Aboriginal Environmental Health

Co-designed Model of Care

How to achieve equity in health outcomes by addressing preventable environmental health conditions

In partnership with Aboriginal communities across Western Australia

Aboriginal Health Council of Western Australia

Government of Western Australia
Department of Health

Cover Artwork by Ashley Spratt, 2024

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ACKNOWLEDGEMENTS

We acknowledge the Whadjuk people of the Noongar Nation as the custodians of the land that Western Australian (WA) Department of Health (DOH) and the Aboriginal Health Council of WA (AHCWA) are located on and we pay our respects to all Elders, past, present and future.

The WA DOH and AHCWA thank all stakeholders, including staff, service providers and community members who engaged with, and participated in, the consultation processes to inform the development of this contemporary Aboriginal Environmental Health (AEH) Model of Care for WA (the Model).

Thank you to the AEH Steering Committee for their considered and valuable feedback during this process.

We would like to acknowledge the contribution of everyone who contributed to the co-design processes and the development of this document.

Wurdimarlu (Kalbarri, Western Australia), 2022

INTRODUCTION

In Western Australia, rates of preventable conditions due to a poor environment are higher among Aboriginal people than non-Aboriginal people. This inequity and a reduced capacity to prevent or minimise environmental health conditions, is the result of the lasting impacts of colonisation and subsequent Government policies, marginalisation and limited access to services. Achieving better environmental health outcomes requires cultural safety, trust, local presence and engagement, and the ability for environmental health workers to work safely, respectfully and effectively with Aboriginal communities. Environmental health promotion, family education, preventative health (living skills) programs and on-the-spot repairs require the ability to partner with households and community without shame to support and reinforce behaviour change through knowledge sharing and practical resources.

Aboriginal people have a holistic conceptualisation of health. Community, Family, Culture, Spirituality, Language, Country, Emotions and the Physical are all seen as integral in both an individual, and a community for achieving and sustaining health. With acknowledgment of the Aboriginal Community Controlled Health Services (ACCHS) Model of Care (Appendix 1), the Model presented in this report reflects these key principles.

An independent Review of the Western Australian Aboriginal Environmental Health Program (the Review) undertaken by the University of Western Australia for the WA DOH was published in 2022. The Review found extensive evidence demonstrating a strong need for the continuation of the AEH Program (the Program) and recognised the value of the Program to WA communities. While areas for improvement were identified, there was widespread recognition that maintaining, optimising and expanding the Program is vital for improving Aboriginal health and wellbeing in WA. Fourteen out of 33 recommendations submitted to the WA DOH through the Review, explicitly affirmed co-design as a key requirement for the future of the Program[1].

In 2023, AHCWA was funded by the WA DOH to develop a contemporary AEH Model of Care incorporating the findings and recommendations of the Review and based on the perspectives, experiences and aspirations of the AEH sector in WA. AHCWA worked with the WA DOH, AEH service providers, Aboriginal Community Controlled Organisations (ACCOs) and ACCHS, to co-design the scope for the future model.

The co-design process included a detailed consideration of the Program focus, future growth of the Program and required resourcing supports. The Model has been informed by this process, along with the Review and a detailed literature review.

The Model and the co-design process undertaken in its development, are aligned with the *WA Aboriginal Health and Wellbeing Framework 2015–2030* (the Framework), the *WA Sustainable Health Review* (SHR) and the *National Agreement on Closing the Gap* (the National Agreement), and associated Targets and Priority Reforms. The importance of this co-designed project has been recognised through its inclusion as a key action in the *WA Closing the Gap Implementation Plan 2023-25*.

[1]Casey W, Graham P, O'Donnell V, Simpson R, Stevely S, Turner P. Review of the Western Australian Aboriginal Environmental Health Program - Final Report. Department of Health Western Australia; 2022 Mar. Retrieved from: https://www.health.wa.gov.au/~/media/Files/Corporate/general-documents/Aboriginal-Environmental-Health/PDF/AEH-Program-Review_Main-Report_250322.pdf

BACKGROUND

Aboriginal people in WA live in more than 200 strong and culturally diverse communities in regional, remote and metropolitan areas. All of these people deserve a healthy environment no matter where they live.

In 2022, there were over 123,000 Aboriginal people living in WA.[2] The East Metropolitan Health Region has the largest number of Aboriginal people (21.7%) of the WA Aboriginal population, followed by the Kimberley (16.3%) and South Metropolitan (16.2%).

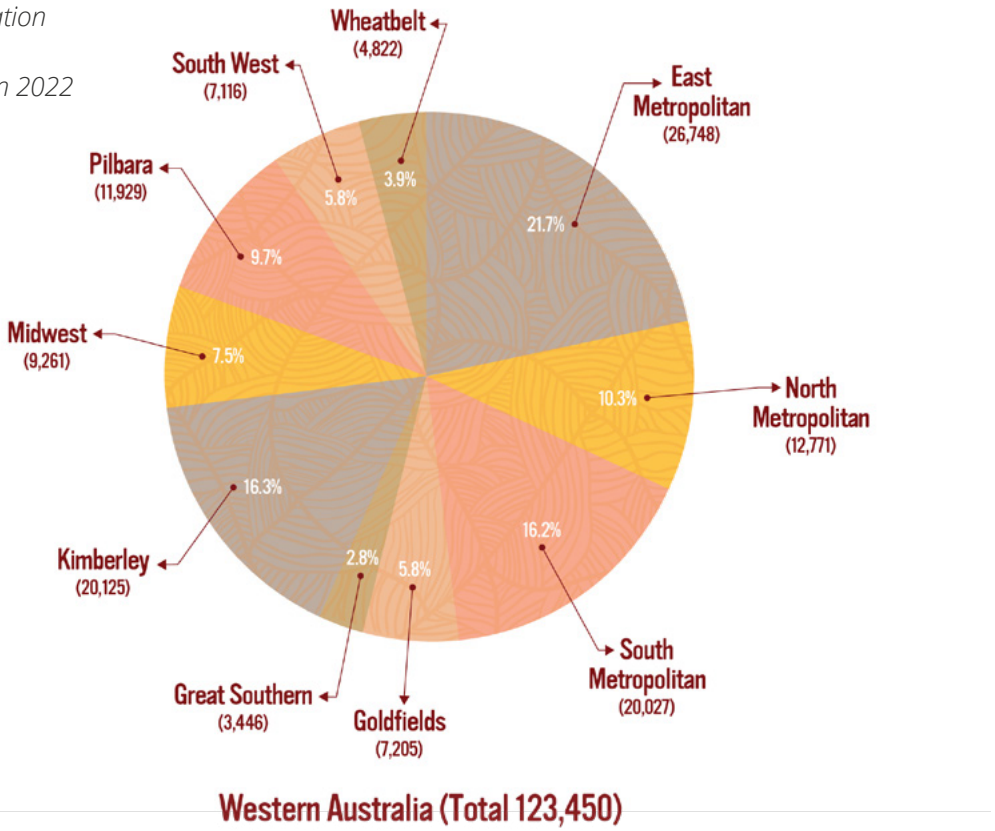
Not all regions in WA are the same. There are unique and important differences in service area characteristics such as local accountabilities for essential services, waste management and disaster management, that vary according to community size, land tenure, history and government contracting.

Most regions have a mixture of remote communities and remote towns which vary in both size and infrastructure.

The Perth Metropolitan area has the largest number of Aboriginal residents, but despite their access to municipal services and utilities, the Aboriginal community is still adversely affected by environmental health issues similar to those living in regional and remote areas.

Currently the Program is funded around $8.3m annually to deliver environmental health services in the Kimberley, Pilbara, Midwest, Goldfields and Perth Metropolitan area. Each of these regions are funded differently. Nineteen organisations are funded to deliver environmental health services including LGAs, ACCOs and ACCHS. Whilst each organisation is funded to deliver some core services, they are not all delivering the same services. The Program does not currently provide services in the South West, Wheatbelt and Great Southern, and the Perth Metropolitan area is poorly resourced with regard to need.

Figure 1: WA Population by Aboriginal Status and Health Region in 2022



[2]Epidemiology Directorate, WA Department of Health, WA Population Data Dashboard, Version 1.0. [Cited 2024 Jul 8]. Estimates of Aboriginal and Torres Strait Islander Australians, June 2023. Retrieved from: https://www.abs.gov.au/statistics/people/aboriginal-and-torres-strait-islander-peoples/estimates-aboriginal-and-torres-strait-islander-australians/latest-release.

REVIEW OF THE WA ABORIGINAL ENVIRONMENTAL HEALTH PROGRAM

Despite many examples of good practice in the Program, the findings of the Review indicated a need for system changes, greater Aboriginal leadership and program co-design, and improved data collection for routine evaluation. The Review also identified extensive evidence for the need of additional new funding to address needs currently outside the remit of the Program, and to expand the Program to all regions across WA.[1]

The Review recommended that a best-practice AEH Program Model that meets the needs of the community it serves, would be one that:

- has greater Aboriginal leadership and co-design processes with the ACCOs;
- identifies and addresses local environmental health risks;
- integrates across sectors and providers and advocate to address service provision gaps;
- embeds the nine Healthy Living Practices (see Appendix 2);
- embeds clinical referrals as part of early interventions;
- embeds Community Environmental Health Action Plans;
- ensures there is locally tailored and culturally responsive training and workforce development; and
- has outcomes-based reporting and ongoing evaluation.[1]

POLICY CONTEXT

National Agreement on Closing the Gap *(page 7)*

The development and future implementation of the Model is strongly aligned to strategic elements of the Aboriginal Empowerment Strategy and the Priority Reform Areas under the National Agreement.[3]

Implementation of the Model will significantly contribute to Targets 1, 7, 8 and 9 of the National Agreement.[3,4]

WA Aboriginal Health and Wellbeing Framework 2015-2030

The Model addresses the Guiding Principles of the Framework while also supporting the Strategic Directions and Priority Areas. In line with the Framework, the process undertaken in the development of the Model was done so to ensure services delivered will be culturally safe, with strong focus on strengthening Aboriginal community control and capacity building. The Model highlights the importance of prevention and early intervention, and through its implementation, the Model will support better access to and equality of service.[5]

WA Health Workforce Strategy 2034

As outlined on page 27, the Model supports significant growth of the AEH workforce, particularly at the local level. A strong and skilled Aboriginal health workforce is vital to providing culturally safe and responsive care to Aboriginal people and addressing disparities in health outcomes.

Growing the Aboriginal workforce is woven throughout the WA Health Workforce Strategy 2034 as a priority focus for the WA health system.[6] Increasing Aboriginal training and employment through the Model also aligns to Target 7 and 8 of the National Agreement, for Aboriginal people to have strong economic participation through employment and education.

WA Sustainable Health Review

The SHR clearly outlines the need for the WA health system to have a stronger focus and increased investment in prevention to ensure sustainability, as well as the need to reduce inequity in health outcomes and access to care for Aboriginal people.[7]

[3]Coalition of Peaks. National Agreement on Closing the Gap | Closing the Gap [Internet]. 2019 [cited 2024 Aug 28]. Retrieved from: https://www.closingthegap.gov.au/national-agreement/national-agreement-closing-the-gap
[4]Department of Premier and Cabinet. Closing the Gap – WA's Implementation Plan [Internet]. 2023 [cited 2024 Aug 9]. Retrieved from: https://www.wa.gov.au/government/publications/closing-the-gap-was-implementation-plan
[5]Aboriginal Health Policy Directorate, Department of Health Western Australia. WA Aboriginal Health and Wellbeing Framework 2015–2030 [Internet]. 2015. Available from: https://www.health.wa.gov.au/Improving-WA-Health/About-Aboriginal-Health/WA-Aboriginal-Health-and-Wellbeing-Framework-2015-2030
[6] Strategic Workforce and Development Directorate, Department of Health Western Australia. WA Health Workforce Strategy 2034. [internet] 2024. Available from: https://www.health.wa.gov.au/~/media/Corp/Documents/Reports-and-publications/workforce-strategy-2034/workforce-strategy-2034.pdf
[7]Department Of Health, Western Australia. Sustainable Health Review: Final Report to the Western Australian Government [Internet]. 2019. Available from: https://www.health.wa.gov.au/~/media/Files/Corporate/general-documents/Sustainable-Health-Review/Final-report/sustainable-health-review-final-report.pdf

Alignment to the National Agreement on Closing the Gap

ABORIGINAL EMPOWERMENT STRATEGY

National Agreement on Closing the Gap
The Model is aligned to the Aboriginal Empowerment Strategy, the Priority Reform Areas and the Targets under the National Agreement.[3]

PRIORITY REFORM ONE	PRIORITY REFORM TWO	PRIORITY REFORM THREE	PRIORITY REFORM FOUR
Formal Partnerships and Shared Decision Making	**Building the Community Controlled Sector**	**Transforming Government Organisations**	**Shared Access to Data and Information at a Regional Level**
The formalised co-design process, established between the WA DOH and AHCWA, has ensured that Aboriginal people and organisations have led the discussions and decision-making throughout the development of the Model.	Implementation of the Model will support sustainable growth of ACCOs (including ACCHS) to deliver high quality environmental health services to Aboriginal people. It supports an increased proportion of ACCOs to deliver services and follows the principles of investing in capacity building, with a focus on prevention and early intervention.	The development and implementation of the Model demonstrates the WA Governments commitment to working in partnership with ACCOs, Aboriginal people and communities. The Model is founded on the principals of supporting culture and culturally safe service delivery.	Implementation of the Model will support shared access to location specific data and information.
Target 1: Everyone enjoys long and healthy lives.	**Target 7:** Youth are engaged in employment or education.	**Target 8:** Strong economic participation and development of people and their communities.	**Target 9:** People can secure appropriate, affordable housing that is aligned with their priorities and need.

WA Closing the Gap Implementation Plan 2023-25
Implementation of the Model is a key action of the WA Closing the Gap Implementation Plan under Target 9 and is aligned to Target 1, 7 and 8.[4]

CO-DESIGN PROCESS

STEERING COMMITTEE

A Steering Committee was formed in September 2023 to oversee the project, with representatives from AHCWA, WA DOH, ACCHS and ACCOs who work in the environmental health sector (Appendix 3). The Steering Committee met initially to develop a Terms of Reference and to appoint a consultant to undertake the consultations and write the report. Jeanette Ward – Health Perspectives was engaged on the 11 October 2023.

At a subsequent meeting, the consultant worked with the Steering Committee to develop a high-level Program Logic (Appendix 4) to inform the project. The Steering Committee went on to meet regularly after that, reviewing progress of the consultations and the development of the report.

CONSULTATIONS

Prior to engaging the consultant for this co-design process, AHCWA held two AEH Forums. The first AEH Forum was held in 2021 and a second in 2022. The findings from these consultations have been included in a literature review undertaken by the consultant for this project. In brief, the participants from those forums agreed with the recommendations of the Review and supported the development of a contemporary AEH Model of Care.

As part of the co-design process, the consultant engaged with stakeholders from across the state between November 2023 and June 2024. This included two, 2-day EH Forums held in Perth as well as one face to face consultation and a series of online consultations as shown below:

STAKEHOLDER	DATE	FORMAT	PARTICIPANTS
Pilbara	11 December 2023	Online	12 participants
Goldfields & Central Desert	13 February 2024	Online	8 participants
South West	1 March 2024	Online	3 participants
Murchison	1 March 2024	Online	5 participants
EH Forum 1	12 & 13 March 2024	Face to Face	87 participants
Perth Metro	2 April 2024	Online	3 participants
Kimberley	4 April 2024	Online	7 participants
AEH Providers	3 May 2024	Face to Face	7 participants
DOH AEH Directorate	3 May 2024	Face to Face	2 participants
ACCHS	24 May 2024	Online	6 participants
EH Forum 2	2 July 2024	Face to Face	56 participants

Aboriginal Environmental Health Forum, Boorloo, 2024

The following agenda was used for each consultation:

1. Current AEH Program – an overview
2. Co-design of the AEH Model of Care – what's happening, why, and what could it cover. Project Logic walkthrough and gathering input.
3. Open Discussion Part 1: What is the current situation for AEH in this region?
4. Open Discussion Part 2: What insights and ideas from this region are important to consider in developing a Model of Care?
5. Exploring some features of a Model of Care: Referrals
    a. Do we need a referral system between ACCO AEH Service Providers and ACCHS?
    b. Do we need more referral tools, referral follow-ups and updated roles and responsibilities?
    c. Do we need more data sharing and transparency between organisations in this region?
6. Open Discussion Part 3: How would you measure the future impact of a new AEH Model of Care in improving your current regional situation?

