the high rate in the Kimberley region as a larger proportion of the population are Aboriginal.

Table 15: Kimberley region - Aboriginal and Non-Aboriginal children dental hospitalisations

Age Group		Aboriginal	Non-Aboriginal
age 0-4	n	241	55
	AAR	1,190.50	485.3
age 5-9	n	346	103
	AAR	1,793.20	834.3

The South West has a low proportion of Aboriginal people and the water supply in this region is not fluoridated. A recent report indicated that children from non-fluoridated areas had poorer dental health outcomes than children from fluoridated areas[xxxv]. For the South West region it was determined that, after controlling for age, sex and Aboriginality, children in the region had poorer health outcomes than children in the fluoridated Perth metropolitan area. They were 1.5 times more likely to have one or more decayed, missing or filled deciduous teeth and 1.6 times more likely to have one or more decayed, missing or filled permanent teeth.

Skin infections

PPH conditions relating to diseases of the skin and subcutaneous tissue have been grouped into a category of 'skin infections'. These PPH conditions include the ICD Codes L02-L04, L08, L88, L98.0, L98.3 ICD which include cutaneous abscess, cellulitis and acute lymphangitis, acute lymphadenitis, local infections of skin and subcutaneous tissue, pyoderma gangrenosum, pyonic granuloma, and eosinophilic cellulitis.

Risk factors for skin infections have been attributed to;

- household crowding
- undernourishment
- low socioeconomic status
- poor hygiene
- shared bathing and other factors.

For Aboriginal children, poor household conditions in remote areas are a major factor contributing to high rates of skin infections[xxxvi].

It is important to note that these figures are for hospitalisations due to skin health only, and that primary health care data is not available.

Table 16 - Skin condition hospitalisations for 0-19 years[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	65	1.25	72	0.72
Great Southern	42	0.8	10	0.24
Kimberley	45	3.19	427	1.73
Midwest	64	1.23	175	1.33
Pilbara	43	1.09	163	1.31
South West	158	0.98	29	0.42
Wheatbelt	55	0.87	50	0.71

For non-Aboriginal children, the Kimberley, Midwest and Pilbara regions have significantly higher rates compared to the State rate.

For Aboriginal children the Kimberley, Midwest and Pilbara regions are higher than the state rate. When the ASR for Aboriginal and non-Aboriginal children and youth are compared, ASR are significantly higher for Aboriginal children, up to 11 times higher in the Pilbara, nine times higher in the Midwest and five times higher in the Kimberley.

Acute Poststreptococcal Glomerulonephritis

Acute Poststreptococcal Glomerulonephritis (APSGN) is an inflammatory disease of the kidneys that can occur 2-3 weeks after a specific type of skin or throat infection. APSGN is most commonly found in children and while complete recovery is common, frequent cases may contribute to chronic renal disease in Aboriginal people.

APSGN is not classified as a PPH so the data shown here is hospitalisations with a Principal diagnosis and additional diagnosis of APSGN.

Prevention is through daily washing with soap, ensuring any sores are covered and washing bed linen weekly and penicillin is used to treat confirmed cases. Clusters of APSGN are associated with overcrowded living conditions as it can be spread easily[xxxvii].

It is important to prevent and/or treat as in some Aboriginal communities children had a six times greater risk of developing renal disease as an adult, however whether the link is causative or associative is not definitive[xxxviii].

Table 17 - APSGN hospitalisations for 0-19 years[xxvii]

