



**Kimberley
Aboriginal
Health**
Planning Forum

Po Box 1377,
Broome, WA 6725
kahpf@kamsc.org.au

Kimberley Public Health Planning Report

**Updated estimates of the costs of hospitalisations for Aboriginal people
resident in the Kimberley due to their environment:**

2018 calendar year hospitalisations

Data extraction by WA Health Purchasing & System Performance Division

**Data analyses by Dr Margie Lesjak
Visiting Epidemiologist
KPHU
Nirrumbuk**

Data interpretation and write-up by KAHPF Environmental Health SubCommittee

Endorsed by Environmental Health SubCommittee

28 November 2019

Endorsed by KAHPF

12 December 2019



INTRODUCTION

As defined by the World Health Organisation (WHO), the environment is *'all the physical, chemical and biological factors external to the human host, and all related behaviours, but excluding those natural environments that cannot reasonably be modified'* (Prüss-Üstün & Corvalán 2006)(see also Prüss-Üstün, Mathers et al 2003 and Prüss-Üstün, Wolf et al 2016). Environmental health is the scientific practice of reducing risk from the environment to human health through evidence-based environmental action. In 2016, a survey of all Kimberley-based Aboriginal environmental health service providers undertaken by the Environmental Health SubCommittee (EHSC) of the Kimberley Aboriginal Health Planning Forum (KAHPF) found that environmental health *'needs to be pushed from the top'* (KAHPF EH SubCommittee 2017). In 2018, the EHSC asked for costings to show the financial impost on the WA public hospital system due to remedial factors in the environment affecting Aboriginal peoples' health in the Kimberley. Using 2016 hospitalisations data, that report was endorsed at KAHPF (EHSC 2018). It is available on the KAHPF website. Furthermore, the findings were cited in the final report of the WA Health Minister's Sustainable Health Review released in April 2019 (SHRP 2019).

To update these costs, EHSC again sought the assistance of the Purchasing and System Performance Division of the WA Department of Health to obtain the most recent hospitalisation data, specifically data for the **2018 calendar year**. These data were received in May 2019. This report has been prepared for the KAHPF Environmental Health SubCommittee for review, anticipating approval for progression to KAHPF for endorsement.

METHOD

We replicated the methods applied in the earlier report (EHSC 2018). To summarise, 46 diseases have some quantifiable component of environmental attribution in the Kimberley (see McMullen et al 2016)(Table 1). For each of these 46 diseases, the matching ICD-10 codes had been previously assigned in conjunction with the Purchasing and System Performance Division of the WA Department of Health (Appendix 1). EHSC (2018) contains additional detail. For example, 'Skin Infections' comprised five mutually exclusive codes. Division staff in the WA Department of Health then repeated their data extraction from the Hospital Morbidity Data Collection (Inpatient Data Collections) using 2018 data.

In May 2019, the Division forwarded this dataset including data for **Principal Diagnosis** for hospitalisations of Aboriginal people resident in the Kimberley in 2018 and also for ALL people resident in the Kimberley for 2018 by five-year age groups including patients 0-4 years; 5-9 years, 10-14 years, 0-14 years, 15 years plus and all ages. Selection of Aboriginal people used the variable for Aboriginal and/or Torres Strait Islander patients (indstat 1-3). Kimberley residential postcodes comprise 6725, 6726, 6728, 6740, 6743, 6765 or 6770. As defined in the Australian Coding Standards, the Principal Diagnosis is *'the diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the health care establishment, as represented by a code'* (METeOR: 514273) (Australian Institute of Health and Welfare, 2014). The Division also provided **cost estimates** for these hospitalisations using their standard cost formula based on estimates from the Independent Hospital Pricing Authority (IHPA) for each entire admission. The Division's cost estimates for 2018 were generated using the Independent



Hospital Pricing Authority national public sector estimated average costs for Diagnosis Related Groups (DRG v9.0 Round 21) based on public hospitals. It should also be noted that these costs were for separations where the condition specified was listed as the Principal Diagnosis for the hospitalisation, and are not the costs associated with specifically providing care for the specified condition alone.

Using this Principal Diagnosis dataset, we selected those admissions for any of the 46 diseases listed in Table 1. For each of these diseases, we summed admissions, lengths of stay and costs by each of the three age groups. We then multiplied each by the respective KEAF to calculate how much of each was directly attributable to the environment. As provided by the WA Department of Health, small numbers were not suppressed in order to undertake the environmental fractions analysis. Here, all effort has been taken to suppress numbers where values are < 5. Ethics committee applications were not required as this analysis was conducted for planning not publication purposes.