CONSULTATION FINDINGS

The key findings from the consultation process regarding the future of the Program and the Model included:

Aboriginal leadership and management

- The Program should be Aboriginal-led and managed. Funding is currently distributed via DOH to the service provider and there was discussion about the possibility of shifting this management function to AHCWA.
  NOTE: *This topic was outside of the scope of the project but has been further expanded on at the end of this document, under 'Future Considerations'.*
- All AEH funding should be transitioned to ACCHS or ACCOs, or a combination of both, where possible.

Expansion

- The Program should be funded in all regions.
- There should be an increase in funding for expansion of the Program.
- ACCOs and ACCHS should be resourced to allow capacity building for the provision of AEH services.

Program design

- Services should be flexible and allow for local priorities and needs.
- There should be improved coordination of the referral system between ACCO service providers and ACCHS.
- There should be a strong focus on prevention through building the capacity of people and communities to have greater ownership over their environments and health.
- Six Domains, key activities and scope of services were developed and agreed on as the fundamental services required for a successful Program.

Workforce development

- The AEH Workforce should be expanded and transformed to place greater emphasis on health promotion, education and capacity building.
- Workforce need to be multidisciplinary and should work collaboratively with other community workforce.
- The roles and responsibilities of the workforce should reflect the Model.

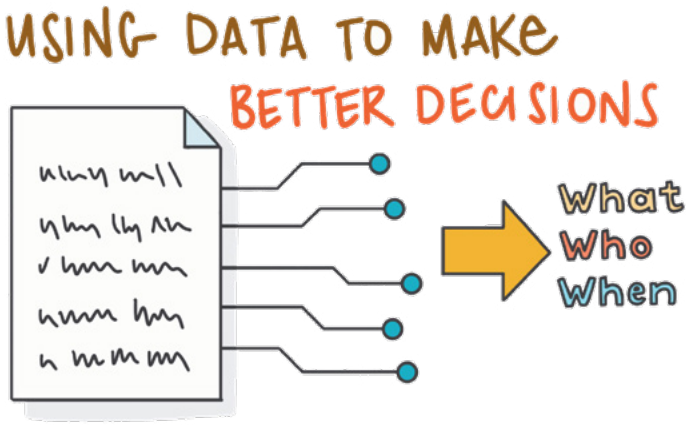
THE DATA STORY

The impacts of environmental health conditions for Aboriginal people are significant.
They are determined by multiple and complex issues, affecting the prevalence and severity of disease, effectiveness of treatment and costs of intervention. This often results in the need for increased tertiary intervention and disproportionately high adverse health outcomes for Aboriginal people when compared to non-Aboriginal people.

Appendix 5 presents the environmental health related conditions that have been considered as part of the data story to inform the Model.

INPATIENT HOSPITALISATION DATA

Table 1 presents the number of cases, age standardised rate (ASR) (per 100,000 population), length of stay and cost for inpatient hospitalisations for conditions which have a link (attribution) to the environment as presented in Appendix 5. This data is presented as a total for all conditions by Aboriginal status and health region for the period 2018 to 2022. Hospitalisation data is reported by the patient's residential address when they attended hospital.



Data in Table 1 indicates that $553.23 million was spent on hospitalisation costs for Aboriginal patients over four years (or an average of $138.31 million a year) for conditions which have an environmental attribution. This figure ranges from $123.53 million over four years in the Kimberley Health Region to $13.53 million over four years in the Great Southern Health Region. Data in Table 1 also indicates the Age Standardised Rate (ASR) of hospitalisations due to conditions which have a link to the environment are much higher for Aboriginal people than non-Aboriginal people for all health regions across WA.

Appendix 6 presents the number of cases, ASR (per 100,000 population), length of stay and cost for inpatient hospitalisations for conditions which have an environmental attribution. This data is presented by condition and health region for Aboriginal people for 2018 to 2022.

As emergency and outpatient data have not been included in this analysis of hospitalisation data, disease burden will be substantially underestimated. Additionally, the data presented in Table 3 and Appendix 6 only identify cases that considered the principal diagnosis (rather than secondary diagnosis). Therefore, road traffic accidents, intentional self-harm, unintentional injuries and violence have been excluded.

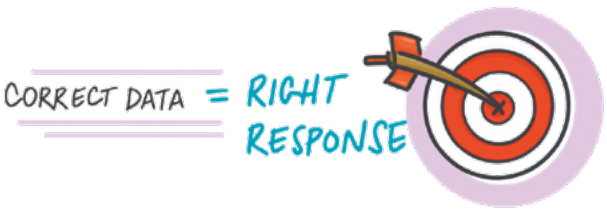


Figure 2 presents the Aboriginal to non-Aboriginal per person cost ratio for hospitalisations for conditions that have an environmental attribution. These costs have been developed based on number of cases, hospitalisation costs and the population size by Aboriginal status.

The data indicates that in most regions, the costs per person for Aboriginal people is higher than that for non-Aboriginal people when it comes to hospitalisations for conditions that have an environmental attribution. This is due to the higher burden of disease experienced by Aboriginal people when compared with non-Aboriginal people.

Figure 2: Aboriginal and non-Aboriginal cost ratio per person for hospitalisations related to environmental factors.

Table 1: Hospitalisations for conditions which have an environmental attribution, by Aboriginal status and Health Region, 2018-2022

HEALTH REGION	ABORIGINAL STATUS	FEMALES				MALES				PERSONS			
		Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
East Metropolitan Health Service	Aboriginal	7,280	18,094.2	39,188	56.21	6,014	68,261.3	40,724	52.13	13,294	17,689.0	79,912	108.33
	Non-Aboriginal	133,182	7,141.8	602,386	987.16	136,385	7,621.4	619,013	1,105.32	269,570	7,337.9	1,221,407	2,092.51
	Total Population	140,462	7,373.1	641,574	1,043.37	142,399	7,794.3	659,737	1,157.45	282,864	7,538.6	1,301,319	2,200.84
Goldfields Health Region	Aboriginal	2,707	18,055.4	10,798	21.06	2,285	17,570.6	9,459	18.75	4,992	17,126.0	20,257	39.80
	Non-Aboriginal	8,007	6,907.3	30,651	59.17	9,143	7,109.6	33,059	72.39	17,150	6,981.1	63,710	131.55w
	Total Population	10,714	8,182.4	41,449	80.22	11,428	8,037.3	42,518	91.14	22,142	8,064.3	83,967	171.36
Great Southern Health Region	Aboriginal	873	15,223.5	3,086	6.13	940	25,831.0	4,184	7.40	1,813	15,496.0	7,270	13.53
	Non-Aboriginal	13,687	7,283.5	49,902	93.71	15,589	7,851.7	52,600	119.26	29,276	7,535.9	102,502	212.97
	Total Population	14,560	7,563.5	52,988	99.85	16,529	8,202.2	56,784	126.66	31,089	7,847.9	109,772	226.50
Kimberley Health Region	Aboriginal	9,732	23,264.0	34,009	66.08	7,614	21,531.9	30,798	57.45	17,346	21,779.6	64,807	123.53
	Non-Aboriginal	2,646	6,893.0	8,039	17.21	3,928	8,872.7	11,580	27.59	6,575	7,962.5	19,620	44.80
	Total Population	12,378	14,450.4	42,048	83.29	11,542	13,942.8	42,378	85.04	23,921	14,195.4	84,427	168.33
Midwest Health Region	Aboriginal	3,690	19,511.5	14,684	28.92	3,146	87,695.9	14,938	27.14	6,836	19,328.2	29,622	56.06
	Non-Aboriginal	12,317	7,559.0	47,332	85.97	15,200	8,289.0	56,152	118.09	27,518	7,921.3	103,485	204.07
	Total Population	16,007	8,923.7	62,016	114.89	18,346	9,370.6	71,090	145.23	34,354	9,137.9	133,107	260.12
North Metropolitan Health Service	Aboriginal	3,476	18,583.4	19,314	26.96	2,617	58,918.6	16,168	21.41	6,093	20,687.7	35,482	48.37
	Non-Aboriginal	154,747	7,474.3	730,266	1,100.99	151,914	7,833.5	675,253	1,143.64	306,661	7,594.8	1,405,519	2,244.63
	Total Population	158,224	7,573.0	749,581	1,127.95	154,531	7,903.0	691,421	1,165.05	312,755	7,678.7	1,441,002	2,293.00
Pilbara Health Region	Aboriginal	4,577	22,546.5	15,509	31.37	3,694	20,046.4	15,558	31.34	8,271	20,211.3	31,067	62.71
	Non-Aboriginal	4,382	6,431.3	14,702	28.29	5,431	7,460.4	17,463	38.45	9,813	6,900.8	32,165	66.74
	Total Population	8,959	10,212.5	30,211	59.66	9,125	9,308.6	33,021	69.78	18,084	9,551.3	63,232	129.45

Table 1 continued: Hospitalisations for conditions which have an environmental attribution, by Aboriginal status and Health Region, 2018-2022

HEALTH REGION	ABORIGINAL STATUS	FEMALES				MALES				PERSONS			
		Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
South Metropolitan Health Service	Aboriginal	3,813	14,780.7	20,063	29.98	3,398	61,601.9	18,224	29.20	7,211	15,545.8	38,287	59.18
	Non-Aboriginal	134,246	7,007.3	568,670	958.42	135,873	7,401.8	532,192	1,050.09	270,121	7,160.2	1,100,870	2,008.53
	Total Population	138,059	7,109.4	588,733	988.40	139,271	7,488.9	550,416	1,079.29	277,332	7,253.2	1,139,157	2,067.71
South West Health Region	Aboriginal	1,438	14,657.5	5,904	9.69	1,206	16,802.0	5,328	9.63	2,644	13,721.4	11,232	19.31
	Non-Aboriginal	39,241	7,229.3	146,602	265.89	41,169	7,537.8	149,531	306.70	80,411	7,350.4	296,134	572.59
	Total Population	40,679	7,350.4	152,506	275.57	42,375	7,629.8	154,859	316.32	83,055	7,456.7	307,366	591.90
Wheatbelt Health Region	Aboriginal	1,745	19,551.6	8,039	12.26	1,280	15,397.4	5,476	10.16	3,025	17,166.5	13,515	22.42
	Non-Aboriginal	16,190	7,300.8	62,053	115.31	20,009	7,772.6	71,456	157.22	36,199	7,527.1	133,509	272.53
	Total Population	17,935	7,849.4	70,092	127.57	21,289	8,077.1	76,932	167.38	39,224	7,948.9	147,024	294.95
Total	**Aboriginal**	**39,331**	**NA**	**170,594**	**288.65**	**32,194**	**NA**	**160,857**	**264.58**	**71,525**	**NA**	**331,451**	**553.23**
	Non-Aboriginal	**518,645**		**2,260,603**	**3,712.12**	**534,641**		**2,218,299**	**4,138.75**	**1,053,294**		**4,478,921**	**7,850.92**
		557,977		**2,431,198**	**4,000.77**	**566,835**		**2,379,156**	**4,403.33**	**1,124,820**		**4,810,373**	**8,404.16**

PRIMARY HEALTH CARE DATA

Hospitalisation data alone does not demonstrate the full cost and burden of disease associated with environment health related conditions, as it only identifies cases serious enough to be admitted for hospital care.

As such, a sample of environmental health related conditions was extracted from several ACCHS including Broome Regional Aboriginal Medical Service (BRAMS), Derby Aboriginal Health Service (DAHS), Mulan Health Centre, Billiluna Health Centre, Bidyadanga Health Centre, Beagle Bay Health Service, Balgo Health Centre, Derbarl Yerrigan Health Service (DYHS), South West Aboriginal Medical Service (SWAMS), Geraldton Regional Aboriginal Medical Service (GRAMS), Bega Garnbirringu Health Service and Puntukurnu Aboriginal Medical Service (PAMS) and is presented in Appendix 7.

This data indicates environmental health related conditions such as acute rheumatic fever, diarrhoeal diseases, eye conditions (such as keratoconjunctivitis) ear conditions (such as otitis media), skin conditions (such as skin infections and scabies), throat infections and unintentional injuries contribute to a high number of clinical items managed by ACCHS. This data also indicates that all age groups (0-14 years, 15-24 years, and 25+ years) experience the burden of disease due to environmental health related conditions.

It is important to note that comprehensive extraction and analysis of primary health care data presents challenges, which includes (but is not limited to) the incomparability between the two primary care electronic health record systems used in WA ACCHS. Therefore, primary health care data presented as part of the Model are indicative only, and not necessarily representative of ACCHS use across WA.

NOTIFIABLE DISEASE DATA

Notifiable infectious diseases continue to disproportionately affect Aboriginal people. For example, in 2023, shigellosis had a state wide Aboriginal to non-Aboriginal rate ratio of 4:1, and a rate of 52.19 per 100,000 population compared with 13.03 per 100,000 population.[8] Shigellosis is an infection of the digestive tract caused by bacteria which results in severe diarrhoea and has a high risk for ongoing person to person transmission particularly in environments where there is crowding, hygiene concerns and poor sanitation.[9]

Appendix 8 presents the number of notifiable infectious diseases presented by condition and Health Region for Aboriginal people in 2023. Only cases for Aboriginal people who are known WA residents have been included.

[8]WA Department of Health. Notifiable infectious disease dashboard. [cited 2024 Aug 6]. Available from: https://www.health.wa.gov.au/Articles/N_R/Notifiable-infectious-disease-dashboard

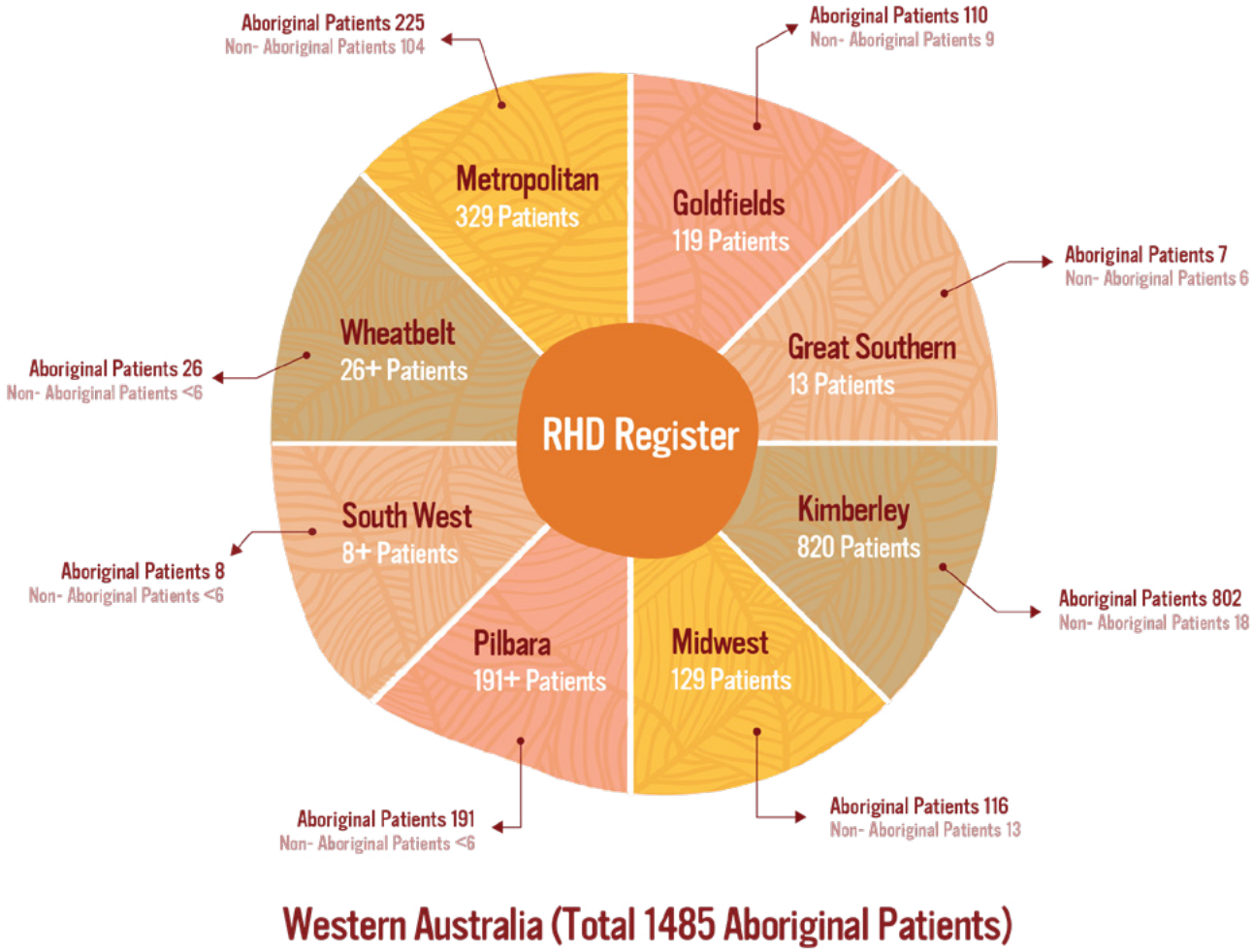
[9]Department of Health, Public and Aboriginal Health Division. Treatment for Shigella infectious ('Shigellosis') in Western Australia. Communicable Disease Control Directorate Guidelines [Internet]. 2022 Mar [cited 2024 Aug 7]; Guideline 0006. Available from: https://www.health.wa.gov.au/~/media/Corp/Documents/Health-for/Communicable-Diseases/Guidelines/Treatment-for-Shigella-infections-in-Western-Australia.pdf

CASE STUDY - ACUTE RHEUMATIC FEVER (ARF) AND RHEUMATIC HEART DISEASE (RHD)

The circumstances in which people live affect the risk of Group A streptococcus (Strep A) infections, ARF and RHD. Living in crowded conditions and having limited access to facilities to wash people, clothes and bedding increase the risk of Strep A infections, ARF and RHD.[10] This relates directly to the Health Living Practices. Despite advances in medical treatment and management of ARF and RHD, the associated health benefits at a population and community level have not been as evident for Aboriginal people as they have for non-Aboriginal people.[11] This is reflected in Figure 2 which demonstrates the number of patients on the WA RHD register by Aboriginal Status.