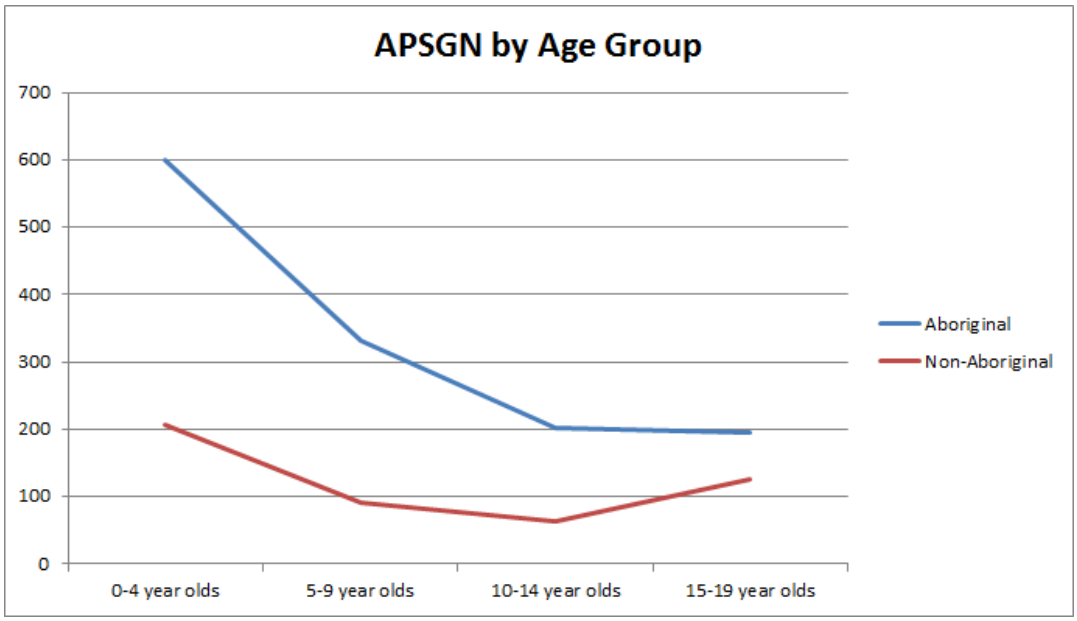
Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	85	1.52	111	0.87
Great Southern	48	0.87	32	0.6
Kimberley	25	1.64	722	2.29
Midwest	69	1.25	160	0.94
Pilbara	42	0.95	239	1.5
South West	134	0.78	21	0.24
Wheatbelt	82	1.21	45	0.5

In WAu, the Kimberley and Goldfields regions had a significantly higher rate of APSGN for non-Aboriginal children aged 0-19 compared to the state, whereas the South West had a significantly lower rate.

For Aboriginal children, the rates of APSGN were generally higher in regions where Aboriginal children make up a higher proportion of the population. Both the Kimberley and the Pilbara have higher rates compared to the state, and in the 0-19 years age group, Aboriginal children make up approximately 66 per cent and 27 per cent, respectively. The regions with a lower proportion of Aboriginal children in that age group have rates that are significantly lower than the state. These are the South West (5% of children aged 0-19 years are Aboriginal), Great Southern (8%), and the Wheatbelt (12%).

Even though many regions in WACHS are significantly lower than the state rate, APSGN is still a significant issue as this is comparing Aboriginal children in each region to Aboriginal children in Western Australia. Comparing the ASR with non-Aboriginal children shows that in all regions Aboriginal children have a higher rate than non-Aboriginal children. Significant differences include the Pilbara, where the ASR is 16 times higher for Aboriginal children, or the Kimberley, where it is 13 times higher.

Figure 30 - Acute Poststreptococcal Glomerulonephritis (2011-2015) by Aboriginality and Age Group[xxvii]



In Western Australia, ASPGN hospitalisations were mainly in the 0-4 year old age group. For 2011-2015, Aboriginal and non-Aboriginal children showed slightly different patterns as ages increased.

For Aboriginal children, there was a consistent decline in ASPGN through the age groups, with a very small decline between 10-14 year olds and 15-19 year olds. In the younger age groups (0-4 years, 5-9 years, 10-14 years) there are three times as many Aboriginal children with APSGN than non-Aboriginal children, with the gap narrowing to 1.5 times as many for the 15-19 year age group.

For non-Aboriginal children, there was an increase in APSGN from the 10-14 year old age group to the 15-19 year age group, with numbers doubling from 63 to 125.

Ear, nose and throat

Ear, nose and throat (ENT) infections in children can have ongoing implications for overall child health. Ear disease is highly prevalent in Aboriginal children (up to 70% in remote communities[xxxix]) and can lead to hearing loss which impacts up on speech and educational development. There are a range of risk factors including household overcrowding, passive smoking, premature birth, bottle feeding and malnutrition.

Overcrowding, passive smoking, premature birth and malnutrition also play a role in the development, recurrence and persistence of ear disease[xl].