Separations from all WA public and private hospitals were included except for cancelled procedures, healthy newborns, posthumous organ procurements, boarders, aged care residents, non-WA hospitals (such as Darwin hospital) and funding hospital (duplicate) cases.

There can be only one Principal Diagnosis per separation in the Hospital Morbidity Data Collection (Inpatient Data Collections).

For further demographic background, Appendices 2-4 present 2016 Census data for the Kimberley region (Statistical Area 3).

RESULTS

Table 2 shows the number and bed days for admissions in 2018 for all Aboriginal people and, in pink columns, those directly attributable to the environment.

Table 3 shows the number and bed days for admissions in 2018 for children aged 0-14 years and, in pink columns, those directly attributable to the environment.

Using admissions calculated to have been due entirely to the environment, Table 4 shows those admission codes for which an Aboriginal person had been admitted in 2018 (✓). Those admission codes for which ONLY an Aboriginal person had been admitted are show in **red**.

Table 5 shows the calculated costs for each disease code directly due to the environment in 2018 for all Aboriginal people and, in a separate column, the calculated costs for each disease code directly due to the environment in 2018 for Aboriginal children 0-14 years.

Table 6 is a summary table.

As shown in these tables, these calculations estimate that **\$19,079,992** was spent on hospitalisations for Aboriginal people in 2018 directly attributable to the environment. This exceeds the amount spent in 2016. For Aboriginal children 0-14 years, the total spent on hospitalisations in 2018 attributable to the



environment was **\$3,405,154**. Of this expenditure 52.9% was accounted for by those children 0-4 years of age (\$1,804,178).

In 2018 the total cost of admission to hospital for any principal diagnosis for Aboriginal people (all ages) was \$77,152,635.00. Hospitalisation costs directly attributable to the environment as a proportion of all hospital costs were **24.7%**. As total admissions for 2018 for any principal diagnosis in 2018 for Aboriginal children 0-14 years cost \$9,894,649.00, the proportion of hospital costs of these children directly attributable to the environment was more than a third (specifically **34.4%**).

ACKNOWLEDGEMENTS

Authors of this work acknowledge Aboriginal elders past and present, emerging Aboriginal leaders, future descendants and, above all, the continuing relationship of Aboriginal people to the country and its waters. Their lands were never ceded during colonization. We also acknowledge that the benefits now enjoyed by some as a result of colonization of the continent of Australia have been at the expense of incalculable suffering to others.

Data access with technical refinements and selection of codes were finalized in collaboration with Vikki Mirosevich, A/Manager Inpatient Data Collections and Owen Carter Senior Data Collections Officer alongside generous oversight and liaison by Deborah Yagmich, Principal Coding Consultant, WA Clinical Coding Authority, Data Quality & Governance in Purchasing and System Performance Division in the WA Department of Health. We thank these staff for providing 2016 data.

Mike Yun, Data Analyst, Inpatient Data Collections, Data Collections Branch, Information and Performance Governance Unit, Information and System Performance Directorate, Purchasing & System Performance Division, WA Department of Health provided these 2018 data in May 2019.



Table 1
Kimberley Environmental Attributable Fractions (KEAFs) for 46 diseases (listed alphabetically)

DISEASE CONDITION	KEAF TO BE APPLIED
Acute Rheumatic Fever (ARF)	.80
Asthma	.55
Cancer	.16
Cardiovascular disease (Not RHD)	.56
Cataracts	.70
Chronic lung disease incl. COPD	.12
Conjunctivitis (Infective)	.60
Deafness	.40
Dental caries, abscess, extractions	.60
Diarrhoeal diseases	.80
Drowning	.66
Failure to thrive	.60
Falls	.60
Fires/ burns	.30
Intestinal nematodes (hookworm)	.90
Keratoconjunctivitis	.80
Low birth weight	.27
Lower respiratory infections	.47
Malnutrition and nutritional concerns	.78
Mental health / psychosocial	.20
Miscarriage	.07
Murray Valley Encephalitis	.80
Musculoskeletal diseases	.25
Other arboviruses (Barmah Forest)	.80
Otitis Media	.90
Perinatal deaths	.05
Perinatal infections	.08
Poisonings	.20
Post-streptococcal glomerulonephritis	.75
Premature birth	.07
Pterygium	.80
Rheumatic heart disease (RHD)	.65
Road traffic accident	.60
Ross River Virus	.80
Scabies	.95
Shingles	.05
Skin cancer	.95
Skin infection incl. pustules, abscess, cellulitis, impetigo #	1.0
STD	.05
Suicide	.09
Throat infection	.80
Trachoma	.90
Tuberculosis	.33
Unintentional injuries incl. dog bite	.95



Urinary tract infection	.10
Violence	.25

This KEAF was determined by the skills-based panel to have a value of 1.0 or 100%: in this case, the skills-based panel considered factors in the Kimberley other than the environment were so small as to be negligible.