The WA RHD Register recorded 1,044 Aboriginal people with a history of ARF and/or RHD in 2019. Today that has increased to 1,485. The prevalence of RHD is 60-times higher in Aboriginal people under 55 years than other Australians of similar age. A person with RHD is typically managed with a highly structured chronic disease management plan including long-term secondary antibiotic prophylaxis. This can be a painful process of monthly injections over a few years which has low compliance rate. There is an avoidable cost to both the individual and the health system if environmental health conditions increasing risk of Strep A infection, ARF and RHD were addressed.

Figure 3: WA Patients on the WA RHD Register to 31 December 2023



[10]Coffey PM, Ralph AP, Krause VL. The role of social determinants of health in the risk and prevention of group A streptococcal infection, acute rheumatic fever and rheumatic heart disease: A systematic review. PLOS Neglected Tropical Diseases. 2018 Jun;12(6):e0006577. Retrieved from https://doi.org/10.1371/journal.pntd.0006577

[11]RHDAustralia (ARF/RHD writing group). The 2020 Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease [Internet]. Edition 3.2, March 2022. 2020. Available from: https://www.rhdaustralia.org.au/system/files/fileuploads/arf_rhd_guidelines_3.2_edition_march_2022.pdf

THE CONTEMPORARY WA ABORIGINAL ENVIRONMENTAL HEALTH MODEL OF CARE

The Model has been designed with a strong focus on prevention, primary health care, community engagement and capacity building, to deliver health gains, equity, social justice and a more economical program. The Model would also see expanded funding to additional regions and consistent service delivery through the development of a scope of service.

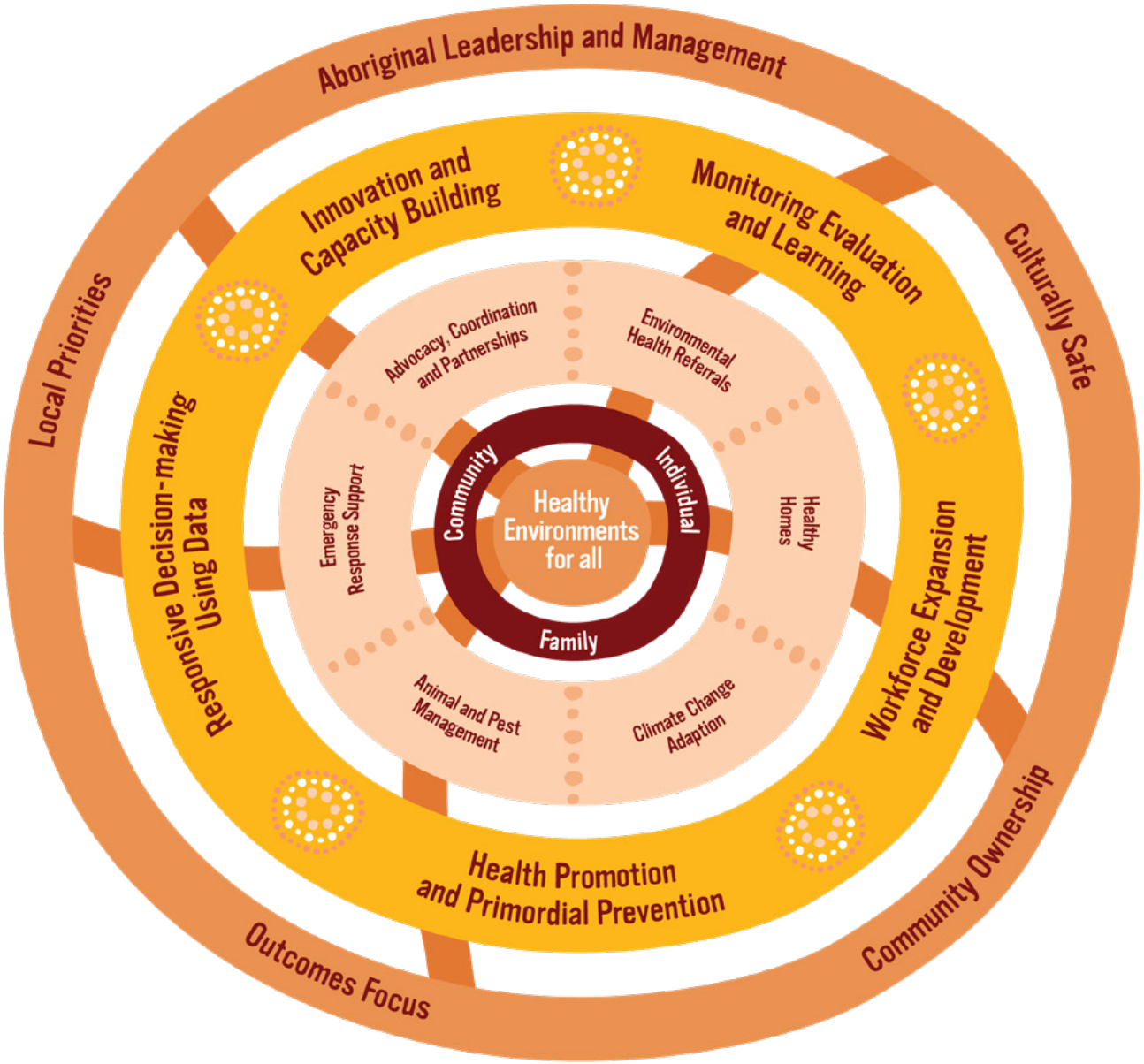


Figure 4: Aboriginal Environmental Health Model of Care

VISION

The vision of the Model is located in the centre circle in the diagram and focuses on "healthy environments for all".

COMMUNITY OUTCOME

Under the Model the community outcome is for individuals, families and communities to understand and action the link between their environment, behavioural choices, essential services and health outcomes.

To ensure Aboriginal ways of knowing, being and doing are at the forefront of environmental health work, the second ring outlines COMMUNITY - FAMILY - INDIVIDUAL as connected and equal. Working together connects western ways with traditional knowledge systems and protects our environment. It is how healthy environments for all are created.

PRINCIPLES

Achieving healthy environments for all requires the realisation of five principles shown in the outer (Orange) circle:

- Aboriginal Leadership and Management – respecting the strengths, knowledge and capabilities of Aboriginal people to provide leadership in the development and implementation of the Model.
- Local Priorities – recognising that communities are unique, and that locally informed and flexible solutions will better meet the needs of an individual community and improve health outcomes.
- Outcomes Focus – a focus on better understanding and implementing strategies that work to improve health outcomes.
- Culturally Safe – working within a holistic framework that recognises and respects the importance of Connection to Country, culture, language, spirituality, family and community.
- Community Ownership – communities are supported to build their capability and have ownership and control over their health and wellbeing.

DRIVERS

The Model requires the following drivers to support successful implementation:

- Responsive decision-making using data.
- Workforce expansion and development.
- Health promotion and primordial prevention.
- Innovation and capacity building.
- Monitoring, evaluation and learning.

Consistent with the ACCHS Model of Care, the Model has a preventive focus. It includes resources to ensure capacity building, health promotion and education is Aboriginal-led, technically expert, reflects best practice and is uniquely place-based.

The Model is built on effective, creative, evidence-based strategies, respecting and harnessing unique differences in Aboriginal communities in their circumstances, strengths, needs and local knowledge. It encourages more innovation, flexibility and responsiveness to local priorities. It emphasises prevention and AEH promotion and ensures the rights of Aboriginal peoples to healthy environments are realised.

Whilst the service scope applies to all communities, there is enough flexibility in service delivery to ensure that local priorities are addressed. Place-based community needs assessments, based on the six domains of AEH, completed regularly will inform the development of Community EH Action Plans (CEHAPs). These needs assessments set the scene for how the AEH service providers partner with communities and other community organisations in achieving their priorities.

Aboriginal organisations know their communities well and are usually the first to be aware of upcoming local events, pressures, emerging threats, and the current state of resilience and capacity. Prevention can start in these ACCOs early and effectively. Appropriately resourced services will be able to respond quickly, with tailored information and support, including individual and population-based health promotion, community mobilisation, capacity building, and deployment of assets and equipment.

Local and regional variations and responsive actions will be informed by local Primary Health Care (PHC) and hospital data. These culturally responsive strategies will effectively disrupt health inequities due to environmental health conditions.
The Model has a strong focus on capacity building, health promotion and education. Health literacy and disease prevention awareness will be raised safely in mixed settings i.e. home-based support services, at community events, through PHC and health expos in the community. Knowledge-sharing and education can be combined with practical assistance such as hygiene and cleaning packs or transport to community laundries to better address Healthy Living Practices (HLPs).

Through innovative primordial prevention that starts at the community level before disease occurs, communities will adopt new behavioural norms that shift collective behaviour towards prevention and greater capacity for control and responsibility.

Regional coordination is key to avoid duplication in regions with multiple service providers. For this reason, Regional Coordinators have been factored into the workforce. A Regional Coordinator would ensure the fidelity of the Model and would be available to advise and mentor local workforce in communities. They also offer the opportunity to bring regional teams together for concerted activities in communities with a greater need and the regional health planning forums have identified that this type of response is appropriate/required.

DOMAINS

Following consultation with key AEH stakeholders, the model proposes Six Domains to best reflect a contemporary approach to EH for Aboriginal people and communities across the state.

The Six Domains are further explored in the following tables outlining the key action areas; scope of service; potential measures; and outcomes. Although the scope of services delivered by individual providers will be negotiated and determined through service agreements, each community should have access to these Six Core Domains of environmental health.

Figure 5: *Domains*

Rationale: Home visits are the centrepiece of Healthy Homes in the Model. A Healthy Home Assessment (HHA) can identify the need for household education and support. These visits are an essential service and should be conducted at regular intervals.

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
1.1 Culturally appropriate and locally tailored environmental health promotion and education	• Community environmental health promotion and education on HLPs (including hand and face washing, showering, laundry, safe food practices, cleaning, etc.). • Home-based environmental health promotion and education on healthy homes practices as identified through home visits. • Offer Living Skills courses on healthy living practices. • Provide education on maintenance and safety information on appliances and whitegoods.	• Increase community knowledge and practice of HLPs and environmental health. • # of living skill courses provided. • # referrals to health services. • # community education events. • # and type of resources developed	**HLP 2** – Washing clothes and bedding. **HLP 4** – Improving nutrition, the ability to store prepare and cook food.	• Aboriginal people and families are provided with the knowledge, skills, resources and facilities to have and maintain healthy homes. • Environmental Health Hardware are maintained in good condition/ working order. • Homes are safe and hazards are mitigated.
1.2 Assess, monitor and repair Health Hardware	• Conduct HHA inclusive of health hardware checks. • Undertake basic plumbing tasks within the restricted scope of the Plumbing & License Board. • Support tenants to notify landlord of maintenance requirements.	• # of houses offered HHA. • # of HHA completed (houses accessed and assessment completed). • # and types of repairs performed. • # of referrals made to Department of Communities (Housing).	**HLP 1** – Washing people. HLP 2 – Washing clothes and bedding. **HLP 3** – Removing wastewater safely. **HLP 8** – Controlling the temperature of the living environment.	
1.3 Supporting home hygiene and environmental health hazard management	• Identify environmental health related home hazards that could contribute to injuries and/or poisonings. • Provide advice on management of hazards (refer to HLP 9). • Provide advocacy if needed with Housing regarding occupancy strategies. • Provision of cleaning and hygiene packs in response to identified environmental health related hazard or issues. • Provision of linen (sheets, towels, tea towels, and dish cloths) in response to identified environmental health related hazard or issues.	• # of environmental health related home hazards identified and mitigated. • # of cleaning and hygiene packs provided.	**HLP 1** – Washing people. **HLP 2** – Washing clothes and bedding. **HLP 5** – Reducing the negative impacts of crowding. H**LP 6** – Reducing the negative effects of animals, insects and vermin. **HLP 9** -Reducing hazards that cause physical trauma.	

Rationale: An AEH service that can be personalised and tailored appropriately for individuals and households who have self-referred or referred by a Primary Health Care (PHC) clinician due to a medical condition linked to the environment. AEH needs to work collaboratively with PHC to support prevention of environmental health related conditions as part of a wraparound service.

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
2.1 Support optimisation of Environmental Health Clinical Referrals (EHCR) system with PHC clinics and other relevant clinicians.	• Provide orientation education workshops and materials to relevant PHC staff of the EHCR system to promote awareness, relevance and understanding. • Develop procedural EHCR flowcharts for clinicians. • Engage and collaborate with PHC to ensure routine EHCR are embedded in Clinical Guidelines. • Knowledge exchange with PHC staff of region/local trends in EH disease prevention and/or possible outbreak declarations. • Engage and collaborate with PHC services to identify local environmental health related issues and appropriate strategies for prevention and early intervention. • Develop suitable resources to support disease prevention knowledge and awareness by AEH practitioners and the home residents they visit and support.	• # of orientation education workshops to PHC staff or other relevant clinicians. clinicians/staff delivered. • # of materials provided/ accessed to PHC staff and/ or other relevant clinicians. • Increase knowledge and awareness of EHCR system for GPs and locums. • # of clinicians reached through orientation and in-services. • Increase in utilisation of EHCR systems and processes (based on # of referral and # of staff active with EHCR system) • # of clinical guidelines reviewed • # of local issues identified (this to be incorporated as part of Community Environmental Health Action Plans)	**HLP 2** – Washing clothes and bedding. **HLP 3** – Removing wastewater safely. **HLP 4** – Improving nutrition, the ability to store prepare and cook food. **HLP 5** – Reducing the negative impacts of crowding. **HLP 6** – Reducing the negative effects of animals, insects and vermin. **HLP 7** – Reducing the health impacts of dust.	• Increased engagement and collaboration between AEH and PHC to deliver early intervention of environmental-based diseases. • Reduction in environmental-based diseases amongst Aboriginal population.
2.2 Respond to referrals (Clinical or self-referred).	• Action and respond to EHCR. • Develop partnerships and work in collaboration with PHC by participating in case management as required. • Provide advice to PHC on prioritisation and wait-list management for EHCR system. • Provide PHC Team with progress and outcome reports on regular basis.	• # of EHCR offered by clinicians. • # of EH services requested. • # of EHCR made to AEH Team. • # of EHCR actioned by AEH Team. • # of EHCR closed by AEH Team. • # of repeat presentations. • # of EHCR where client declines AEH services. • # of case management meetings attended.		
2.3 Continuous quality improvement processes for the EHCR system	• Support changes in PHC Patient Information Management Systems to share data and improve system functioning.	• Annual review and evaluation of EHCR systems and processes.		

Rationale: Complementary and interdependent components from multiple service providers help determine a healthy environment. Shared accountability for healthy environments requires local awareness, joint planning and coordinated service delivery, as well as monitoring, reporting and evaluation of services outcomes. Resources are required to support effective and ongoing advocacy and partnerships between service providers.