ENT infections are the leading cause of PPH in Western Australia for 0-4 year olds for both Aboriginal and non-Aboriginal children. For WACHS, ENT infections are also the leading cause of PPH for 10-14 year old Aboriginal children, and 15-19 year old non-Aboriginal children.

Table 18 - ENT hospitalisations for 0-19 years[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	343	1.11	166	0.98
Great Southern	359	1.25	76	1.07
Kimberley	186	2.15	1,042	2.47
Midwest	292	1.01	191	0.84
Pilbara	303	1.15	215	1.03
South West	720	0.8	47	0.42
Wheatbelt	494	1.35	88	0.74

Between 2011 and 2015 there were 2697 cases of PPH ENT for non-Aboriginal children. The Kimberley, Wheatbelt, Great Southern and Pilbara experienced higher rates compared to the state for non-Aboriginal children, and the South West experience lower rates.

For Aboriginal children, there were 1,827 cases of PPH due to ENT. Rates are highest in the Kimberley, which is the only region identified as being higher than the state rate. However, this is because the rates are compared to all Aboriginal children.

If we look at ASR, all regions, except the South West, have a higher ASR compared to non-Aboriginal children, showing the disproportionate impact of this issue on Aboriginal children. The low ASR and SRR in the South West exist for both Aboriginal and non-Aboriginal children.

The 2012-13 Aboriginal and Torres Strait Islander Health Survey showed 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[xli].

WA Health's Model of Care for Otitis Media[xl] recognises the high burden of disease of Otitis Media and the disproportionate burden on Aboriginal children, and identifies a three-pronged approach of:

1) Prevention through; addressing the socioeconomic determinants of health; culturally appropriate and community-driven health promotion and education; and coordination with other public health prevention programs that address similar diseases.

2) Primary health care through; early diagnosis and effective treatment; monitoring of children with recurrent Otitis Media; coordinated management; testing for and provision of hearing aids for individuals and in classrooms to enable learning in school; and developmental rehabilitation in communities, schools and health care settings for children who have developed Otitis Media related hearing loss.

3) Specialist care; including ENT review; audiology and speech pathology; and ENT surgery as close to home as possible.

Respiratory diseases

For this purpose, pneumonia and Chronic Obstructive Pulmonary Disease are grouped together into a category of respiratory disease, and are chronic conditions that tend to have long lasting and persistent effects.

For non-Aboriginal children, rates of PPH for Respiratory conditions were higher compared to the state in the Kimberley and the Goldfields.

Rates of PPH were lower in the South West for both Aboriginal and non-Aboriginal children.

Table 19 - PPH due to Respiratory diseases for 0-19 years[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	42	1.46	35	1.35
Great Southern	21	0.76	6	0.55
Kimberley	21	2.58	123	1.91
Midwest	32	1.15	41	1.17
Pilbara	30	1.27	45	1.4
South West	51	0.59	5	0.28
Wheatbelt	37	1.06	11	0.6

Rates of PPH for Respiratory conditions for Aboriginal children were higher compared to the state for the Kimberley and Pilbara regions.

Asthma

There is a different pattern relating to specifically asthma as to where potentially preventable hospitalisations are occurring across the state. Asthma is the most common chronic condition in children in Australia[xlii] and nine per cent of children in WA report being diagnosed with asthma[viii].

For non-Aboriginal children, PPH due to Asthma is higher compared to the state in the Goldfields, Great Southern, Pilbara and Midwest regions.

Table 20 - PPH due to Asthma for 0-19 years[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	SRR	N
Goldfields	174	1.67	26	0.69
Great Southern	145	1.37	48	3.04
Kimberley	28	0.88	68	0.72
Midwest	128	1.23	57	1.16
Pilbara	107	1.28	80	1.67
South West	352	1.09	30	1.11
Wheatbelt	135	1.02	25	0.93

For Aboriginal children, PPH due to Asthma is higher compared to the state in the Great Southern and Pilbara regions, and lower in the Goldfields and the Kimberley.