Table 2 Number, bed days and costs of selected and total admissions in 2018 for all Aboriginal people and, in pink, directly attributable to the environment

DISEASE CONDITION	No of admissions	Total length of stay (bed days)	No of Admissions due to environment	Total number of bed days due to environment
Unintentional injuries incl. dog bite	665	2411	631.75	2290.45
Lower respiratory infections	621	1717	291.87	806.99
Violence	583	1287	145.75	321.75
Skin infection	558	1615	558	1615
Mental health / psychosocial	428	2713	85.6	542.6
Cardiovascular disease (Not RHD)	390	1297	218.4	726.32
Falls	350	1495	210	897
Urinary tract infection	281	721	28.1	72.1
Diarrhoeal diseases	200	375	160	300
Chronic lung disease incl. COPD	199	559	23.88	67.08
Cancer	142	950	22.72	152
Suicide / self harm	130	231	11.7	20.79
Otitis Media	125	148	112.5	133.2
Dental caries, abscesses	104	210	62.4	126
Road traffic accident	88	413	52.8	247.8
Cataracts	80	93	56	65.1
Premature birth	70	1370	4.9	95.9
Asthma	61	93	33.55	51.15
Miscarriage	55	87	3.85	6.09
Fires/ burns	55	305	16.5	91.5
Poisonings	38	87	7.6	17.4
Malnutrition /nutritional concerns	31	180	24.18	140.4
Post-strep glomerulonephritis	25	159	18.75	119.25



DISEASE CONDITION	No of admissions	Total length of stay (bed days)	No of Admissions due to environment	Total number of bed days due to environment
Acute Rheumatic Fever (ARF)	22	152	17.6	121.6
STD	22	63	1	3
Pterygium	21	24	16.8	19.2
Scabies	16	49	15.2	46.55
RHD	12	47	7.8	30.55
Throat infection	12	22	9.6	17.6
Failure to thrive	8	73	4.8	43.8
Others#	18	51	10.2	22.88
Subtotal	5,424	19,044	2,870	9,230
ALL OTHER ADMISSIONS	24,051	32,856	N/A	N/A
TOTAL	29,475	51,900	2,870	9,230

Other disease condition :Drowning, Ross River virus, deafness, keratoconjunctivitis, conjunctivitis, Low birth weight, perinatal, shingles, skin cancer



Table 3 Number and bed days of selected and total admissions in 2018 for Aboriginal children aged 0-14 years and – in pink – directly attributable to the environment

DISEASE CONDITION	No of admissions	Total length of stay (bed days)	No of Admissions due to environment	Total number of bed days due to environment
Skin infection	129	316	129	316
Lower respiratory infections	116	287	54.52	134.89
Otitis Media	109	127	98.1	114.3
Diarrhoeal diseases	106	194	84.8	155.2
Unintentional injuries incl. dog bite	74	244	70.3	231.8
Dental caries, abscesses	70	122	42	73.2
Premature birth	70	1370	4.9	95.9
Falls	62	90	37.2	54
Urinary tract infection	27	92	2.7	9.2
Post-strep glomerulonephritis	24	155	18	116.25
Road traffic accident	20	146	12	87.6
Fires/ burns	20	88	6	26.4
Asthma	18	22	9.9	12.1
Acute Rheumatic Fever (ARF)	13	120	10.4	96
Scabies	11	22	10.45	20.9
Mental health / psychosocial	9	38	1.8	7.6
Chronic lung disease incl. COPD	8	38	0.96	4.56
Failure to thrive	8	73	4.8	43.8
Violence	6	42	1.5	10.5
Poisonings	6	9	1.2	1.8
STD	5	20	0	1
Others#	25	100	14.52	58.34
Subtotal	936	3,715	615	1,671
ALL OTHER ADMISSIONS	1,002	1,641	N/A	N/A



DISEASE CONDITION	No of admissions	Total length of stay (bed days)	No of Admissions due to environment	Total number of bed days due to environment
TOTAL	1,938	5,356	615	1,671