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
3.1 Culturally appropriate and locally tailored environmental health promotion and education.	• Provide community awareness around available services and providers. • Support community to better understand their consumer rights and ways to advocate.	• # of health messages and/or resources developed. • # of health messages and/or resources delivered.	**HLP 1** – Washing people. **HLP 2** – Washing clothes and bedding. **HLP 3** – Removing wastewater safely. **HLP 4** – Improving nutrition, the ability to store prepare and cook food. **HLP 5** – Managing visitors and overcrowding. **HLP 6** – Reducing the negative effects of animals, insects and vermin. **HLP 7** – Reducing the health impacts of dust. **HLP 8** – Managing the temperature of the living environment. **HLP 9** – Reducing hazards that cause physical trauma.	• Aboriginal people and families are provided with the knowledge, skills, resources and facilities to have and maintain healthy homes. • Environmental Health Hardware are maintained in good condition/ working order. • Homes are safe and hazards are mitigated.
3.2 Stakeholder engagement and coordination.	• Build and maintain relationships with the community (including Traditional Owners). • Identify key stakeholders and service providers (e.g., Ranger Program, schools, Local Government, social services). • Establish and maintain relationships with all relevant stakeholders and service providers. • Undertake regional strategic planning, incorporating community priorities and preferences. • Undertake capacity building with key partners and stakeholders. • Link with community based social support and health programs (including Aboriginal Community Controlled Health Services). • Actively participate in regional Environmental Health committee that meet regularly. • Engage with Local Government in the development and implementation of Public Health Plans.	• # of stakeholders identified. • # and type of engagements with key stakeholders and service providers. • # of community consultations conducted. • # of capacity building sessions provided.		
3.3 Formal partnership agreements.	• Develop local place-based Service Level Agreements and/or Memorandums of Understanding with other service providers. • Develop Community Environmental Health Action Plans.	• # of Memorandums of Understanding. • # of Service Level Agreements. • # of Community Environmental Health Action Plans developed. • # of Community Environmental Health Action Plans reviewed. • # of formal agreements with stakeholders. • # of formal agreements fully implemented.		

Advocacy, Coordination and Partnerships continued:

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
3.4 Advocacy for services	• Monitoring environmental factors and identifying risks affecting health and wellbeing of the community. • Advocacy with service providers for community infrastructure: – Provision of safe playgrounds, ovals, shaded areas, water parks, pools etc. – Food security in community. – Appropriate and suitable housing. – Access to consistent power and other utilities. – Access to clean and safe drinking water. – Dust control. • Advocacy with service providers for service delivery: – Waste management through municipal services. – Tip location and management. – Sewage management. – Access to affordable and healthy food. – Mosquito and pest control. – Transportation and service costs related to environmental health. – Natural environment and water management. – Removal of community environmental health hazards.	• # and type of advocacy provided.	**HLP 1** – Washing people. **HLP 2** – Washing clothes and bedding. **HLP 3** – Removing wastewater safely. **HLP 4** – Improving nutrition, the ability to store prepare and cook food. **HLP 5** – Managing visitors and overcrowding. **HLP 6** – Reducing the negative effects of animals, insects and vermin. **HLP 7** – Reducing the health impacts of dust. **HLP 8** – Managing the temperature of the living environment. **HLP 9** – Reducing hazards that cause physical trauma.	• Aboriginal people and families are provided with the knowledge, skills, resources and facilities to have and maintain healthy homes. • Environmental Health Hardware are maintained in good condition/ working order. • Homes are safe and hazards are mitigated.
3.5 Monitoring, reporting, continuous quality improvement and escalation	• Through regional planning forums, share service outputs and facilitate joint problem-solving and development of improved service delivery. • Appropriate escalation to authorised agencies to address barriers to local service delivery. • Conduct annual program evaluation.	• # of planning forums conducted. • # of escalations using agreed protocols. • # of escalations resolved.		

Rationale: It is recognised that Aboriginal communities are at an increased risk of experiencing adverse health affect due to the impacts of climate change. Aboriginal stewardship and locally informed and led initiatives are essential to minimising the health impacts of climate change for Aboriginal communities.

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
4.1 Culturally appropriate and locally tailored environmental health promotion and education.	• Engage Aboriginal communities to understand the health impacts of climate change and extreme weather events. • Develop culturally appropriate public health messages and resources relating to climate change adaptation. • Develop and promote knowledge and understanding of climate change health risks through education and information sharing.	• # of community education sessions provided. • # of resources developed.	**HLP 7** – Reducing the health impacts of dust. **HLP 8** – Controlling the temperature of the living environment**.** **HLP 9** – Reducing hazards that cause physical trauma.	• Increased understanding of climate change health risks for local community members and impacts on service delivery. • Co-designed and prioritised adaptive strategies and resources to address climate health risks. • Better preparedness and response to climate change in relation to health impacts.
4.2 Community preparedness and response	• Support the development and implementation of community-led and informed (including local knowledge, stories and data) Climate Change Adaptation Plans. • Make announcements and community preparation messages for extreme weather events. • Provide practical support for high-risk community members as required.	• Community Climate Change Adaptation Plans developed. • # of community engagement occurrences regarding Climate Change health impacts.		

Rationale: An environmental emergency event can lead to negative health outcomes for individuals without the appropriate resourcing and support. AEH capacity, visibility and on-the-ground responsiveness to environmental emergencies is critical.

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
5.1 Culturally appropriate and locally tailored environmental health promotion and education.	• Raise awareness of common regional and local environmental emergencies. • Raise awareness of regional and local emergency response plans, their currency and key officer contacts. • Develop environmental health messages and resources on how a household can prepare for emergencies events.	• # of education sessions delivered. • # of environmental health emergency response resources developed and distributed.	**HLP 5** – Reducing the negative impacts of crowding. **HLP 9** – Reducing hazards that cause physical trauma.	• Increased awareness of emergency response plans. • Better preparedness and response to environment emergency events.
5.2 Community preparedness and response.	• Contribute to community Emergency Response Plans (ERP) developed by local government agencies. • Ensure ERP are embedded in Community Environmental Health Action Plans (CEHAPs). • Participate in emergency response as per the local ERP. • Provision of emergency packs for community members. • Secure or remove hazards prior or following an environmental emergency.	• # CEHAPs with emergency plans included. • # of emergency pack provided.		

Rationale: Animals and pests can significantly contribute to disease and injury through contamination of food, causing damage to people and living spaces and transmission of diseases. Prevention is critical and AEH that supports and promotes appropriate management and control of animals and pests can significantly reduce the health risk.

KEY ACTION AREA	AEH SERVICE SCOPE	POTENTIAL MEASURES	HLP ALIGNMENT	OUTCOMES
6.1 Animal management and population control.	• Domestic animal management including use of restricted substances, regular anti-parasitic treatment, sterilisation, and euthanasia. • Facilitate Dog Health and Population control through visiting vets offering micro-chipping and de-sexing.	• # of communities serviced for Animal Management. • # of Community Environmental Health Action Plans with Animal Management included. • # of requests for service received for Animal Management. • # of requests for service actioned for Animal Management. • # of vet visits.	**HLP 6** – Reducing the negative effects of animals, insects and vermin. HLP 9 -Reducing hazards that cause physical trauma.	• Improved health of Aboriginal people living in communities by reducing disease transmission from animals and pests. • Increased community awareness of EH Animal Management services available.
6.2 Vector control.	• Visual checks of conditions conducive to vectors that need action by relevant department. • Risk assessment of vermin and other animal populations.	• # of requests for service relating to Animal and Pest Management. • # of risk assessments conducted.	**HLP 6** – Reducing the negative effects of animals, insects and vermin. **HLP 9** – Reducing hazards that cause physical trauma.	
6.3 Culturally appropriate and locally tailored environmental health promotion and education.	• Raise awareness of common diseases and injuries that can be caused by animals and pests. • Develop health messages and resources on how a household can manage animals and pests.	• # of resources developed and distributed.	**HLP 6** – Reducing the negative. effects of animals, insects and vermin	
6.4 Pest Control.	• Monitor mosquito control measures i.e. breeding sites. • Pest control services provided to homes.	• # of requests for service actioned for pest control. • # of homes received pest control service.	**HLP 6** – Reducing the negative effects of animals, insects and vermin.	

BUILDING A WORKFORCE TO SUPPORT THE MODEL OF CARE

Resources are required to build and implement an AEH workforce, in alignment with the Model and service scope, involving flexible interdisciplinary teams with cultural, clinical, health promotion and environmental health expertise.
hese teams must have an understanding of the Aboriginal community, and the interrelated factors that affect EH, and must have or be working towards training in the following areas:

- Aboriginal Environmental Health; and/or
- Health Promotion.

Figure 6: Aboriginal Environmental Health Workforce

Figure 5 outlines the ideal interdisciplinary AEH workforce and should be used in conjunction with the Model. The Model requires training, career paths and meaningful jobs for Aboriginal people to achieve the vision of Healthy Environments for All. Providing employment and training opportunities for Aboriginal staff is an essential component of the Model. 50D positions are used in both government and ACCOs to designate specific positions for Aboriginal people. Designating positions as 50D helps to prioritise the employment of Aboriginal people and will assist organisations to achieve full Aboriginal employment in AEH.

At a minimum, each site would need funding to include:

- Regional Coordinators;
- Team Leaders;
- Environmental Health Practitioners (50D positions);
- Field Support Officers (50D positions);
- Health Promotion Officer; and
- Living Skills Officer.

As the workforce grows and develops the Regional Coordinator and Team Leader positions should transition to 50D.

The AEH team would be supported by community members and existing ACCO and ACCHS workforces including:

- Elders;
- Community Leaders;
- Aboriginal Health Practitioners / Aboriginal Health Workers;
- Support Workers;
- Registered Nurses;
- Doctors;
- Social Workers;
- Case Managers;
- Managers; or
- Administrators.

WORKFORCE ROLES AND RESPONSIBILITIES

Regional Coordinators

Regional Coordinators would coordinate the Program across the region to ensure the fidelity of the Model and consistent service delivery. Where there are multiple providers within regions the placement of these positions would need to be negotiated.

Team Leaders

Team Leaders manage the Program within organisations and provide guidance and instruction to the team about projects and workflows. They oversee the delegation of work, progress towards goals, and coach team members as needed.

Environmental Health Practitioners (50D positions)

Environmental Health Practitioners hold an environmental health qualification. They ensure people have access to clean water, safe food, well managed environmental health hazards, and healthy places to live, work and play. They work to ensure high environmental health standards are maintained to prevent disease, illness, injury and premature death arising from environmental exposures and other environmental health impacts.

Field Support Officers (50D positions)

The Field Support Officers (FSO) work alongside the Environmental Health Practitioners (EHPs) to identify and reduce environmental health hazards in the community, undertake Healthy Homes Assessments and provide basic maintenance. FSO positions are considered experienced EHPs who can provide mentoring and advice to the broader AEH workforce.

Health Promotion Officer

The Health Promotion Officer assists individuals and the community to improve their health by raising awareness of healthy environments. They plan and coordinate health promotion messaging, campaigns, programs and activities for various community groups.

Living Skills Officer

The Living Skills Officer assists individuals, families and the community to improve their health by providing education on Healthy Living Practices. They plan, coordinate and deliver individual or group education sessions for families in the home or various community groups. For costing purposes these positions are included in the Health Promotion category.

WORKFORCE DEVELOPMENT

The following is a list of current Environmental Health and other relevant training opportunities in WA that would support the development of the AEH workforce.

- Bachelor Occupational and Environmental Health and Safety Major
  Edith Cowan University
  https://www.ecu.edu.au/degrees/courses/bachelor-of-health-science/unitset?id=MAAAKH&crsCd=K97

- HLT26120 Certificate II in Indigenous Environmental Health
  Djaringo Pty Ltd (Nirrumbuk)
  https://training.gov.au/Training/Details/HLT26120

- HLT26015 Certificate II in Population Health
  North Metropolitan TAFE
  https://training.gov.au/Training/Details/HLT26015

- Webinars, Seminars and Workshops Environmental Health Directorate
  WA DOH
  https://www.health.wa.gov.au/Articles/A_E/Environmental-health-events-training-and-webinars

- Graduate Certificate in Health Promotion
  Curtin University
  https://www.curtin.edu.au/study/offering/course-pg-graduate-certificate-in-health-promotion--gc-hlpromv3/

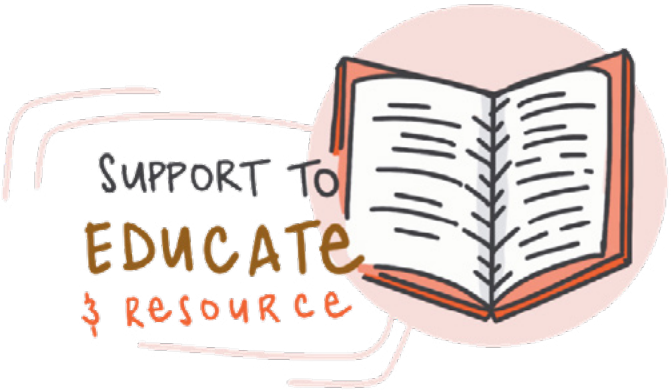
- Graduate Diploma in Health Promotion
  Curtin University
  https://www.curtin.edu.au/study/offering/course-pg-graduate-diploma-in-health-promotion-openunis--og-hlpromv2/

The employer is responsible for ensuring that an employee or trainee is given induction training and has the skills and knowledge to work safely. In most workplaces, the supervisor or experienced worker will provide this training. In AEH formal course-based skills are required, in addition to supervision, coaching, mentoring, and on-the-job training.

The minimum formal qualification for an Environmental Health Practitioner/Field Support Officer is the HLT26120 Certificate II in Indigenous Environmental Health. This course ensures core knowledge in environmental disease transmission pathways, competencies in Healthy Home Assessments and community development. It also provides the minimum accredited training required for EHPs to be able to attend to basic plumbing repairs.

The other training listed above provides career pathways for people working in AEH. Additional relevant training is available in other jurisdictions and employees may be able to access scholarships, user choice funding, and away from base funding to access these courses.

The consultation findings included the requirement for at least one funded, accredited Aboriginal Community Controlled Registered Training Organisation (RTO) in WA delivering the HLT26120 Certificate II in Indigenous Environmental Health. Ultimately, this RTO should also deliver the HLT36115 Certificate III in Indigenous Environmental Health to ensure development pathways for the environmental health workforce. To make this happen, there needs to be advocacy between Health and Education. There also needs to be sustainable funding applied to retain the course content and scope and a continuous demand for accredited training.



FUTURE CONSIDERATIONS

TRANSITION OF PROGRAM OVERSIGHT TO ABORIGINAL COMMUNITY CONTROL

Whilst this was not in the scope of work to develop the Model, the consultation process highlighted the Sector's desire for the oversight of the AEH Program to shift away from the WA DOH to Aboriginal Community Control.

As the State's Aboriginal community-controlled peak body, AHCWA could be resourced to maintain the Model through procurement and contract management processes. Through the establishment of a community of practice, Information Technology (IT) systems, reconceptualised CEHAP templates, tools, forums, peer learning, and Standard Operating procedures (SOPs) could be developed for the Sector. This would require the transition of the DOH AEH Directorate budget to AHCWA.

AHCWA currently manages devolved funding through a number of agencies including the National Aboriginal Community Controlled Organisation (NACCHO), the Mental Health Commission (MHC), the Department of Communities, and Lotterywest.

AHCWA has developed strong and transparent processes for the procurement of services through expressions of interest from our member services. AHCWA has effectively contract managed subcontract arrangements with our member services.

Transition to AHCWA would result in a clear cascade of Aboriginal leadership from system level to regional planning, to local service delivery and back again. Aboriginal leadership must be embedded in implementation, monitoring, evaluation and learning.

A transition process would be funding dependent and occur over a staged period as the program is established in its new format.

AHCWA Chair Vicki O'Donnell OAM presents at the Aboriginal Environmental Health Forum 2024

APPENDIX 1 – ACCHS MODEL OF CARE

COMMUNITY and **COUNTRY** are reflected in place-based approaches embedded in this Aboriginal Environmental Health Model of Care.

CULTURE is reflected in standards for cultural safety in every activity funded through the Aboriginal Environmental Health Program.

FAMILY is reflected in home-based activities and approaches which do not victimise or shame individuals, families and Aboriginal communities.

LANGUAGE is reflected in co-design through local and regional governance.

SPIRITUAL, **EMOTIONAL** and **PHYSICAL** aspects are reflected in program outcomes, affirmation of strengths-based approaches and data sharing between primary health care services and Aboriginal Environmental Health Service Providers.

A disconnection from any of the eight dimensions in the ACCHS Model of Care can cause an individual to experience an imbalance in their overall health and wellbeing, not only from a medical point of view, but also an Aboriginal cultural point of view.

Figure 1: *The Aboriginal Community Controlled Model of Care*

APPENDIX 2 – HEALTHY LIVING PRACTICES

BACKGROUND

There are nine evidence-based Healthy Living Practices (HLPs) describing actions to stop the spread of germs (viruses and bacteria) and parasites, based on best-practice public health knowledge that link poor health and the living environment[13]. The nine HLPs are:

1. washing people;
2. washing clothes and bedding;
3. removing wastewater safely;
4. improving nutrition – including the ability to store, prepare and cook food;
5. reducing the negative health impacts of overcrowded housing;
6. reducing the negative effects of animals, vermin or insects;
7. reducing the health impacts of dust;
8. controlling the temperature of the living environment; and
9. reducing hazards that cause minor injury (trauma).