This is at odds with prevalence data which identified that 4 per cent of children aged 0-15 years in the Goldfields reported having asthma, compared to the state prevalence of 10 per cent[xxvii]. In addition, prevalence data identified that all children aged 10-15 years in the Wheatbelt have a higher prevalence (12%) compared to the State (10%). This may not be shown in the PPH data due to a number of reasons. The PPH data is for a larger age range, so the specific ages where it is more or less prevalent may be masked by the amount of data. Additionally, PPH data relates to hospitalisations, and asthma for children in the Wheatbelt may be managed in a primary health care setting.

Acute Rheumatic Fever and Rheumatic Heart Disease

Acute Rheumatic Fever (ARF) is caused by an autoimmune response to a bacterial infection with group A streptococcus. Repeated cases can cause damage to valves in the heart, and this is known as Rheumatic Heart Disease (RHD). RHD is highly preventable through appropriate treatment of ARF.

ARF is most common in Aboriginal children aged 5-14 years (refer below). RHD follows a similar pattern, with 47 per cent of PPH cases of RHD in the same age[xxix].

The prevalence of Aboriginal children with RHD has been reported to be as high as 8.9/1,000 children in the Kimberley region, and 16.7/1,000 children having borderline RHD[xliii].

It has been commonly accepted that group A streptococcal pharyngitis recurrence is the main risk factor for RHD, however research has shown that in some Aboriginal communities pharyngitis is rare but pyoderma (skin infections) are highly prevalent and that there may be a link between skin infections and ARF[xliv]. Other risk factors include household overcrowding, poor hygiene and poor sanitation.

PPH for ARF and/or RHD numbers are too low to report for non-Aboriginal children, further demonstrating the disproportionate burden on Aboriginal children. There are also insufficient numbers for Aboriginal children in the South West. The table below shows a comparison of these conditions compared to the State, the Metro and to WACHS.

Table 21 – PPH due to Acute Rheumatic Fever/Rheumatic Heart Disease for 0-19 year olds, Aboriginal[xxvii]

Health region	N	SRR
Goldfields	57	2.98
Great Southern	5	0.64
Kimberley	124	2.61
Midwest	14	0.56
Pilbara	20	0.82
South West	N/A	N/A
Wheatbelt	8	0.56

RHD is significantly higher for Aboriginal children compared to the state rate for Aboriginal children in the Goldfields (2.98 times) and the Kimberley (2.61 times). In the Midwest RHD is significantly lower (0.56 times) compared to the state rate.

There are 228 children and youth with RHD in WACHS, with RHD being more prevalent between the ages of 5-9 (over 60 cases) and 10-14 (over 100 cases).

Gastroenteritis

Gastroenteritis is an infection or inflammation of the digestive system that can cause a range of symptoms including nausea, diarrhoea, stomach cramps and fever. It can be caused by viruses, bacteria or parasites.

Gastroenteritis is not classified as a PPH so the data shown here is hospitalisations with a Principal Diagnosis of Gastroenteritis.

For non-Aboriginal children, the Midwest, Wheatbelt and South West have a higher rate of Gastroenteritis when compared to the State, with all other regions having a lower rate of Gastroenteritis.

Table 22 - Hospitalisations with a principal diagnosis of Gastroenteritis for 0-19 year olds[xxvii]

Health region	Non Aboriginal		Aboriginal	
	N	SRR	N	SRR
Goldfields	1,223	0.83	154	0.63
Great Southern	1,414	0.91	107	1.05
Kimberley	309	0.8	785	1.31
Midwest	1,711	1.13	314	0.99
Pilbara	781	0.73	367	1.2
South West	5,394	1.15	179	1.05
Wheatbelt	1,928	1.07	151	0.88

For Aboriginal children, the Kimberley and Pilbara regions both have a higher rate of hospitalisation for gastroenteritis.

A study by Telethon Kids on gastroenteritis trends indicates that the gap between non-Aboriginal and Aboriginal children may be improving, with hospitalisation rates for Aboriginal children dropping significantly over a 20 year time period, whilst hospitalisations for non-Aboriginal children were increasing[xlv]. This can be seen through the higher ASR for non-Aboriginal children in most WACHS regions.

Another analysis showed that rates of hospitalisation for gastroenteritis in Aboriginal children are almost seven times higher compared to non-Aboriginal children, and rates were higher in rural and remote areas than in urban areas[xlvi]. The Kimberley and Pilbara region are two of the most remote areas in Western Australia, and have the highest ASR for Aboriginal children.