Other disease condition : Drowning, deafness, self-harm, keratoconjunctivitis, Low birth weight, perinatal, STIs, throat infections, malnutrition, RHD,cataracts

Table 4. Principal Diagnoses with an environmental determinant for which at least one Aboriginal person was admitted by age group and overall, 2018

Principal disease (KEAF)	age group (Years)				
	0-4	5-9	10-14	15 +	all ages
Scabies (0.95)	✓		✓	✓	✓
ARF (0.80)	✓	✓	✓	✓	✓
Ross River (0.80)				✓	✓
Keratoconjunctivitis (0.80)			✓	✓	✓
Low Birth Weight (0.80)	✓				✓
APGSN (0.75)	✓	✓	✓	✓	✓
Drowning (0.66)			✓		✓
Conjunctivitis (0.60)				✓	✓
STIs (0.05)	✓		✓	✓	✓
Throat infections (0.80)			✓		
Cataracts (0.70)	✓	✓			
RHD (0.65)#			✓	✓	
Cardiovascular (no RHD) (0.56)	✓		✓		
Deafness (0.40)	✓				
Burns (0.30)	✓		✓		
Assault (0.25)	✓	✓			
Poisoning (0.2)		✓	✓		
COPD (0.12)		✓			
UTI (0.10)			✓		
Self-harm (0.09)			✓		

* Red highlighted diseases are those where only Aboriginal people were hospitalised at all ages for that condition/disease

RHD had one non-Aboriginal hospitalisation in the 5-9 age group, otherwise all other admissions were Aboriginal people. If this one admission in 2018 had not occurred, RHD would also be red.

Explanatory note: There are 46 diseases in the Kimberley for which there is a KEAF. Of these, 36 appear as Principal Diagnosis in the 2018 hospitalisation data set. For these, some had only non-Aboriginal people admitted (eg skin cancer). The rows in Table 4 are those Principal Diagnoses for which at least one Aboriginal person was admitted. The rows then continue to indicate if any one of



the age group in the column was admitted for that disease. When the disease is in red / bold, then not one non-Aboriginal person was admitted for it during 2018.

Apart from skin cancer, it seems that the greater the KEAF value, the more likely it is that only Aboriginal people were admitted with it (ie the red diagnoses).

Table 5 Costs of admissions due to the environment in 2018 for all Aboriginal people and for children 0-14 years (in pink)

DISEASE CONDITION	Cost \$ for all Aboriginal people	Cost \$ for Aboriginal children 0-14 years
Unintentional injuries incl. dog bite	4,674,939	454,015
Lower respiratory infections	1,867,824	349,220
Violence	812,845	7,899
Skin infection	3,311,200	726,026
Mental health / psychosocial	553,629	12,847
Cardiovascular disease (Not RHD)	2,190,796	27,364
Falls	1,642,898	161,559
Urinary tract infection	138,018	14,654
Diarrhoeal diseases	600,650	295,949
Chronic lung disease incl. COPD	153,502	9,110
Cancer	262,664	-
Suicide / self harm	39,476	205
Otitis Media	415,053	321,951
Dental caries, abscesses	267,752	169,185
Road traffic accident	510,501	154,236
Cataracts	168,545	10,634
Premature birth	135,090	135,090
Asthma	106,806	30,480
Miscarriage	10,021	-
Fires/ burns	231,178	57,496
Poisonings	28,143	3,716
Malnutrition /nutritional concerns	141,657	20,330
Post-strep glomerulonephritis	139,160	133,257
Acute Rheumatic Fever (ARF)	204,367	123,266
STD	6,579	1,428



DISEASE CONDITION	Cost \$ for all Aboriginal people	Cost \$ for Aboriginal children 0-14 years
Pterygium	65,341	-
Scabies	115,671	79,524
RHD	167,397	33,469
Throat infection	27,242	9,081
Failure to thrive	36,939	36,939
Skin Cancer	2,515	-
Perinatal infections	1,713	1,713
Keratoconjunctivitis	17,707	9,634
Deafness	2,581	2,581
Shingles	647	-
Ross River	6,310	-
Conjunctivitis	3,296	3,296
Low Birth Weight	5,209	5,209
Drowning	2,243	2,243
ALL OTHER ADMISSIONS	N/A	N/A
TOTAL	19,068,103	3,405,154