These nine HLPs were developed and published by Paul Pholeros and Healthabitat with involvement of Aboriginal leaders Yami Lester and Stephan Rainow, through the Housing for Health program in 1993. The HLPs are well known and accepted throughout the delivery of AEH services[14]. The practices have been widely utilised to shape the work of AEH within a local community context for Aboriginal people.

An example of this includes the development of the health promotion message of Milpa's Six Steps to Stop Germs. This resource was developed from a public health message around washing hands and grew to a composite message which includes the common steps promoted in Aboriginal clinic settings for teeth, eye and ear health. This resource aims to encourage everyone, specifically kids, to stay healthy and strong to eliminate trachoma and other infectious disease by following the six health hygiene steps of:

1. Blow nose until empty;
2. Wash hands with soap and water;
3. Wash face to clean snot and yucky eyes;
4. Brush teeth with toothpaste morning and night;
5. Have a shower with soap every day; and
6. Don't share towels.[15]

Publications and environmental health training describe HLPs as the foundation for the delivery of AEH services and includes foundational content of the Indigenous Environmental Health qualification: Certificate II and Certificate III. A study conducted in the Northern Territory (published on the Medical Journal of Australia) explored the required status of infrastructure to address four of the nine key HLPs. These included: "washing people, washing clothes and bedding, waste removal and food storage and preparation"[16]. The HLPs have also formally been endorsed by New South Wales Health when addressing AEH issues or provision of delivery[17].

HLPs are considered central and a framework to guide professional practice within the responsibilities of Aboriginal Environmental Health Practitioners (AEHPs). This contributes to AEHPs role to promote and educate community members regarding what actions they can take in their homes to stay healthy and safe by preventing many environmental health related diseases.

[13]Australian Indigenous HealthInfoNet. Australian Indigenous HealthInfoNet. [cited 2024 Aug 28]. Healthy living practices - Environmental Health. Available from: https://healthinfonet.ecu.edu.au/learn/determinants-of-health/environmental-health/personal-hygiene/

[14]Pholerus P, Rainow S, Torzillo P, Healthhabitat. Housing for health: towards a healthy living environment for Aboriginal Australia. Newport Beach, NSW: Healthhabitat; 1993. Available from: https://nla.gov.au/nla.cat-vn1684582

[15]Ferguson R, Melbourne School of Global and Population Health. Milpa's Six Steps to Stop Germs [Internet]. 2023. Available from: https://mspgh.unimelb.edu.au/centres-institutes/onemda/research-group/ieh/HP/trachoma/six-steps#intro

[16]Bailie RS, Runcie MJ. Household infrastructure in Aboriginal communities and the implications for health improvement. Medical Journal of Australia [Internet]. 2001 Sep 25 [cited 2024 Aug 28];175(7). Available from: https://www.mja.com.au/journal/2001/175/7/household-infrastructure-aboriginal-communities-and-implications-health

[17]NSW Health. Healthy living practices - Aboriginal environmental health [Internet]. 2021 [cited 2024 Aug 28]. Available from: https://www.health.nsw.gov.au:443/environment/aboriginal/Pages/healthy-living-practices.aspx

HEALTHY LIVING PRACTICES AND THE ABORIGINAL ENVIRONMENTAL HEALTH MODEL OF CARE

The HLPs are key elements, based on global evidence, acknowledging what is required to support healthy living and they form the basis of what a healthy home should be able to provide for its residents.

HLPs provide critical guidance in the existing scope of AEH by addressing environmental health outcomes for Aboriginal people and communities. They should be incorporated as key indicators within the Model as an expansion to the vision of Healthy environments for all. In addition, within each of the Model's domains, the suggested AEH service scope should align to the HLPs as an outcome.

Further information about the HLPs can be found via the Housing for Health – The Guide: A design and specification tool for anyone worldwide who is interested in the detailed links between housing and health[18].

THE NINE HEALTHY LIVING PRACTICES

HLP 1 – Washing People

Functioning facilities that allow people to wash, reduces the spread of diseases such as diarrhoeal disease, respiratory disease, hepatitis, and infections. Diarrhoeal and respiratory diseases are the major causes of illness amongst Aboriginal and Torres Strait Islander children and play a major role in malnutrition experienced in the first three years of life and the ability to thrive.

The health hardware required to support this HLP (the ability to wash people, particularly children) includes, but is not limited to, private, functional bathrooms with hot and cold-water supply, a shower, a bath (or tub for washing children), a hand basin and working drainage.

HLP 2 – Washing clothes and bedding

Regular washing of clothes and bedding helps to remove bacteria, dirt, fleas, mites and other irritants that might cause infections. The regular washing of clothes and bedding can therefore help reduce the incidence of infectious diseases, such as diarrhoeal disease, respiratory infections, scabies and other skin infections.

The ability to wash clothes requires a reliable water supply, a washing machine or trough to wash the clothes and provide safe disposal of the wastewater generated. The laundry design for a house to provide these facilities, along with safely stored detergents, is also integrated within this HLP.

HLP 3 – Removing wastewater safely

Wastewater in the living environment can cause illness. If people are in direct contact with wastewater, or if their water supply is contaminated with wastewater, there is a greater risk of the transmission of bacteria and viruses that cause disease. These risks increase if animals, vermin or insects have been in direct contact with wastewater that can then pass bacteria and viruses' on to people.

Removing wastewater safely from the home and outside living areas, and managing disposal of the wastewater safely at a community level is important for maintaining people's health.

[18]Healthhabitat. Health & Housing [Internet]. Housing for Health - the guide. [cited 2024 Aug 28]. Available from: https://www.housingforhealth.com/the-guide/health-housing/

HLP 4 – Improving nutrition, and the ability to store, prepare and cook food

Poor nutrition is one factor that contributes to Aboriginal and Torres Strait Islander people having high rates of obesity, diabetes, cardiovascular disease and renal disease. Children with poor nutrition are also at greater risk of acquiring infectious diseases.

A reliable water supply is critical for improving nutrition. Drinking water is essential for life and potable water is also required for the safe preparation of food and cleaning of used food utensils and cooking equipment.

HLP 5 – Reducing the negative impacts of crowding

Crowded living conditions increase the risk of spreading infectious diseases, such as meningococcal disease, rheumatic fever, tuberculosis and respiratory infections. In a crowded environment, it can be challenging to access health hardware, such as a working shower, toilet, hot water and washing machine. Crowding of a house may be regular, temporary and/or resulting from a desirable event (e.g., ceremony, Sorry Business, community events) and can involve large numbers of people living in a household. Crowding results in additional use of the health hardware, which may lead to the hardware breaking or becoming non-functional.

Increasing house size does not guarantee reduced crowding but ensuring that the health hardware in a house is durable and able to cope with crowding, increases the functionality of a house.

HLP 6 – Reducing the negative effects of animals, insects and vermin

People's health can be affected by contact with animals, vermin and insects in the living environment. Examples include:

- Mosquito-borne illnesses;
- Chronic gut parasite carried by dogs;
- Dust mites causing increased levels of asthma;
- Cockroaches being carriers of bacteria within the household;
- Mice and rats making living conditions unhygienic; and
- Dogs and cats defecating in the home and eating from food scraps and bins.

HLP 7 – Reducing the health impacts of dust

In Australia, many communities experience problems with dust, either caused by unsealed roads and surfaces in the community or blown into the community from surrounding arid, rural or drought affected lands.

Dust can cause direct health problems by irritating the skin and parts of the body that secrete mucus, which may contribute to eye irritation, respiratory disease and skin infections. This HLP relates to design strategies for the house and living areas to reduce the direct impact of dust on people's health.

HLP 8 – Controlling the temperature of the living environment

Living in homes that are too cold or too hot can contribute to a range of physical illnesses and can cause several forms of distress for residents. Exposure to cold temperatures increases the likelihood of developing chest infections and pneumonia, particularly for children and elderly people and these infections can spread rapidly throughout the household.

Extended exposure to high temperatures can also result in illness with increased risk of dehydration and heat stress for sick children and elderly people. Most Aboriginal housing homes do not have air conditioning. If it has been installed it is normally at the resident's expense. Servicing of air conditioners are also not covered under housing maintenance contracts for remote community homes.

HLP 9 – Reducing the hazards that cause trauma

If houses are poorly designed and constructed, or not well maintained, there is an increased risk that residents may be injured. Elderly people, those with disabilities and young children are particularly at risk. Injuries may require medical treatment or hospitalisation and could result in infections, long term harm and even disability.

APPENDIX 3 – ABORIGINAL ENVIRONMENTAL HEALTH STEERING COMMITTEE

The Committee comprised the following representatives nominated by the AHCWA Board:

NAME	POSITION
Vicki O'Donnell (Co-Chair)	Chair, Aboriginal Health Council of Western Australia
Anthony Murphy	Ngaanyatjarra Health
Patrick Davies	Nindilingarri Cultural Health Services
Lesley Nelson	South West Aboriginal Medical Service
Raymond Christophers	Nirrumbuk Environmental Health and Services
Debbie Woods	Geraldton Regional Aboriginal Medical Service
Wayne McDonald	Bundiyarra Aboriginal Community Aboriginal Corporation
Chris Pickett	Pilbara Aboriginal Health Alliance
Marlon Fernando	Bega Garnbirringu Health Service
Tracey Brand	Derbarl Yerrigan Health Service

The Committee comprises the following representatives nominated by the WA Department of Health:

REPRESENTATIVES	
Wendy Casey (Co-Chair)	Director, Aboriginal Health Policy Directorate
Michael Lindsay	Executive Director, Environmental Health Directorate
Sarai Stevely	Director, Procurement and Contracting Unit
Matt Lester	A/Director, Environmental Health Directorate

APPENDIX 4 – PROGRAM LOGIC

AEHP ProgamLogic June 2024

FRAMEWORK AND POLICY ALIGNMENTS →	**WA Aboriginal Health and Wellbeing Framework (AHWF) 2015-2030**	**Outcomes Framework for Aboriginal Health 2020-2030**	**National Agreement on Closing the Gap**	**WA Aboriginal Empowerment Strategy**	
Healthy environments for all Aboriginal people in WA through co-design with Aboriginal people, their community-controlled organisations and WA Government departments at all levels to ensure a holistic guarantee of culturally safe local services delivered in partnership, responsive to community priorities and continuously improved to address environmental determinants of health					
COMMUNITY OUTCOMES →	Intergenerational health and wellbeing that comes from self-determination, control and responsive, culturally safe services	Community decision-making, influence and control over the design, management and delivery of community services including environmental health services, essential amenities and primary health care	Community members have complete clarity about which service provider is responsible for what components and with what accountability and monitoring to ensure a healthy community environment	Communities have shared access to data and information at place-based service area for self-determination, self-empowerment and capacity to hold service providers and funders to account	
PROGRAM OUTCOMES →	Reduction in rates of disease due to the environment and improved outcomes including: • Demand for PHC for conditions sensitive to the environment • Hospitalization rates for conditions sensitive to the environment	Parity in community infrastructure, essential services and conditions (eg housing, water, sewerage, waste management, power and roads and other composite measures) as reported in Productivity Commission dashboard SEO#9	Trustworthy governance across whole of government mechanisms	Meaningful shift in funding to ACCOs as per Priority Reform 2 are reported publicly on an annual basis	Indigenous data sovereignty to support implementation of Priority Reform 4	WA acknowledged as an exemplar in implementing the National Agreement on Closing the Gap
SERVICE OUTCOMES →	Implementation of agreed community AEH planning decisions in partnership for specific place-based service with a philosophy of continuous service improvement	Trusted AEH expertise available to communities to support their decisions and deliver highest quality technical and culturally safe services	Avoid exacerbation of existing inequity	Community satisfaction	
OUTPUTS →	Negotiated KPIs in service contracts are minimum requirements based on AEH domains				
ENABLERS →	Data-driven needs assessments at state, regional and local levels	Community-driven CEHAPs organised according to eight AEH domains to ensure informed decision-making, document community priorities and strengthen communication and coordination between services	Service contracts provide secure, rolling budget allocations necessary for sustained effort and titrated against program outcomes	Local and regional partnerships and coordination to avoid duplication and maximise value-for-money	State-wide mechanisms to promote and share best practice through Aboriginal cultural lens and expertise
INPUTS →	Increased government funding and coordination based on co-designed model-of care	Place-based service areas delineated for regions and sub-regions for planning and coordination purposes	Needs-based formula for AEH funding for rolling five-year service contracts	Whole-of-government accountability	Agreed governance structures for shared decision-making	Outcomes-focussed service procurement	Training, workforce development and permanent jobs that are culturally responsive and reflective of need in each and every place-based footprint to ensure equity of outcomes	Systems for state-wide/regional and local monitoring, evaluation and learning	Permanent fulfilling jobs for Aboriginal people which are valued by communities and build capacity in individuals and in communities including business development

APPENDIX 5 – CONDITIONS IN SCOPE

The table below presents conditions which have (a varying degree) of environmental attribution and have been considered as part of this model of care. Most of these conditions were recognised by McMullen et al[19] except for melioidosis and strongyloidiasis, which are also recognised as being linked to the environment.[20, 21]

ENVIRONMENTAL HEALTH RELATED CONDITIONS	
Acute Rheumatic Fever (ARF)	Other arboviruses (Barmah Forest)
Asthma	Otitis Media
Cancer	Poisonings
Cardiovascular disease (Not RHD)	Post-streptococcal glomerulonephritis
Cataracts	Premature birth
Chronic lung disease including COPD	Pterygium
Conjunctivitis (infective)	Rheumatic heart disease (RHD)
Deafness	Road traffic accident
Dental caries, abscess, extractions	Ross River Virus
Diarrhoeal diseases	Scabies
Drowning	Shingles
Failure to thrive	Skin cancer
Falls	Skin infection including pustules, abscess, cellulitis, impetigo
Fires/ burns	Sexually Transmitted Infections
Intestinal nematodes (hookworm)	Intentional self-harm
Keratoconjunctivitis	Throat infection
Low birth weight	Trachoma
Lower respiratory infections	Tuberculosis
Malnutrition and nutritional concerns	Unintentional injuries including dog bite
Mental health / psychosocial	Urinary tract infection
Miscarriage	Violence
Murray Valley Encephalitis	

[19]McMullen C, Eastwood A, Ward J. Environmental attributable fractions in remote Australia: the potential of a new approach for local public health action. Australia New Zealand Journal of Public Health. 2016 Apr;40(2):174–80. Retrieved from: https://pubmed.ncbi.nlm.nih.gov/26259550/

[20]Wiersinga WJ, Currie BJ, Peacock SJ. Melioidosis. New England Journal of Medicine. 2012 Sep 13;367(11):1035–44. Retrieved from: https://www.nejm.org/doi/abs/10.1056/NEJMra1204699

[21]Krolewiecki A, Nutman TB. Strongyloidiasis: A Neglected Tropical Disease. Infect Dis Clin North Am. 2019 Mar;33(1):135–51. Retrieved from: https://pubmed.ncbi.nlm.nih.gov/30712758/

APPENDIX 6 – HOSPITALISATION DATA BY CONDITION AND HEALTH REGION

Table 1: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, East Metropolitan Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	11	NA	39	0.09	11	NA	36	0.06	22	12.2	75	0.15
Asthma	149	288.9	323	0.96	76	134.9	119	0.21	225	209.6	442	1.16
Cancer	345	1,210.3	1,912	4.84	353	8,060.8	2,303	5.63	698	1,348.7	4,215	10.47
Cardiovascular disease (Not RHD)	680	2,719.7	2,798	6.91	803	13,630.7	2,754	8.45	1,483	3,032.3	5,552	15.36
Cataracts	251	1,125.3	255	0.78	184	2,323.4	185	0.59	435	1,063.6	440	1.37
Chronic lung disease including COPD	323	1,012.1	1,195	2.85	243	2,361.4	940	1.89	566	1,011.4	2,135	4.74
Conjunctivitis (Infective)	NR	NA	NR	0.00	NR	NA	NR	0.00	NR	NA	NR	0.01
Deafness	13	NA	13	0.17	18	NA	18	0.09	31	23.9	31	0.26
Dental caries, abscess, extractions	337	468.1	439	1.56	256	352.7	333	1.28	593	403.7	772	2.84
Diarrhoeal diseases	256	615.5	534	0.90	187	3,134.4	396	0.66	443	564.0	930	1.56
Drowning												
Failure to thrive	13	NA	31	0.10	7	NA	25	0.04	20	9.8	56	0.13
Fires/ burns	29	65.1	148	0.36	69	99.5	325	1.26	98	91.2	473	1.62
Intestinal nematodes (hookworm)												
Keratoconjunctivitis	NR	NA	NR	0.01					NR	NA	NR	0.01
Low birth weight												
Lower respiratory infections	471	1,359.3	1,595	3.99	397	13,347.1	1,456	4.09	868	1,404.0	3,051	8.09
Malnutrition and nutritional concerns	8	NA	87	0.16	12	NA	149	0.29	20	14.7	236	0.45
Melioidosis												
Mental health / psychosocial	2,307	4,696.0	22,997	16.02	1,988	8,002.5	25,681	13.10	4,295	4,384.6	48,678	29.11
Miscarriage	148	244.1	181	0.45					148	114.5	181	0.45