Implications for primary health care service planning:

PPH due to **growth failure** is of concern in the Goldfields and Kimberley for non-Aboriginal children and youth and in the Kimberley for Aboriginal children.

For PPH due to **Anaemia**, the Goldfields region has significantly higher rates compared to the state for non-Aboriginal children, and the Kimberley has higher rates for both non-Aboriginal children and Aboriginal children.

Age Standardised Rates are significantly higher for **Skin infections** for Aboriginal children compared to non-Aboriginal children, up to 11 times higher in the Pilbara.

Acute Poststreptococcal Glomerulonephritis occurs more often in Aboriginal children compared to non-Aboriginal children. APSGN in the Pilbara is 16 times higher for Aboriginal children and 13 times higher in the Kimberley.

ENT infections are the leading cause of PPH for 0-4 year olds for both Aboriginal and non-Aboriginal children. For WACHS, ENT infections are also the leading cause of PPH for 10-14 year old Aboriginal children, and 15-19 year old non-Aboriginal children.

For both Aboriginal and non-Aboriginal children, rates of PPH for **Respiratory** conditions were higher compared to the state in the Kimberley and the Goldfields.

For Aboriginal children, PPH due to **Asthma** is higher compared to the state in the Great Southern and Pilbara regions.

Rheumatic Heart Disease is the leading PPH for Aboriginal children aged 10-14 years in the Goldfields, and is significantly higher than the state rate for all children 0-19 years for both the Goldfields and the Kimberley.

Hospitalisations for **gastroenteritis** are nearly seven times higher for Aboriginal children in Western Australia than for non-Aboriginal children, with rates higher in non-metropolitan areas.

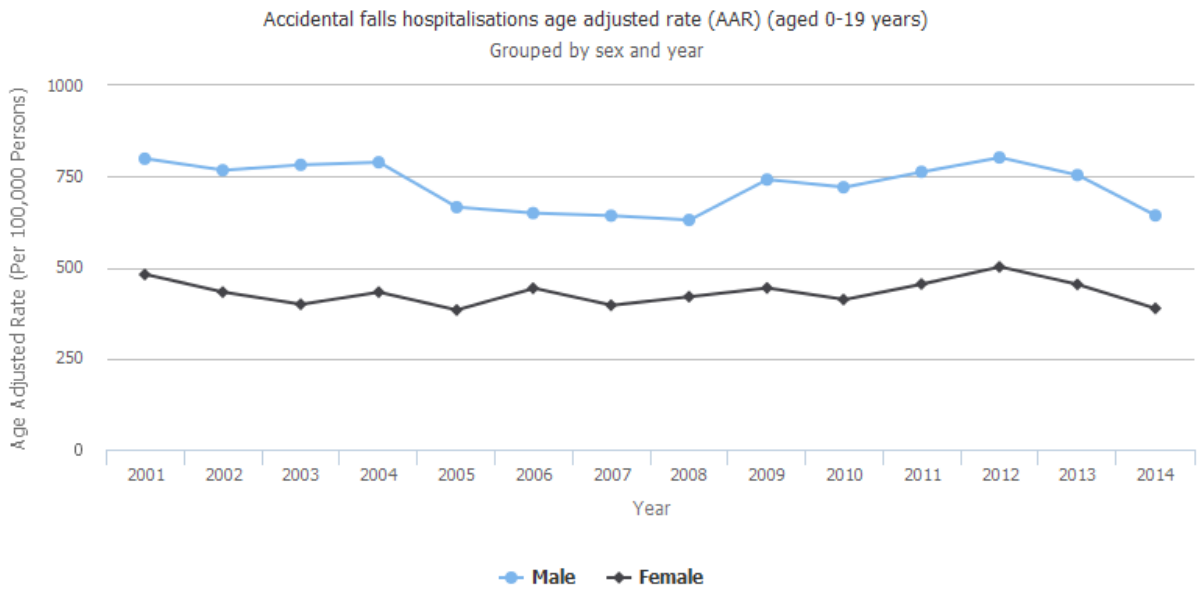
Injuries, 0-19 years

For 2010-2014, injury and poisoning hospitalisations in children and youth aged 0-19 years in WACHS accounted for 16,645 hospitalisations. The hospitalisation rate of all injury and poisoning was significantly higher (1.3 times) for Pilbara children (2,185 per 100,000) than for children in the State[xxix].