Table 6 Summary – in pink – of environmental attributable admissions, length of stay and costs, by age group and Aboriginality 2018

age group		N	Length of stay		Costs \$\$		KEAF N	Length of stay		Costs \$\$	
			Mean	total	Mean	Total		Mean	Total		
all ages	Aboriginal	5,410	3.5	18997	6,830	36,951,172	2864	3.2	9211.2	6,662	19,079,992
	Non-Aboriginal	2,201	3.2	7143	6,686	14,716,766	1221	2.8	3417.6	5,999	7,324,487
	Both	7,611	3.4	26140	6,789	51,667,935	4093	3.1	12638	6,458	26,433,061
0-4 yrs	Aboriginal	521	4.9	2540	8,346	4,348,420	327.9	2.7	898.89	5,503	1,804,178
	Non-Aboriginal	106	2.7	291	6,846	725,642	65.33	1.8	115.02	4,754	310,591
	Both	627	4.5	2831	8,093	5,074,062	396.7	2.6	1018.1	5,356	2,124,340
5-9 yrs	Aboriginal	290	2.5	735	5,102	1,479,465	216.7	2.5	531.2	5,067	1,098,267
	Non-Aboriginal	50	1.3	67	4,513	225,644	37.44	1.3	49.01	4,513	168,960
	Both	340	2.4	804	5,015	1,705,109	256.8	2.3	584.16	4,974	1,277,315
10-14 yrs	Aboriginal	176	3.0	527	6,537	1,150,438	120.1	2.7	326.05	6,310	757,819
	Non-Aboriginal	42	1.4	60	4,463	187,445	30.88	1.5	47.05	4,679	144,477
	Both	218	2.7	587	6,137	1,337,884	151.7	2.5	373.9	5,999	909,800
0-14 yrs	Aboriginal	935	4.0	3708	7,174	6,707,359	614.7	2.7	1667.1	5,540	3,405,154
	Non-Aboriginal	185	2.1	395	5,770	1,067,468	121	1.6	188.53	4,582	554,365
	Both	1120	3.7	4105	6,942	7,774,828	735.7	2.5	1856.8	5,382	3,959,519
15 plus yrs	Aboriginal	4,423	3.4	15195	6,777	29,972,842	2199	3.4	7455.1	7,009	15,414,878
	Non-Aboriginal	2003	3.4	6723	6,779	13,578,041	1087	2.9	3205.4	6,162	6,700,461
	Both	6426	3.4	21918	6,777	43,550,882	3287	3.2	10660	6,729	22,115,339

Highlighted columns environmental attributable admissions, LOS, costs



REFERENCES

- Aboriginal Health Council of Western Australia (AHCWA). *SHR submission*. October 2017.
<http://ww2.health.wa.gov.au/~media/Files/Corporate/general%20documents/Sustainable%20Health%20Review/Submissions/AboriginalHealthCouncilofWA.pdf>
- ABS. Kimberley SA3 population age groups.
- KAHPF <http://www.kahpf.org.au/>
- KAHPF Environmental Health SubCommittee. *Increasing referrals to environmental services in the Kimberley: Current position and strategies for change: Views of environmental health services in 2016: a baseline report*. April 2017. Available at <https://www.kahpf.org.au/reports-documents>
- Prüss-Üstün A, Corvalán C. *Preventing Disease through Healthy Environments: Towards an Estimate of the Environmental Burden of Disease*. Geneva (CHE): World Health Organisation; 2006
- Prüss-Üstün A, Mathers C, Corvalán C, Woodward A. *Assessing the environmental burden of disease at national and local levels*. Geneva (CHE): World Health Organization. 2003
- Prüss-Üstün A, Wolf J, Corvalán C, Bos R, Neira M. *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*. Geneva (CHE): World Health Organization. 2016
- Sustainable Health Review Panel (SHRP). *Interim Report to the Western Australian Government*. January 2018
<http://ww2.health.wa.gov.au/~media/Files/Corporate/general%20documents/Sustainable%20Health%20Review/sustainable-health-review-interim-report.pdf>
- Sustainable Health Review Panel (SHRP). *Final Report to the Western Australian Government*. April 2019
<https://ww2.health.wa.gov.au/Improving-WA-Health/Sustainable-health-review/Final-report>
- WA Health. Current version of the HMDS Reference Manual is available at:
<http://www.health.wa.gov.au/healthdata/resources/hmnds.cfm>
- WACHS. *SHR submission*. October 2017.
<http://ww2.health.wa.gov.au/~media/Files/Corporate/general%20documents/Sustainable%20Health%20Review/Submissions/WACHS.pdf>



Appendix 1 Hospitalisations for Aboriginal residents from the Kimberley to a WA hospital (either Kimberley hospitals or Perth hospitals but not Darwin hospitals)