Table 1 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, East Metropolitan Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	94	122.9	105	0.40	116	138.5	125	0.45	210	126.8	230	0.86
Poisonings	270	535.9	556	1.41	184	1,723.1	379	1.12	454	468.0	935	2.54
Post-streptococcal glomerulonephritis	NR	NA	NR	0.03	0		0	0.00	NA	NR	NA	0.03
Premature birth	220	227.2	2,597	6.39	214	199.7	3,281	7.50	434	212.8	5,878	13.89
Pterygium	19	NA	19	0.08	21	95.3	21	0.08	40	68.2	40	0.16
Rheumatic heart disease (RHD)	17	NA	93	0.48	23	35.9	47	0.21	40	48.3	140	0.69
Ross River Virus												
Scabies	11	NA	27	0.10	7	NA	26	0.07	18	NA	53	0.17
Shingles	NR	NA	NR	0.02	NR	NA	NR	0.03	9	NA	22	0.05
Skin cancer	26	121.3	26	0.12	59	8,498.3	69	0.29	85	320.3	95	0.41
Skin infection including pustules, abscess, cellulitis, impetigo	595	1,192.5	1,414	3.51	567	3,734.5	1,439	3.59	1,162	1,149.9	2,853	7.10
Sexually Transmitted Infections	20	31.1	59	0.13	7	NA	17	0.05	27	31.3	76	0.18
Strongyloidiasis												
Throat infection	11	NA	13	0.03	9	NA	23	0.02	20	17.3	36	0.05
Trachoma												
Tuberculosis					NR	NA	NR	0.01	NR	NA	NR	0.01
Urinary tract infection	643	1,833.7	1,685	3.36	194	2,262.9	560	1.06	837	1,523.5	2,245	4.42
Total				**56.20**				**52.12**				**108.32**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 2: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Goldfields Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	8	NA	42	0.09	14	NA	62	0.18	22	47.7	104	0.27
Asthma	60	399.6	122	0.27	25	132.2	54	0.13	85	265.7	176	0.39
Cancer	71	557.1	448	1.08	79	798.7	406	0.83	150	655.2	854	1.91
Cardiovascular disease (Not RHD)	358	2726.9	1231	3.09	391	4101.8	1655	4.28	749	3088.4	2886	7.38
Cataracts	111	1076.8	111	0.35	85	883.4	90	0.26	196	961.8	201	0.61
Chronic lung disease including COPD	177	1314.8	601	1.21	112	952.2	423	1.02	289	1152.8	1024	2.23
Conjunctivitis (Infective)					NR	NA	NR	0.00	NR	NA	NR	0.00
Deafness	NR	NA	NR	0.01	NR	NA	NR	0.01	8	NA	8	0.02
Dental caries, abscess, extractions	62	305	95	0.26	54	251.3	67	0.21	116	277.8	162	0.46
Diarrhoeal diseases	87	506.6	213	0.37	78	391.2	197	0.35	165	460.7	410	0.72
Drowning					NR	NA	NR	0.00	NR	NA	NR	0.00
Failure to thrive	10	NA	58	0.05	NR	NA	NR	0.02	12	NA	68	0.07
Fires/ burns	24	130.6	158	0.26	53	309.4	265	0.71	77	224.5	423	0.97
Intestinal nematodes (hookworm)	NR	NA	NR	0.01					NR	NA	NR	0.01
Keratoconjunctivitis												
Low birth weight												
Lower respiratory infections	404	2704.8	1387	3.10	312	2608.9	1137	2.81	716	2464.9	2524	5.91
Malnutrition and nutritional concerns	NR	NA	NR	0.05	NR	NA	NR	0.08	7	NA	39	0.13
Melioidosis												
Mental health / psychosocial	523	3330.7	2654	3.37	432	2592.6	2354	2.56	955	3025.6	5008	5.92
Miscarriage	37	205.2	58	0.10					37	97.1	58	0.10

Table 2 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Goldfields Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	72	287	103	0.33	77	294.3	101	0.37	149	289.3	204	0.70
Poisonings	55	342.5	136	0.35	37	208	72	0.16	92	272.7	208	0.51
Post-streptococcal glomerulonephritis	NR	NA	NR	0.06	8	NA	49	0.07	13	NA	99	0.12
Premature birth	53	198.7	1184	2.61	71	239.7	1095	2.05	124	220.3	2279	4.66
Pterygium	8	NA	8	0.03	NR	NA	NR	0.02	13	NA	13	0.05
Rheumatic heart disease (RHD)	14	NA	164	0.47	NR	NA	NR	0.04	19	NA	202	0.51
Ross River Virus												
Scabies	14	NA	36	0.13	15	NA	37	0.14	29	69	73	0.27
Shingles					NR	NA	NR	0.04	NR	NA	NR	0.04
Skin cancer	NR	NA	NR	0.02	6	NA	16	0.02	8	NA	18	0.03
Skin infection including pustules, abscess, cellulitis, impetigo	329	1962.4	1171	2.24	324	2109.1	1034	1.97	653	1926.9	2205	4.20
Sexually Transmitted Infections	6	NA	30	0.03	NR	NA	NR	0.02	8	NA	34	0.05
Strongyloidiasis												
Throat infection	10	NA	16	0.03	NR	NA	NR	0.00	12	NA	18	0.03
Trachoma												
Tuberculosis												
Urinary tract infection	199	1496.6	697	1.12	82	1333.6	226	0.41	281	1311	923	1.53
Total				**21.06**				**18.75**				**39.80**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 3: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Great Southern Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)					NR	NA	NR	0.01	NR	NA	NR	0.01
Asthma	23	386.6	45	0.07	9	NA	16	0.02	32	278.3	61	0.09
Cancer	67	1270.3	350	0.65	81	4279.7	525	1.20	148	1522.4	875	1.85
Cardiovascular disease (Not RHD)	98	2128.4	315	0.99	106	3456.4	353	1.31	204	2218.2	668	2.30
Cataracts	38	1009.1	38	0.11	27	2427.5	28	0.09	65	1048.9	66	0.20
Chronic lung disease including COPD	79	1612	273	0.70	45	802.8	127	0.29	124	1361	400	0.99
Conjunctivitis (Infective)												
Deafness	NR	NA	NR	0.05	NR	NA	NR	0.00	NR	NA	NR	0.05
Dental caries, abscess, extractions	65	694.7	69	0.28	55	486.7	64	0.25	120	583.3	133	0.53
Diarrhoeal diseases	28	489.9	52	0.10	21	262.6	29	0.06	49	348.5	81	0.17
Drowning												
Failure to thrive	NR	NA	NR	0.01					NR	NA	NR	0.01
Fires/ burns	NR	NA	NR	0.04	9	NA	18	0.10	11	NA	20	0.15
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight												
Lower respiratory infections	66	1206.2	273	0.67	47	821.2	152	0.39	113	1042.3	425	1.06
Malnutrition and nutritional concerns	NR	NA	NR	0.04	NR	NA	NR	0.03	NR	NA	NR	0.07
Melioidosis												
Mental health / psychosocial	217	3599.6	1186	1.31	333	4430.6	2274	2.16	550	3981.6	3460	3.47
Miscarriage	18	NA	20	0.05					18	NA	20	0.05

Table 3 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Great Southern Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	13	NA	13	0.05	27	223	27	0.10	40	188.4	40	0.14
Poisonings	24	355.5	34	0.07	18	NA	41	0.15	42	290.1	75	0.22
Post-streptococcal glomerulonephritis	NR	NA	NR	0.01				0.00	NR	NA	NR	0.01
Premature birth	14	NA	88	0.22	19	NA	214	0.45	33	139.6	302	0.68
Pterygium	NR	NA	NR	0.00	NR	NA	NR	0.01	NR	NA	NR	0.01
Rheumatic heart disease (RHD)	NR	NA	NR	0.09	NR	NA	NR	0.01	NR	NA	NR	0.10
Ross River Virus												
Scabies	NR	NA	NR	0.02					NR	NA	NR	0.02
Shingles	NR	NA	NR	0.00	NR	NA	NR	0.00	NR	NA	NR	0.01
Skin cancer	NR	NA	NR	0.00	24	3688.5	34	0.14	25	480.2	35	0.14
Skin infection including pustules, abscess, cellulitis, impetigo	48	772.2	136	0.27	72	2207.2	163	0.42	120	919.5	299	0.69
Sexually Transmitted Infections	NR	NA	NR	0.05	NR	NA	NR	0.02	6	NA	16	0.08
Strongyloidiasis												
Throat infection	NR	NA	NR	0.00					NR	NA	NR	0.00
Trachoma												
Tuberculosis												
Urinary tract infection	50	765.6	103	0.26	35	1891.6	69	0.18	85	675	172	0.45
Total				**6.13**				**7.40**				**13.53**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 4: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Kimberley Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	99	152.9	673	1.13	124	199.4	877	1.29	223	176	1550	2.42
Asthma	213	472.8	349	0.73	51	96.1	73	0.14	264	293.9	422	0.86
Cancer	353	1045	2319	4.49	346	1675.7	2101	4.33	699	1153	4420	8.82
Cardiovascular disease (Not RHD)	1052	3107	3370	8.91	872	2809.5	2918	8.01	1924	3061.7	6288	16.91
Cataracts	338	1166.4	361	1.07	300	1144	329	0.97	638	1170.6	690	2.04
Chronic lung disease including COPD	495	1439.8	1226	2.84	328	1534.2	1009	2.00	823	1369.9	2235	4.84
Conjunctivitis (Infective)					NR	NA	NR	0.01	NR	NA	NR	0.01
Deafness	13	NA	17	0.04	13	NA	13	0.03	26	18.5	30	0.07
Dental caries, abscess, extractions	296	492.9	534	1.24	240	386.3	458	1.04	536	440.1	992	2.28
Diarrhoeal diseases	426	934.5	881	1.58	369	770.9	778	1.39	795	847.9	1659	2.97
Drowning	NR	NR	NA	0.00	NR	NA	NR	0.01	NR	NA	NR	0.02
Failure to thrive	39	55.4	228	0.19	18	NA	108	0.13	57	39	336	0.32
Fires/ burns	115	230.5	597	1.25	133	238.5	641	1.40	248	238.8	1238	2.66
Intestinal nematodes (hookworm)	NR	NR	NA	0.00					NR	NA	NR	0.00
Keratoconjunctivitis												
Low birth weight	NR	NA	NR	0.06	NR	NA	NR	0.03	NR	NA	NR	0.08
Lower respiratory infections	1474	3804	4176	9.74	1211	4477	3720	8.86	2685	3725.2	7896	18.60
Malnutrition and nutritional concerns	25	48.4	243	0.44	12	NA	134	0.23	37	37.1	377	0.67
Melioidosis	8	NA	50	0.08	10	NA	120	0.21	18	NA	170	0.30
Mental health / psychosocial	1262	2753.8	7180	7.93	1223	2742.5	7821	7.91	2485	2772.2	15001	15.84
Miscarriage	204	382	304	0.56					204	194.2	304	0.56

Table 4 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Kimberley Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	258	385.6	309	0.91	281	384.9	383	0.99	539	386.3	692	1.89
Poisonings	103	219.4	194	0.42	57	126.5	95	0.23	160	173.9	289	0.65
Post-streptococcal glomerulonephritis	35	52	183	0.29	32	45.5	206	0.28	67	48.7	389	0.57
Premature birth	166	235.9	2799	5.44	204	269	3644	6.69	370	253.1	6443	12.13
Pterygium	73	200	74	0.28	71	231.6	73	0.27	144	212.9	147	0.55
Rheumatic heart disease (RHD)	64	130.7	386	1.45	38	69.8	271	0.93	102	101.8	657	2.38
Ross River Virus					NR	NA	NR	0.01	NR	NA	NR	0.01
Scabies	44	83.7	219	0.50	39	69.1	127	0.37	83	76.9	346	0.87
Shingles	10	NA	50	0.08	NR	NA	NR	0.03	15	NA	64	0.10
Skin cancer	14	NA	34	0.08	21	100.5	31	0.10	35	85	65	0.18
Skin infection including pustules, abscess, cellulitis, impetigo	1485	3170.9	4340	9.06	1387	3074	3893	7.95	2872	3102.3	8233	17.01
Sexually Transmitted Infections	30	52.9	95	0.21	12	NA	50	0.09	42	40.9	145	0.30
Strongyloidiasis					NR	NA	NR	0.01	NR	NA	NR	0.01
Throat infection	32	65.4	48	0.08	13	NA	21	0.04	45	46.2	69	0.12
Trachoma												
Tuberculosis					NR	NR	NA	0.04	NR	NR	NA	0.04
Urinary tract infection	1001	2455.9	2747	5.00	195	901.1	735	1.45	1196	1660	3482	6.45
Total				**66.08**				**57.45**				**123.53**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 5: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Midwest Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	18	NA	105	0.43	17	NA	92	0.37	35	68.1	197	0.80
Asthma	85	428.8	230	0.57	40	137.3	94	0.14	125	280.7	324	0.71
Cancer	188	1085	1168	2.32	235	6849.1	1625	3.14	423	1300.2	2793	5.46
Cardiovascular disease (Not RHD)	430	2849.8	1589	3.91	550	34936.2	2222	6.10	980	3707	3811	10.01
Cataracts	172	1050.5	173	0.54	142	9108	145	0.44	314	1069.6	318	0.98
Chronic lung disease including COPD	285	1692.3	883	1.85	144	3835.3	683	1.33	429	1467.4	1566	3.19
Conjunctivitis (Infective)					NR	NA	NR	0.01	NR	NA	NR	0.01
Deafness	6	NA	6	0.01	NR	NA	NR	0.01	10	NA	10	0.02
Dental caries, abscess, extractions	185	757.7	241	0.80	125	472	197	0.54	310	613.3	438	1.34
Diarrhoeal diseases	160	799.9	377	0.64	120	517.5	360	0.53	280	653.5	737	1.17
Drowning					NR	NA	NR	0.00	NR	NA	NR	0.00
Failure to thrive	10	NA	47	0.09	8	NA	19	0.04	18	NA	66	0.13
Fires/ burns	31	117.3	115	0.26	82	341.8	255	0.78	113	225.6	370	1.03
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight												
Lower respiratory infections	419	2309.2	1661	3.09	344	8632	1368	3.04	763	2231.5	3029	6.13
Malnutrition and nutritional concerns	NR	NA	NR	0.07	NR	NA	NR	0.09	NR	NA	NR	0.15
Melioidosis												
Mental health / psychosocial	513	2580.7	3034	3.72	542	5572.7	4519	3.54	1055	2767.6	7553	7.25
Miscarriage	79	378.6	99	0.25					79	190.5	99	0.25