The leading causes of injury and poisoning hospitalisations for children in WACHS for 2010-2014 were accidental falls (SRR 1.06, n = 4,229), motor vehicle occupant injured in transport accidents (SRR 2.04, n=1,619) and accidental exposure to other and unspecified forces (SRR 1.09, n=1,137). All of these were significantly higher than the state rate and these accounted for nine per cent of all cases. Males accounted for 63 per cent of motor vehicle occupants injured in transport accidents for males aged 0-19 year, which was more than twice the state rate (SRR 2.09, n=1,215).

The rate of hospitalisations for accidental falls in children and youth in WACHS was 518 per 100,000 children, with more occurring in males than in females. The rate had been fairly constant from 2008 to 2011 but has showed a slight decrease from 2001 to 2014.

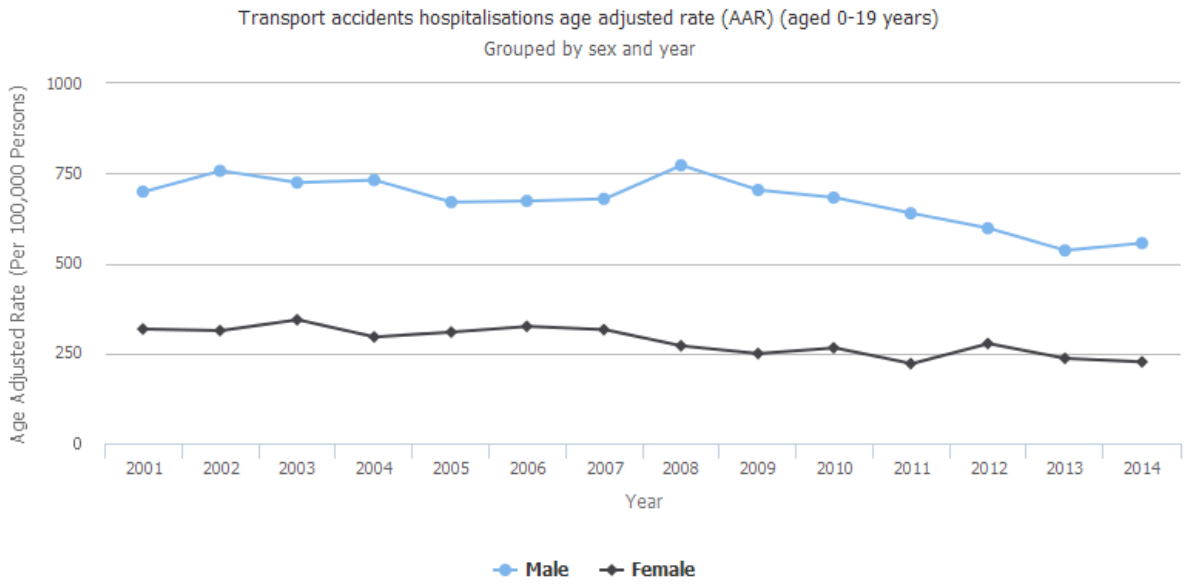
Figure 31 - Accidental falls hospitalisations for 0-19 years in WACHS



The rate for hospitalisations of WACHS children aged 0-19 years who were motor vehicle occupants injured in transport accidents was 222 per 100,000 (0.2%).