Coding frame: Disease ICD -10

DISEASE CONDITION	ICD-10 ACHI code(s)
Skin infection incl. pustules, abscess, cellulitis, impetigo	L08.9 Local infection of skin and subcutaneous tissue, unspecified L08.8 Other specified local infections of skin and subcutaneous tissue L02 Cutaneous abscess, furuncle and carbuncle L03 Cellulitis L01 Impetigo
Scabies	B86 Scabies
Unintentional injuries incl. dog bite*	W20-W64, W75-X59
Skin cancer	C43 Malignant melanoma of skin C44 Other malignant neoplasms of skin
Otitis Media	H65 Nonsuppurative otitis media H66 Suppurative and unspecified otitis media H67 Otitis media in diseases classified elsewhere
Trachoma	A71 Trachoma
Intestinal nematodes (hookworm)	B82 Unspecified intestinal parasitism B76 Hookworm diseases B77 Ascariasis B79 Trichuriasis B78 Strongyloidiasis B81 Other intestinal helminthiasis, not elsewhere classified B80 Enterobiasis B75 Trichinellosis B74 Filariasis
Diarrhoeal diseases	A00 - A09 Intestinal infectious diseases
Acute Rheumatic Fever (ARF)	I00 - 102 Acute rheumatic fever
Throat infection	J02 Acute Pharyngitis
Ross River Virus	B33.1 Ross River Disease
Other arboviruses (Barmah Forest)	A94 Unspecified arthropod-borne viral fever A93 Other arthropod-borne viral fevers, not elsewhere classified A92 Other mosquito-borne viral fevers
Murray Valley Encephalitis	A83.4 Australian ecephalitis
Pterygium	H11.0 Pterygium
Keratoconjunctivitis	H16.2 Keratoconjunctivitis
Malnutrition and nutritional concerns	E40 - E46 Malnutrition



Post-streptococcal glomerulonephritis	N00 - N07 Glomerular diseases - present with code B95.0
Cataracts	H25 Senile cataract H26 Other cataract H28 Cataract and other disorders of lens in diseases classified elsewhere Q12.0 Congenital cataract
Drowning	T75.1 Drowning and nonfatal submersion W65 - W74 Accidental drowning and submersion (these are the external cause codes). Other external cause code options for Drowning: V90 Accident to watercraft causing drowning and submersion, V92 Water-transport-related drowning and submersion without accident to watercraft, Y21 Drowning and submersion, undetermined intent.
Rheumatic heart disease (RHD)	I05 - I09 Chronic Rheumatic heart disease.
Falls	W00 - W19 Falls
Conjunctivitis (Infective)	H13.1 * Conjunctivitis in infectious and parasitic diseases classified elsewhere B30.1 Conjunctivitis due to adenovirus B30.9 Viral conjunctivitis, unspecified B30.2 Viral pharyngoconjunctivitis A74.0 Chlamydial conjunctivitis B30.3 Acute epidemic haemorrhagic conjunctivitis (enteroviral) B30.8 Other viral conjunctivitis A71.1 Active stage of trachoma
Road traffic accident	V00 - V99 Transport accidents
Dental caries, abscess, extractions	K02 Dental caries K04.7 Periapical abscess without sinus K04.6 Periapical abscess with sinus 97311-xx 97314-xx 97322-xx 97322-09 97322-10 97322-01 97323-xx 97324-xx
Failure to thrive	R62.8 Other lack of expected normal physiological development
Cardiovascular disease (Not RHD)	I51 Complications and ill-defined descriptions of heart disease I10 - I15 Hypertensive diseases I20 - I25 Ischaemic heart disease I30 - I52 Other forms of heart disease
Asthma	J45 Asthma J46 Status asthmaticus
Lower respiratory infections	J22 Unspecified acute lower respiratory infection J12 Viral pneumonia, not elsewhere classified J13 Pneumonia due to Streptococcus pneumoniae J14 Pneumonia due to Haemophilus influenzae J15 Bacterial pneumonia, not elsewhere classified J16 Pneumonia due to other infectious organisms, not elsewhere classified J17 Pneumonia in diseases classified elsewhere