Table 5 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Midwest Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	51	175.1	62	0.20	63	180.7	79	0.21	114	180.6	141	0.42
Poisonings	86	394.7	173	0.32	27	129.8	65	0.22	113	263.4	238	0.53
Post-streptococcal glomerulonephritis	NR	NA	NR	0.02	8	NA	43	0.05	10	NA	58	0.07
Premature birth	93	283.9	1742	4.00	96	263	1371	2.90	189	272.9	3113	6.90
Pterygium	28	146	28	0.10	21	129.9	21	0.08	49	138	49	0.18
Rheumatic heart disease (RHD)	23	117.9	181	0.75	NR	NA	NR	0.13	28	72.8	206	0.88
Ross River Virus												
Scabies	9	NA	21	0.08	11	NA	44	0.11	20	37.8	65	0.18
Shingles	NR	NA	NR	0.01	NR	NA	NR	0.00	NR	NA	NR	0.01
Skin cancer	16	NA	46	0.06	18	NA	20	0.07	34	106.9	66	0.13
Skin infection including pustules, abscess, cellulitis, impetigo	482	2262.1	1578	3.10	449	13029.2	1389	2.80	931	2329.5	2967	5.90
Sexually Transmitted Infections	6	NA	14	0.03	NR	NA	NR	0.01	8	NA	21	0.03
Strongyloidiasis												
Throat infection	6	NA	18	0.02	6	NA	6	0.01	12	NA	24	0.03
Trachoma												
Tuberculosis	NR	NA	NR	0.13	NR	NA	NR	0.02	NR	NA	NR	0.15
Urinary tract infection	299	1714.2	992	1.57	77	3169.8	231	0.44	376	1190.6	1223	2.00
Total				**28.92**				**27.14**				**56.06**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 6: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, North Metropolitan Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	NR	NA	NR	0.06	NR	NA	NR	0.02	6	NA	22	0.07
Asthma	108	530.5	789	0.44	19	NA	29	0.05	127	305.4	818	0.49
Cancer	193	1258	1218	3.18	175	11692.9	769	2.22	368	1997.3	1987	5.40
Cardiovascular disease (Not RHD)	257	3208.1	1031	2.58	321	10130.3	1155	3.32	578	3983.3	2186	5.90
Cataracts	104	1104.7	105	0.33	90	1453.9	95	0.29	194	1219	200	0.62
Chronic lung disease including COPD	127	1077.3	523	0.97	127	9257.8	523	1.09	254	1578.2	1046	2.06
Conjunctivitis (Infective)												
Deafness	9	NA	9	0.07	16	NA	16	0.33	25	46.1	25	0.40
Dental caries, abscess, extractions	216	693.3	254	1.00	163	479.6	195	0.77	379	619.4	449	1.77
Diarrhoeal diseases	117	554.6	241	0.42	63	399.2	126	0.21	180	462.3	367	0.63
Drowning	NR	NA	NR	0.00					NR	NA	NR	0.00
Failure to thrive	NR	NA	NR	0.01	NR	NA	NR	0.03	7	NA	23	0.05
Fires/ burns	11	NA	20	0.10	18	NA	74	0.23	29	39.8	94	0.33
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight												
Lower respiratory infections	193	1073.4	678	1.51	137	9219.1	541	1.09	330	1471.3	1219	2.60
Malnutrition and nutritional concerns	11	NA	96	0.21	NR	NA	NR	0.07	15	NA	126	0.28
Melioidosis												
Mental health / psychosocial	1152	4759.7	10823	7.80	813	5365.7	9459	5.27	1965	4518.8	20282	13.07
Miscarriage	96	343.9	113	0.29					96	179.3	113	0.29

Table 6 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, North Metropolitan Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	41	111.3	44	0.19	40	80.8	41	0.15	81	95.9	85	0.34
Poisonings	154	549.5	519	1.34	100	445.9	335	0.68	254	491.7	854	2.02
Post-streptococcal glomerulonephritis	NR	NA	NR	0.02	NR	NA	NR	0.04	6	NA	28	0.06
Premature birth	85	169.8	1465	3.05	83	159	1551	2.96	168	164.3	3016	6.01
Pterygium	10	NA	10	0.04	13	NA	13	0.05	23	123.5	23	0.09
Rheumatic heart disease (RHD)	NR	NA	NR	0.19	NR	NA	NR	0.18	10	NA	117	0.37
Ross River Virus												
Scabies	NR	NA	NR	0.01	NR	NA	NR	0.04	NR	NA	NR	0.04
Shingles	NR	NA	NR	0.01	NR	NA	NR	0.02	NR	NA	NR	0.03
Skin cancer	31	310.3	32	0.14	70	5121.6	70	0.32	101	825.6	102	0.45
Skin infection including pustules, abscess, cellulitis, impetigo	265	1109.1	578	1.65	260	1111.4	779	1.55	525	1140.5	1357	3.20
Sexually Transmitted Infections	8	NA	21	0.04	NR	NA	NR	0.01	9	NA	22	0.04
Strongyloidiasis												
Throat infection	NR	NA	NR	0.01	NR	NA	NR	0.01	7	NA	14	0.02
Trachoma												
Tuberculosis												
Urinary tract infection	268	1440.7	642	1.29	78	861	230	0.43	346	1192	872	1.72
Total				**26.96**				**21.41**				**48.37**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 7: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Pilbara Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	31	85.3	151	0.30	19	NA	86	0.23	50	65.3	237	0.53
Asthma	114	450.3	210	0.40	63	160.4	102	0.20	177	299.2	312	0.60
Cancer	169	1209.4	1157	2.62	168	1515.5	1350	3.14	337	1212.5	2507	5.76
Cardiovascular disease (Not RHD)	582	3945.1	1913	4.85	491	3096.8	1613	4.93	1073	3544.8	3526	9.79
Cataracts	157	1185.5	157	0.50	114	1065.9	116	0.36	271	1033.9	273	0.86
Chronic lung disease including COPD	245	1555.4	689	1.52	197	2586.8	521	1.46	442	1763.6	1210	2.98
Conjunctivitis (Infective)	NR	NA	NR	0.01	NR	NA	NR	0.01	NR	NA	NR	0.02
Deafness	6	NA	6	0.01	8	NA	8	0.06	14	NA	14	0.07
Dental caries, abscess, extractions	166	493.7	293	0.77	149	391.9	214	0.75	315	437.1	507	1.52
Diarrhoeal diseases	195	861.3	439	0.80	145	492.8	330	0.62	340	728	769	1.42
Drowning	NR	NA	NR	0.02	NR	NA	NR	0.02	9	NA	10	0.03
Failure to thrive	8	NA	81	0.05	NR	NA	NR	0.01	10	NA	88	0.06
Fires/ burns	55	181.2	385	0.43	71	200.1	465	1.01	126	195	850	1.44
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight	NR	NA	NR	0.01				0.00	NR	NA	NR	0.01
Lower respiratory infections	655	3381.7	2013	4.33	585	3485.1	1641	4.03	1240	3228.5	3654	8.36
Malnutrition and nutritional concerns	NR	NA	NR	0.09	7	NA	78	0.13	12	NA	114	0.23
Melioidosis					NR	NA	NR	0.06	NR	NA	NR	0.06
Mental health / psychosocial	514	2107.8	2538	3.28	567	1774.9	4129	4.04	1081	1975.8	6667	7.32
Miscarriage	102	330.3	140	0.27					102	147.1	140	0.27

Table 7 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Pilbara Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	57	152.2	67	0.20	70	160	114	0.26	127	157.1	181	0.46
Poisonings	76	282	143	0.23	35	134.5	54	0.14	111	203.1	197	0.38
Post-streptococcal glomerulonephritis	NR	NA	NR	0.03	NR	NA	NR	0.03	7	NA	46	0.06
Premature birth	89	213.3	1568	2.87	139	301.2	2137	4.40	228	259.5	3705	7.27
Pterygium	38	227.7	43	0.14	28	117.1	28	0.10	66	189.3	71	0.24
Rheumatic heart disease (RHD)	10	NA	94	0.45	7	NA	124	0.49	17	NA	218	0.94
Ross River Virus												
Scabies	22	81.8	68	0.20	24	77.1	61	0.22	46	79.8	129	0.41
Shingles	NR	NA	NR	0.03	NR	NA	NR	0.00	6	NA	18	0.04
Skin cancer	NR	NA	NR	0.01	7	NA	69	0.03	11	NA	73	0.04
Skin infection including pustules, abscess, cellulitis, impetigo	815	3355.3	2191	4.80	695	2924.4	1940	4.04	1510	2961.8	4131	8.84
Sexually Transmitted Infections	6	NA	49	0.07	NR	NA	NR	0.08	8	NA	74	0.15
Strongyloidiasis												
Throat infection	17	NA	24	0.05	10	NA	27	0.03	27	75.7	51	0.08
Trachoma												
Tuberculosis												
Urinary tract infection	423	2200.7	1006	2.02	78	728.5	269	0.44	501	1442.9	1275	2.46
Total				**31.37**				**31.34**				**62.71**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 8: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, South Metropolitan Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	8	NA	23	0.07	NR	NA	NR	0.04	12	NA	48	0.11
Asthma	81	239.0	144	0.27	47	78.2	80	0.14	128	155.1	224	0.41
Cancer	164	850.3	764	2.16	271	3,026.9	1,489	3.61	435	1,279.6	2,253	5.77
Cardiovascular disease (Not RHD)	316	2,137.2	1,099	3.50	440	12,165.1	1,512	4.98	756	2,743.7	2,611	8.47
Cataracts	170	1,229.8	173	0.53	139	9,777.9	142	0.45	309	1,517.6	315	0.98
Chronic lung disease including COPD	148	1,224.6	543	0.99	121	4,917.3	431	0.88	269	1,173.3	974	1.87
Conjunctivitis (Infective)												
Deafness	9	NA	9	0.04	13	NA	13	0.17	22	21.9	22	0.21
Dental caries, abscess, extractions	211	416.6	222	1.02	180	319.5	215	0.85	391	363.1	437	1.87
Diarrhoeal diseases	144	530.9	254	0.47	95	251.8	170	0.33	239	395.9	424	0.81
Drowning	NR	NA	NR	0.12	NR	NA	NR	0.01	6	NA	131	0.13
Failure to thrive	8	NA	23	0.06	NR	NA	NR	0.03	13	NA	34	0.08
Fires/ burns	23	38.9	126	0.26	47	86.9	221	0.64	70	64.6	347	0.90
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight	NR	NA	NR	0.01					NR	NA	NR	0.01
Lower respiratory infections	228	1,071.2	709	1.66	223	10,567.0	833	2.49	451	1,293.2	1,542	4.15
Malnutrition and nutritional concerns	NR	NA	NR	0.10	NR	NA	NR	0.03	8	NA	65	0.13
Melioidosis												
Mental health / psychosocial	1,136	3,469.0	11,885	9.30	1,000	4,059.7	10,208	7.18	2,136	3,100.4	22,093	16.48
Miscarriage	106	240.7	138	0.32					106	106.6	138	0.32

Table 8 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, South Metropolitan Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	59	98.0	66	0.26	89	121.9	94	0.34	148	110.5	160	0.60
Poisonings	124	297.6	263	0.94	109	276.8	213	0.79	233	286.4	476	1.73
Post-streptococcal glomerulonephritis					NR	NA	NR	0.00	NR	NA	NR	0.00
Premature birth	138	187.9	1,867	3.87	126	163.8	1,336	3.22	264	175.6	3,203	7.09
Pterygium	8	NA	8	0.03	15	NA	15	0.05	23	68.3	23	0.08
Rheumatic heart disease (RHD)	8	NA	65	0.29	NR	NA	NR	0.12	13	NA	88	0.41
Ross River Virus												
Scabies	7	NA	32	0.07	NR	NA	NR	0.03	10	NA	44	0.10
Shingles	NR	NA	NR	0.02	NR	NA	NR	0.01	NR	NA	NR	0.02
Skin cancer	21	163.4	21	0.09	52	11,415.6	61	0.30	73	544.1	82	0.39
Skin infection including pustules, abscess, cellulitis, impetigo	306	924.3	663	1.82	263	716.3	673	1.68	569	840.5	1,336	3.51
Sexually Transmitted Infections	NR	NA	NR	0.04	NR	NA	NR	0.04	9	NA	47	0.07
Strongyloidiasis												
Throat infection	8	NA	10	0.02	NR	NA	NR	0.02	13	NA	16	0.04
Trachoma												
Tuberculosis	NR	NA	NR	0.04					NR	NA	NR	0.04
Urinary tract infection	362	1,459.3	739	1.63	134	3,410.0	387	0.76	496	1,178.6	1,126	2.39
Total				**29.98**				**29.20**				**59.18**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 9: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, South West Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)					NR	NA	NR	0.00	NR	NA	NR	0.00
Asthma	24	179.6	51	0.09	14	NA	18	0.05	38	121.9	69	0.13
Cancer	76	1075.4	538	1.21	73	1495	322	0.77	149	1156.1	860	1.97
Cardiovascular disease (Not RHD)	175	3015.7	732	1.39	184	3669.7	448	1.72	359	2781	1180	3.11
Cataracts	75	1566.8	76	0.23	63	1076.8	63	0.19	138	1281.9	139	0.43
Chronic lung disease including COPD	92	1144	353	0.75	58	1194.8	251	0.42	150	1124.7	604	1.17
Conjunctivitis (Infective)												
Deafness	NR	NA	NR	0.04					NR	NA	NR	0.04
Dental caries, abscess, extractions	105	630.9	124	0.47	77	354.1	92	0.35	182	484.7	216	0.82
Diarrhoeal diseases	61	603	112	0.20	37	271.9	81	0.13	98	439.8	193	0.33
Drowning	NR	NA	NR	0.00	NR	NA	NR	0.00	NR	NA	NR	0.01
Failure to thrive	NR	NA	NR	0.00	NR	NA	NR	0.04	NR	NA	NR	0.04
Fires/ burns	11	NA	31	0.14	11	NA	31	0.15	22	61.6	62	0.29
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight												
Lower respiratory infections	76	721	236	0.52	77	3645.8	408	0.75	153	990.3	644	1.27
Malnutrition and nutritional concerns	NR	NA	NR	0.04	NR	NA	NR	0.09	6	NA	47	0.13
Melioidosis												
Mental health / psychosocial	356	2539.5	2647	2.40	344	2760.2	2173	2.04	700	2715.7	4820	4.44
Miscarriage	40	262.9	46	0.13					40	128.2	46	0.13

Table 9 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, South West Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	27	112.4	28	0.09	23	79.5	23	0.08	50	95.4	51	0.17
Poisonings	47	308	60	0.16	36	257	80	0.24	83	282.1	140	0.41
Post-streptococcal glomerulonephritis	NR	NA	NR	0.03					NR	NA	NR	0.03
Premature birth	29	115.2	292	0.61	47	153.2	822	1.69	76	136.1	1114	2.31
Pterygium	NR	NA	NR	0.01	6	NA	6	0.02	10	NA	10	0.04
Rheumatic heart disease (RHD)	9	NA	43	0.13					9	NA	43	0.13
Ross River Virus												
Scabies					NR	NA	NR	0.02	NR	NA	NR	0.02
Shingles					NR	NA	NR	0.01	NR	NA	NR	0.01
Skin cancer	9	NA	9	0.03	8	NA	8	0.03	17	NA	17	0.06
Skin infection including pustules, abscess, cellulitis, impetigo	85	714	251	0.46	96	801.1	259	0.57	181	736.6	510	1.03
Sexually Transmitted Infections					NR	NA	NR	0.01	NR	NA	NR	0.01
Strongyloidiasis												
Throat infection	8	NA	11	0.02				0.00	8	NA	11	0.02
Trachoma												
Tuberculosis					NR	NA	NR	0.11	NR	NA	NR	0.11
Urinary tract infection	119	1255.6	233	0.52	32	327.1	122	0.15	151	736.7	355	0.67
Total				**9.69**				**9.63**				**19.31**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

Table 10: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Wheatbelt Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Acute Rheumatic Fever (ARF)	NR	NA	NR	0.00	NR	NA	NR	0.04	NR	NA	NR	0.04
Asthma	51	625.1	95	0.14	11	NA	20	0.03	62	442.9	115	0.17
Cancer	94	1,216.1	592	1.05	91	1,036.5	614	1.32	185	1,154.1	1,206	2.37
Cardiovascular disease (Not RHD)	202	2,382.5	703	1.83	226	2,680.8	1,005	2.69	428	2,568.4	1,708	4.52
Cataracts	85	1,053.8	86	0.27	61	780.2	61	0.20	146	940.9	147	0.47
Chronic lung disease including COPD	159	1,521.2	522	0.97	105	1,221.2	292	0.77	264	1,383.5	814	1.74
Conjunctivitis (Infective)												
Deafness					NR	NA	NR	0.00	NR	NA	NR	0.00
Dental caries, abscess, extractions	67	564.8	90	0.30	42	272.5	46	0.18	109	418.2	136	0.48
Diarrhoeal diseases	59	670.5	116	0.19	44	410.6	82	0.15	103	581.3	198	0.34
Drowning												
Failure to thrive	NR	NA	NR	0.01					NR	NA	NR	0.01
Fires/ burns	10	NA	38	0.09	10	NA	58	0.10	20	91.8	96	0.19
Intestinal nematodes (hookworm)												
Keratoconjunctivitis												
Low birth weight												
Lower respiratory infections	119	1,377.8	411	1.09	97	2,447.6	302	0.75	216	1,274.1	713	1.84
Malnutrition and nutritional concerns					NR	NA	NR	0.02	NR	NA	NR	0.02
Melioidosis												
Mental health / psychosocial	543	6,245.8	4,098	3.50	392	4,436.6	2,144	2.23	935	5,387.6	6,242	5.73
Miscarriage	21	219.0	25	0.06					21	113.7	25	0.06

Table 10 continued: Hospitalisations for conditions which have an environmental attribution, Aboriginal patients, Wheatbelt Health Region, 2018-2022.