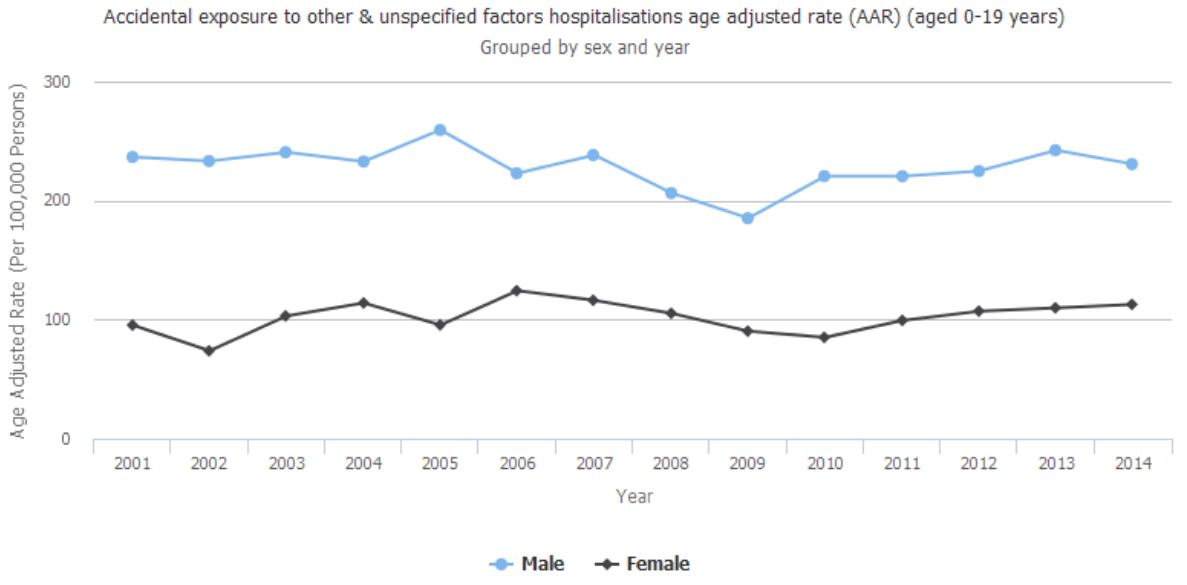
For all transport accidents, this increased to 397 per 100,000, with a significantly higher rate compared to the state (SRR 1.78, n=2,871). All transport accidents include pedestrians that have been injured, cyclists, motor vehicle occupants, water transport and other transport injuries, and more occur in males than in females. The rate of all transport accidents has been decreasing overall since 2001 (refer figure below).

Figure 32 - Transport accidents hospitalisations for 0-19 years in WACHS



The rate of hospitalisations for accidental exposure to other and unspecified forces in children and youth in WACHS was 174 per 100,000. Unlike the previous leading causes of injury, there has been no overall decline in hospitalisation rates since 2001.

Figure 33 - Accidental exposure to other and unspecified forces hospitalisations for 0-19 years in WACHS



Deaths

Leading causes of death

The leading causes of death in children and young people vary as age increases. The Figure 34 shows the top five causes of deaths in each five year age group for WACHS.

Transport accidents were the leading cause for death for children aged 5 to 9 years and 10 to 14 years old. Several conditions are statistically significantly higher than the state rate of 1.0:

- transport accidents (SRR 2.49, n=68);
- suicide and self-harm (SRR 2.35, n=54); and
- exposure to inanimate mechanical forces (SRR 2.99, n=6).

Figure 34 - Top five leading causes of death in WACHS by age group for all children and youth[xxix]

Ranking	0 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years
1st	Certain conditions originating in perinatal period	Transport accidents	Transport accidents	Intentional self-harm
2nd	Abnormal findings & ill-defined conditions	Abnormal findings & ill-defined conditions	Abnormal findings & ill-defined conditions	Transport accidents
3rd	Congenital malformations, deformations & chromosomal abnormalities	Certain conditions originating in perinatal period	Assault	Accidental poisoning
4th	Accidental drowning, submersion & threats to breathing	Congenital malformations, deformations & chromosomal abnormalities	Intentional self-harm	Exposure to mechanical forces
5th	Transport accidents	Asthma	Leukaemia	Assault

Between 2009 and 2013 there were 380 deaths in children and youth in WACHS and the data does not provide meaningful information when broken down by region as numbers are too small.

Avoidable Deaths

Avoidable deaths are those that are potentially preventable and treatable. Avoidable deaths can be influenced by access to health care services, and capital cities have lower rates of avoidable deaths compared to regional areas. In total, there were 228 avoidable deaths, which is 60 per cent of the total WACHS deaths (n=380) of children between 0 to 19 years of age.

For all children aged 0-19 in WACHS, the overall leading avoidable deaths for the time period 2009-2013 are detailed below (Figure 35).