	J18 Pneumonia, organism unspecified
Deafness	H90 Conductive and sensorineural hearing loss H91 Other hearing loss
Tuberculosis	A15-A19 Tuberculosis
Fires/ burns	T20-T31 Burns
Low birth weight	P07.0- Extremely low birth weight P07.1- Other low birth weight
Violence	X85 - Y09 Assault
Musculoskeletal diseases	-
Poisonings	T36-T50 Poisoning by drugs, medicaments and biological substances X40- X49 Accidental poisoning by and exposure to noxious substances
Mental health / psychosocial	Mental Health conditions as classified to: F00 - F99 Mental and behavioural disorders
Cancer	Cancer diagnoses are classified to: C00 - C96
Chronic lung disease incl. COPD	J41 Simple and mucopurulent chronic bronchitis J42 Unspecified chronic bronchitis J43 Emphysema J44 Other chronic obstructive pulmonary disease J47 Bronchiectasis
Urinary tract infection	N10 Acute tubulo-interstitial diseases N11 Chronic tubulo-interstitial nephritis N12 Tubulo-interstitial nephritis, not specified as acute or chronic N20 Calculus of kidney and ureter N21 Calculus of lower urinary tract N13.6 Pyonephrosis N15 Other renal tubulo-interstitial diseases O86.2 Urinary tract infection following delivery N28.8 Other specified disorders of kidney and ureter N30 Cystitis A06.8 Amoebic infection of other sites A36.8 † Other diphtheria A52.7 † Other symptomatic late syphilis A59.0 † Urogenital trichomoniasis A18.1 † Tuberculosis of genitourinary system N34 Urethritis and urethral syndrome B37.4 † Candidiasis of other urogenital sites A56.0 Chlamydial infection of lower genitourinary tract A54.0 Gonococcal infection of lower genitourinary tract without periurethral or accessory gland abscess A54.1 Gonococcal infection of lower genitourinary tract with periurethral and accessory gland abscess A59.0 † Urogenital trichomoniasis A64 † Unspecifically sexually transmitted disease M02.3- Reiter's disease P39.3 Neonatal urinary tract infection O23 Infections of genitourinary tract in pregnancy N39.0 Urinary tract infection, site not specified
Suicide / self-harm	X60-X84 Intentional self harm
Perinatal infections	



Miscarriage	<p>O03.0 Spontaneous abortion, Incomplete, complicated by genital tract and pelvic infection</p> <p>O03.1 Spontaneous abortion, Incomplete, complicated by delayed or excessive haemorrhage</p> <p>"O03.2 Spontaneous abortion, Incomplete, complicated by embolism "</p> <p>O03.3 Spontaneous abortion, Incomplete, with other and unspecified complications</p> <p>O03.4 Spontaneous abortion, Incomplete, without complication</p> <p>"O03.5 Spontaneous abortion, Complete or unspecified, complicated by genital tract and pelvic infection "</p> <p>O03.6 Spontaneous abortion, Complete or unspecified, complicated by delayed or excessive haemorrhage</p> <p>O03.7 Spontaneous abortion, Complete or unspecified, complicated by embolism</p> <p>O03.8 Spontaneous abortion, Complete or unspecified, with other and unspecified complications</p> <p>O03.9 Spontaneous abortion, Complete or unspecified, without complication</p> <p>O02.1 Missed abortion</p>
Premature birth	<p>P07.2- Extreme immaturity</p> <p>P07.3- Other preterm infants</p>
Perinatal deaths	
STD	A50-A64 Infections with a predominantly sexual mode of transmission
Shingles	<p>B02.0 Zoster encephalitis</p> <p>B02.1 Zoster meningitis</p> <p>B02.2 † Zoster with other nervous system involvement</p> <p>B02.3 Zoster ocular disease</p> <p>B02.7 Disseminated zoster</p> <p>B02.8 Zoster with other complications</p> <p>B02.9 Zoster without complications</p>



APPENDIX 2 Kimberley summary demographics using 2016 census

Kimberley SA3	Aboriginal and/or Torres Strait Islander(a)			Non-Aboriginal			Aboriginal status not stated			Total		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
Total persons	6,905	7,391	14,299	8,534	8,110	16,642	1,718	1,701	3,417	17,158	17,207	34,364
Age groups:												
0-4 years	807	777	1,581	594	529	1,114	131	121	252	1,529	1,427	2,957
5-14 years	1,530	1,534	3,058	953	964	1,919	225	220	446	2,711	2,717	5,426
15-24 years	1,254	1,230	2,486	768	678	1,444	195	186	381	2,218	2,094	4,309
25-44 years	1,963	2,128	4,092	2,801	3,128	5,928	568	629	1,195	5,329	5,881	11,208
45-64 years	1,095	1,378	2,478	2,622	2,315	4,937	453	439	898	4,172	4,135	8,308
65 years +	251	352	605	800	504	1,308	145	97	250	1,202	963	2,156