Disease group	Females				Males				Persons			
	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)	Cases	ASR (per 100,000)	Length of stay	Cost ($M)
Otitis Media	21	128.9	29	0.07	13	NA	19	0.05	34	103.3	48	0.12
Poisonings	53	597.9	108	0.26	22	262.8	88	0.14	75	422.9	196	0.39
Post-streptococcal glomerulonephritis	NR	NA	NR	0.05					NR	NA	NR	0.05
Premature birth	26	152.1	569	1.16	32	181.6	429	0.82	58	167.1	998	1.98
Pterygium	NR	NA	NR	0.02	NR	NA	NR	0.01	7	NA	7	0.03
Rheumatic heart disease (RHD)	NR	NA	NR	0.08					NR	NA	NR	0.08
Ross River Virus												
Scabies	NR	NA	NR	0.01	NR	NA	NR	0.03	NR	NA	NR	0.04
Shingles	NR	NA	NR	0.01				0.00	NR	NA	NR	0.01
Skin cancer	6	NA	6	0.03	NR	NA	NR	0.01	10	NA	10	0.04
Skin infection including pustules, abscess, cellulitis, impetigo	82	929.6	193	0.47	87	934.0	195	0.44	169	916.3	388	0.91
Sexually Transmitted Infections	NR	NA	NR	0.01	NR	NA	NR	0.01	NR	NA	NR	0.02
Strongyloidiasis												
Throat infection	NR	NA	NR	0.01	NR	NA	NR	0.01	6	NA	10	0.02
Trachoma												
Tuberculosis												
Urinary tract infection	126	1,464.6	303	0.57	29	319.9	78	0.16	155	966.7	381	0.73
Total				**12.26**				**10.16**				**22.42**

	No cases
NR	Not reported due to low numbers
NA	ASR not calculated due to low numbers

APPENDIX 7 – ABORIGINAL COMMUNITY CONTROLLED HEALTH SERVICES DATA

Table 1: Number of clinical items and individual patients for a sample of conditions from Mulan Health Centre, by age group, 2022 to 2024

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	37	13	62	112	6	NR	16	PP
Diarrhoeal diseases	39	8	75	122	20	6	37	63
Keratoconjunctivtis	47	NR	26	PP	23	NR	21	PP
Otitis Media	225	20	57	302	52	10	26	88
Scabies	54	8	39	101	23	NR	25	PP
Skin infection	261	49	304	614	66	21	95	182
Throat Infection	15	10	22	47	6	8	14	28
Trachoma	27	NR	27	PP	21	NR	23	PP
Unintentional Injuries	400	222	1,101	1,723	63	42	141	246
Worms	28	NR	40	PP	18	NR	27	PP

Table 2: Number of clinical items and individual patients for a sample of conditions from Billiluna Health Centre, by age group, 2022 to 2024

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	100	105	108	313	12	17	26	55
Diarrhoeal diseases	69	11	115	195	36	7	49	92
Keratoconjunctivtis	59	NR	49	PP	37	NR	34	PP
Otitis Media	364	32	140	536	104	19	61	184
Scabies	147	19	99	265	61	11	57	129
Skin infection	485	91	419	995	135	36	128	299
Throat Infection	44	29	46	119	22	17	29	68
Trachoma	44	NR	34	PP	34	NR	30	PP
Unintentional Injuries	604	338	1,565	2,507	117	80	205	402
Worms	52	6	109	167	34	NR	65	PP

Table 3: Number of clinical items and individual patients for a sample of conditions from Bidyadanga Health Centre, by age group, 2022 to 2024

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	49	57	109	215	7	15	41	63
Diarrhoeal diseases	95	25	149	269	51	8	82	141
Keratoconjunctivtis	24	NR	38	PP	18	NR	30	PP
Otitis Media	430	40	163	633	142	18	67	227
Scabies	168	29	80	277	58	10	51	119
Skin infection	958	209	923	2,090	227	73	246	546
Throat Infection	45	25	89	159	24	15	39	78
Trachoma	NR		NR	6	NR		NR	NR
Unintentional Injuries	750	648	2,421	3,819	189	170	445	804
Worms	52	6	62	120	37	NR	50	PP

	No cases	NR	Not reported due to low numbers	NA	ASR not calculated due to low numbers

Table 4: Number of clinical items and individual patients for a sample of conditions from Beagle Bay Health Service, by age group, 2022 to 2024

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	27	61	153	241	NR	8	31	43
Diarrhoeal diseases	34	11	67	112	23	6	39	68
Keratoconjunctivtis	22		9	31	15		8	23
Otitis Media	169	24	95	288	57	12	38	107
Scabies	71	9	49	129	28	6	31	65
Skin infection	355	79	316	750	96	30	110	236
Throat Infection	66	31	46	143	31	14	29	74
Trachoma		NR		NR		NR		NR
Unintentional Injuries	319	172	697	1,188	100	56	194	350
Worms	23	6	26	55	17	NR	18	PP

Table 5: Number of clinical items and individual patients for a sample of conditions from Balgo Health Centre, by age group, 2022 to 2024

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	96	126	149	371	13	21	41	75
Diarrhoeal diseases	112	22	210	344	57	12	96	165
Keratoconjunctivtis	86	10	88	184	54	6	59	119
Otitis Media	580	46	206	832	162	25	92	279
Scabies	204	30	153	387	81	21	91	193
Skin infection	738	163	693	1,594	203	67	233	503
Throat Infection	73	40	82	195	36	22	49	107
Trachoma	70	NR	71	PP	52	NR	57	PP
Unintentional Injuries	1,085	637	2,714	4,436	189	136	429	754
Worms	67	10	127	204	42	9	79	130

Table 6: Number of clinical items and individual patients for a sample of conditions from Broome Regional Aboriginal Medical Service, by age group, 2022 to 2024.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	35	103	218	356	7	21	86	114
Diarrhoeal diseases	33	36	202	271	21	19	112	152
Keratoconjunctivtis	21	NR	50	PP	15	NR	39	PP
Otitis Media	238	33	191	462	129	17	81	227
Scabies	86	28	97	211	51	15	63	129
Skin infection	300	134	671	1,105	140	48	265	453
Throat Infection	43	40	81	164	34	23	42	99
Trachoma	6	NR	22	PP	NR	NR	19	25
Unintentional Injuries	219	320	2,003	2,542	89	82	464	635
Worms	24	9	48	81	22	7	33	62

	No cases	NR	Not reported due to low numbers	PP	Privacy preserving to prevent back calculation

Table 7: Number of clinical items and individual patients for a sample of conditions from Derby Aboriginal Medical Service, by age group, 2021 to 2024.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	23	11	103	137	11	NR	31	PP
Diarrhoeal diseases	9	7	64	80	9	NR	52	PP
Keratoconjunctivtis	13	NR	29	PP	11	NR	28	PP
Otitis Media	81	10	93	184	61	NR	67	PP
Scabies	46	7	49	102	36	6	40	82
Skin infection	171	29	217	417	116	16	139	271
Throat Infection	19	12	18	49	15	9	18	42
Trachoma			6	6			NR	NR
Unintentional Injuries	50	50	609	709	31	21	193	245
Worms	21	NR	25	PP	17	NR	22	PP

Table 8: Number of clinical items and individual patients for a sample of conditions from Puntukurnu Aboriginal Medical Service, by age group, July 2021 to June 2024.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	NR	NR	NR	NR	NR	NR	NR	6
Diarrhoeal diseases	72	23	166	261	52	19	115	186
Keratoconjunctivtis	NR	NR	NR	NR		NR	NR	NR
Otitis Media	492	42	152	686	212	32	108	352
Scabies	71	21	95	187	55	19	78	152
Skin infection	628	186	597	1,411	275	103	305	683
Throat Infection	103	67	227	397	72	48	159	279
Trachoma	NR	NR	8	PP	NR	NR	7	11
Unintentional Injuries	154	98	256	508	114	68	183	365
Worms	25	NR	13	PP	23	NR	13	PP

Table 9: Number of clinical items and individual patients for a sample of conditions from Bega Garnbirringu Health Service, by age group, June 2022 to June 2024.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	NR	NR	NR	8	NR	NR	NR	7
Diarrhoeal diseases	6	NR	10	PP	6	NR	10	17
Keratoconjunctivtis			NR	NR			NR	NR
Otitis Media	57	8	15	80	51	8	17	76
Scabies	13	6	8	27	13	6	7	26
Skin infection	66	17	70	153	57	15	57	129
Throat Infection	7	8	6	21	6	7	6	19
Trachoma								
Unintentional Injuries	NR	NR	11	18	NR	NR	11	18
Worms	NR			NR	NR			NR

	No cases	NR	Not reported due to low numbers	PP	Privacy preserving to prevent back calculation

Table 10: Number of clinical items and individual patients for a sample of conditions from Geraldton Regional Aboriginal Medical Service, by age group, 2022 to 2024.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	NR	NR	NR	NR	NR	NR		NR
Diarrhoeal diseases	7	NR	15	PP	6	NR	15	24
Keratoconjunctivtis	NR	NR	NR	NR	NR			NR
Otitis Media	32	11	34	77	29	10	32	71
Scabies	10	NR	NR	18	10	NR	NR	18
Skin infection	87	30	74	191	80	28	67	175
Throat Infection	NR	11	15	PP	NR	11	14	30
Trachoma								
Unintentional Injuries	NR	NR	30	39	NR	NR	30	39
Worms								

Table 11: Number of clinical items and individual patients for a sample of conditions from South West Aboriginal Medical Service, by age group, 2021 to 2023.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	NR	NR	NR	NR	NR	NR	NR	NR
Diarrhoeal diseases	58	22	126	206	48	19	95	162
Keratoconjunctivtis	NR	NR	NR	NR	NR			NR
Otitis Media	228	18	61	307	145	16	41	202
Scabies	15	NR	22	PP	15	NR	20	37
Skin infection	188	58	230	476	144	48	164	356
Throat Infection	71	81	101	253	63	60	81	204
Trachoma	NR	NR	NR	NR			NR	NR
Unintentional Injuries	38	23	131	192	37	21	103	161
Worms	NR	NR	NR	NR	NR		NR	NR

Table 12: Number of clinical items and individual patients for a sample of conditions from Derbarl Yerrigan Health Service, by age group, July 2021 to June 2023.

Disease group	Number of Clinical Items				Number of Individual Patients			
	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total	Aged 0-14 years	Aged 15-24 years	Aged 25+ years	Total
Acute rheumatic fever	6	NR		PP	NR	NR		6
Diarrhoeal diseases	26	16	131	173	26	14	118	158
Keratoconjunctivtis	NR		NR	NR	NR		NR	NR
Otitis Media	29	NR	21	52	26	NR	21	PP
Scabies	48	10	43	101	43	10	37	90
Skin infection	264	73	509	846	204	66	416	686
Throat Infection	42	41	98	181	36	37	88	161
Trachoma			NR	NR			NR	NR
Unintentional Injuries	25	36	159	220	25	36	143	204
Worms	NR	NR	NR	NR	NR	NR	NR	NR

	No cases	NR	Not reported due to low numbers	PP	Privacy preserving to prevent back calculation

APPENDIX 8 – NOTIFIABLE INFECTIOUS DISEASES

Table 1: Number of notifiable infectious diseases notifications, by condition and Health Region, Aboriginal people, 2023

Notifiable Condition	Wheatbelt	East Metropolitan	Goldfields	Great Southern	Kimberley	Midwest	North Metropolitan	Pilbara	South Metropolitan	South West	Total
Acute Post-Streptococcal Glomerulonephritis (APSGN)		NR			PP			NR			PP
Barmah Forest virus					7					NR	PP
Campylobacteriosis	NR	22	6	8	35	6	7	15	10	8	PP
Chlamydia (genital)	26	355	147	28	570	125	135	278	243	50	1,957
Cryptosporidiosis			NR		13	NR		NR		NR	23
Gonorrhoea	12	172	191	NR	426	72	56	177	132	17	1,260
Listeriosis											
Murray Valley encephalitis virus					NR						NR
Ross River virus		NR			8			NR	NR	NR	13
Rotavirus		12	NR	NR	18	NR	NR	14	8	NR	67
Salmonellosis	NR	10	8	NR	33	9	NR	20	NR	NR	91
Shiga toxin (Verotoxin) producing E. coli (STEC/VTEC) infection		NR	NR	NR	7	NR		NR	NR		16
Shigellosis		NR	NR		43	6		NR		NR	58
Syphilis (infectious)	7	40	35	NR	62	17	13	100	34	NR	313
Syphilis (non-Infectious)	8	12	14	NR	NR	17	NR	15	9	NR	86
Syphilis (congenital)		NR							NR		NR
Tuberculosis						NR					NR
Varicella (shingles)		15	10	NR	22	NR	NR	7	NR	NR	72
Total	**58**	**645**	**419**	**49**	**1,259**	**268**	**224**	**637**	**447**	**96**	**4,102**
Per cent (%)	**1.4**	**15.7**	**10.2**	**1.2**	**30.7**	**6.5**	**5.5**	**15.5**	**10.9**	**2.3**	**100.0**

	No cases	NR	Not reported due to low numbers	PP	Privacy preserving to prevent back calculation

APPENDIX 9 – GLOSSARY

Co-Design
Co-design refers to a participatory approach to designing solutions, in which community members are treated as equal collaborators in the design process. It is built on authentic relationships, communicating through agreed mechanisms, two-way understanding, cumulative evaluation and reflection – to generate and sustain shared development pathways to outcome delivery and reform.

Climate Change and Adaptation
Adaptation means making adjustments to decisions and activities, in consideration of climate change, in order to manage and respond to the impacts of climate change.

Cultural Safety
Cultural safety is about creating an environment that is safe for Aboriginal and Torres Strait Islander people. This means there is no assault, challenge or denial of their identity and experience.
Cultural safety is about:

- Shared respect, shared meaning and shared knowledge;
- The experience of learning together with dignity and truly listening;
- Strategic and institutional reform to remove barriers to the optimal health, wellbeing and safety of Aboriginal people. This includes addressing unconscious bias, racism and discrimination, and supporting Aboriginal self-determination;
- Individuals, organisations and systems ensuring their cultural values do not negatively impact on Aboriginal peoples, including addressing the potential for unconscious bias, racism and discrimination; and
- Individuals, organisations and systems ensuring self-determination for Aboriginal people. This includes sharing power (decision-making and governance) and resources with Aboriginal communities. It's especially relevant for the design, delivery and evaluation of services for Aboriginal people.

Environmental Health
According to Australian Indigenous Health InfoNet, environmental health refers to the physical, chemical and biological factors which affect the health and wellbeing of people within their surroundings, primarily within their homes and communities.

Vectors
A vector is a living organism that transmits an infectious agent from an infected animal to a human or another animal. Vectors include mosquitoes, ticks, flies, fleas and lice.

Vectors can transmit infectious diseases either actively or passively:

- Biological vectors, such as mosquitoes and ticks may carry pathogens that can multiply within their bodies and be delivered to new hosts, usually by biting.
- Mechanical vectors, such as flies can pick up infectious agents on the outside of their bodies and transmit them through physical contact.

Prevention

- Primordial Prevention— a strategy encompassing primordial prevention intends to stop risk factors for disease developing at all, whereas with primary prevention the goal is to modify existing risk factors to prevent development of disease. Thus, primordial prevention aims to change "the sociocultural conditions that lead to risk factor development".
- Primary Prevention—an intervention implemented before there is evidence of a disease or injury. Reduces or eliminates causative risk factors, usually at individual level including behavioural risk factors.
- Secondary Prevention—an intervention implemented after a disease has begun but before it is symptomatic such as early identification through screening based on evidence that outcomes are improved.
- Tertiary Prevention—an intervention implemented after a disease or injury is established. Prevents disease from getting worse.

APPENDIX 10 – ACRONYMS

ABBREVIATION	TERM
ACCHS	Aboriginal Community Controlled Health Service
ACCO	Aboriginal Community Controlled Organisation
AEH	Aboriginal Environmental Health
AEHW	Aboriginal Environmental Health Worker
AHCWA	Aboriginal Health Council of Western Australia
AHWF	Aboriginal Health and Wellbeing Framework
AMS	Aboriginal Medical Services
ARF	Acute Rheumatic Fever
CEHAP	Community Environmental Health Action Plan
CDP	Community Development Program
COAG	Council of Australian Governments
DOH	Department of Health
EAF	Environmental Attributable Fraction
EHCR	Clinical EH referrals
EHD	Environmental Health Directorate
enHealth	Environmental Health Standing Committee
ERPATSIEH	Expert Reference Panel on Aboriginal and Torres Strait Islander Environmental
Health	Tuberculosis
KEAF	Kimberley Environmental Attributable Fraction
LGA	Local Government Authority
NACCHO	National Aboriginal Community Controlled Health Organisation
NAHS	National Aboriginal and Torres Strait Islander Health Strategy
NEHS	National Environmental Health Strategy
RHD	Rheumatic Heart Disease
UWA	The University of Western Australia
WA	Western Australia
WACHS	WA Country Health Services
WA Health	Western Australian Department of Health
WHO	World Health Organization

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