The conditions that are statistically significantly higher compared to the State rate or 1.0 are;

- selected external causes of morbidity and mortality (SRR 2.2, n=59);
- other external causes of morbidity and mortality (SRR 2.07, n=107); and
- all avoidable deaths (SRR of 1.69, 228 cases).

Figure 35 - Top five Avoidable Deaths, ranked by number of cases, in WACHS by age group[xxix]

Ranking	0 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years
1st	Complications of the perinatal period	Transport accidents	Transport accidents	Suicide and self-inflicted injuries
2nd	Transport accidents	Accidental drowning and submersion	Assault	Transport accidents
3rd	Accidental drowning and submersion	Asthma	Suicide and self-inflicted injuries	Accidental poisoning by and exposure to noxious substances
4th	Selected invasive infections	Exposure to inanimate mechanical forces	Acute lymphoid leukaemia/Acute lymphoblastic leukaemia	Exposure to inanimate mechanical forces
5th	Cerebrovascular diseases	Acute lymphoid leukaemia/Acute lymphoblastic leukaemia	Complications of pregnancy, labour or the puerperium	Assault

Between 2009 and 2013 there were 228 PAD in children and youth in WACHS and as a result the data does not provide meaningful information when broken down by region. However, breaking down by Aboriginality shows several differences between Aboriginal and non-Aboriginal children aged 0-19 years old.

Table 23 – Leading Avoidable deaths for non – Aboriginal children 0-19 years[xxix]

Condition	N	SRR	% of all cases
Transport accidents	47	2.46	1.7
Complications of the perinatal period	27	0.81	1
Suicide and self-inflicted injuries	18	1.39	0.7
Accidental drowning and submersion	5	1.06	0.2
Acute lymphoid leukaemia/Acute lymphoblastic leukaemia	5	3.06	0.2
Exposure to inanimate mechanical forces	5	3.12	0.2

Table 24 – Leading Avoidable Deaths for Aboriginal children 0-19 years[xxix]

Condition	N	SRR	% of all cases
Suicide and self-inflicted injuries	55	1.6	3.3
Complications of the perinatal period	40	1.05	2.4
Transport accidents	36	1.04	2.1
Selected invasive infections	14	1.47	0.8
Assault	11	1.35	0.7
Accidental drowning and submersion	8	1.23	0.5

Transport accidents are the leading avoidable deaths for non-Aboriginal children accounting for 1.7 per cent of all cases, and are statistically higher compared to the state. Transport accidents are the third leading condition for Aboriginal children, but account for 2.1 per cent of all cases.

Suicide and self-inflicted injuries are the third leading cause of avoidable deaths for non-Aboriginal children with 0.7 per cent of all cases, but are the leading cause for Aboriginal children and youth with 3.3 per cent of all cases.

Complications of the perinatal period are the second leading cause of PAD for both Aboriginal and non-Aboriginal children, but account for a larger percentage of cases for Aboriginal children (2.4% compared to 1% for non-Aboriginal children).

The top six leading causes of PAD for non-Aboriginal causes account for four percent of all cases, whereas for Aboriginal children the top six PAD account for 9.8 per cent of all cases.

Implications for health service planning:

Transport accidents are top contributor in deaths of children between 5 to 19 years of age.

Children of 10-14 years of age are more likely to die from assault than 15-19 years old age group.

Intentional self-harm, suicide and self-inflicted injuries are leading causes of deaths among 15-19 year age group. These deaths are avoidable possibly with better community youth network and counselling services.

Glossary

AAR	Aged Adjusted Rate
ABS	Australian Bureau of Statistics
ACCHO	Aboriginal Community Controlled Health Organisations
AEDC	Australian Early Development Census
ARIA	Accessibility/Remoteness Index of Australia
ASR	Age-standardised rate
ATSIC	Aboriginal and Torres Strait Islander Commission
CI	95% Confidence Interval of a rate or proportion
DoH	Department of Health WA
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
LGA	Local Government Area
PPH	Potentially Preventable Hospitalisations
SEIFA	Socio-Economic Indexes for Areas
STI	Sexually transmitted infections
SRR	Standardised rate ratio
WA Tomorrow, 2015	Department of Planning Population Projections
WACHS	Western Australia Country Health Service

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