Source ABS 2016 Census of Population and Housing Aboriginal and Torres Strait Islander Profiles



APPENDIX 3

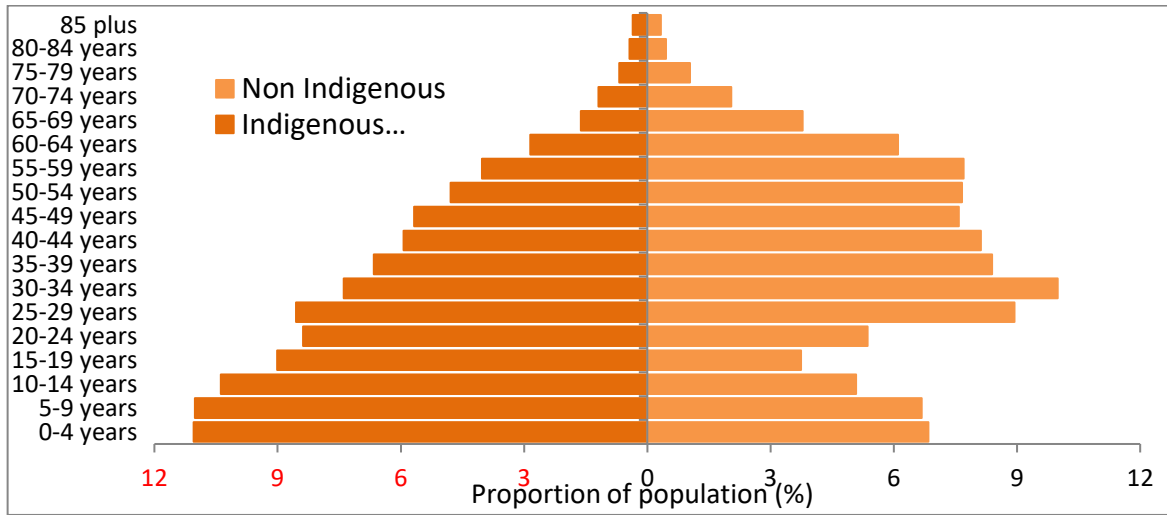


Figure 3 Kimberley population by age group and Indigenous status (2016 Census data)



APPENDIX 4 Kimberley region key population data, ERP 2018

Age group	Non Aboriginal	Aboriginal	Total
0 - 4	1202	2037	3239
5 - 9	1077	1963	3040
10 - 14	972	1822	2794
15 - 19	509	1570	2079
20 - 24	639	1681	2320
25 - 29	1381	1612	2993
30 - 34	1812	1485	3297
35 - 39	1482	1270	2752
40 - 44	1440	1063	2503
45 - 49	1374	1028	2402
50 - 54	1212	914	2126
55 - 59	1407	834	2241
60 - 64	1250	583	1833
65 plus	1566	829	2395
Total	17323	18691	36014

Above dataset: Projected population, Aboriginal and Torres Strait Islander Australians, Indigenous Regions, 2016 to 2031 and Dataset: ERP by SA2 (ASGS 2016), Age and Sex, 2001 Onwards
Data extracted on 11 Sep 2019 05:35 UTC (GMT) from ABS.Stat © Commonwealth of Australia.

Estimated resident population (ERP) is the official estimate of the Australian population, which links people to a place of usual residence within Australia. Usual residence within Australia refers to that address at which the person has lived or intends to live for six months or more in a given reference year. For the 30 June reference date, this refers to the calendar year around it. More detailed explanations of the concept of ERP, as adopted by the ABS for official population estimates, are contained in [Population Estimates: Concepts, Sources and Methods](#) (cat. no. 3228.0.55.001).

Estimated resident population is based on Census counts by place of usual residence (excluding short-term overseas visitors in Australia), with an allowance for Census net undercount, to which are added the estimated number of Australian residents temporarily overseas at the time of the Census.

The base population is the 2016 census (for Aboriginal people and for total estimated resident population of Australia at 30 June 2016, derived from 2016 Census counts of Aboriginal and Torres Strait Islander Australians, adjusted for net undercount as measured by the Post Enumeration Survey (PES).

Assumptions have been formulated on the basis of past demographic trends (migration both overseas and interstate, fertility, births and deaths), in conjunction with consultation with various experts and government department representative at the national and state/territory level. They do not attempt to allow for non-demographic factors (such as major government policy decisions, economic factors, natural disasters, epidemic or significant health treatment improvements) which may alter future demographic behaviour or outcomes.