

Evaluation of Maari Ma Health Aboriginal Corporation's Chronic Disease Strategy

Appendices

December 2016





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Goal	Improve the long-term health outco	omes for Aboriginal people	
Health Impacts	 The rates of chronic disease morbic The disparities in chronic disease m Preventable chronic disease risk fac 	lity and mortality among Aboriginal people are reducec orbidity and mortality between Aboriginal and non-Ab ctors among Aboriginal people are reduced	original people are reduced
Medium term Results	 Overall Strengthen community capacity and Increase inter-sectoral collaboration Increase number of Aboriginal peop Increase number of Aboriginal peop Increase number of health care pro lifestyle choices and to manage the Improve access to primary health c Improve access to primary health c Improve capacity of the organisatio Improve capacity of the organisatio Improve health promotion and edu <i>Program specific results – Healthy Start</i> Improve overall child development <i>Program specific results – Keeping Well</i> Improve chronic disease preventior 	d linkages between the health service and community n to address poor health outcomes ole actively participating in their own health care ole trained and employed to provide health care is and number of people) providing primary health care viders who are equipped to assist Aboriginal people wi ir health are s where required Aboriginal people in to deliver coordinated and comprehensive care cation hild and maternal care and wellbeing <i>program</i> hild and maternal care and wellbeing <i>program</i> h, management and follow-up care	and other services to Aboriginal people h, or at risk of, chronic disease to make healthy
Programs and Program Elements	Healthy Start program Kee Prevention Pre • Antenatal care including key • health messages	<i>cping Well program</i> <i>vention</i> Smoking cessation and prevention programs Alcohol harm-reduction programs	 Health service support Raising community awareness programs (e.g. community development, social marketing)

- Healthy young mothers and babies program;
 - breastfeeding; immunisation Oral health promotion and
 - Child health development care
- and early learning/literacy programs
- Children and young people's program

Early intervention

Children and young people's health surveillance and screening including GP reviews •

Care

GP clinics •

•

psychiatry, speech pathology Secondary services including paediatrician, oral health,

- Brief interventions for lifestyle risk factors
- Physical activity, weight loss and nutrition programs Programs to reduce access to tobacco and alcohol
 - among young people

Early intervention

GP-led adult Aboriginal Health Checks and followup of well people

Care

- Agreed, coordinated, GP-led multidisciplinary care plans
 - Better access to, and coordination of, specialist nephrology, respiratory, smoking cessation, services (e.g. cardiology, endocrinology, psychiatry, mental health teams etc.)
 - Regular monitoring of chronic disease
- Providing access to pharmaceuticals and quality use of medicines
- Self-management support
- Multidisciplinary rehabilitation services (e.g. cardiac, pulmonary, stroke)
- Support, education and advice regarding lifestyle risk factors

- Workforce planning and development meet population needs; develop and (e.g. provide education, training and professional development in chronic disease; build workforce capacity to support employment of Aboriginal people)
- Continuous quality improvement and research activities aimed at systems change
- time for GP chronic disease prevention, decision support to facilitate efficient Organising and prioritising sufficient registers, care plans, recall systems, Clinical information systems and follow-up systems, appointment and effective care (e.g. disease booking systems, etc.)
- Proactively designing service delivery systems to facilitate efficient and early detection and management effective care

Note: The Goal and Health Impacts are subject to a range of influences outside the health system and health services, and trends in indicators that reflect progress towards these impacts will need to take account of influences outside the health system as well as in the Maari Ma Chronic Disease Strategy. Trends in indicators that reflect progress in relation to Medium-term Results, Programs and Program Elements are expected to be more directly related to Maari Ma activities and influences within the broader health system.

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Objective No.	Objective	Indicator	Data Source
Health Imp	bacts		
1 and 2	Rates of chronic disease morbidity and	All-cause mortality per 100,000 population	Hospitalisation data
	mortality among Aboriginal people are reduced	Hospitalisations for all causes and by principal diagnosis per 100,000	Hospitalisation data
		Potentially preventable hospitalisations (PPH) – total and by vaccine- preventable, acute and chronic conditions – per 100,000	Hospitalisation data
	Disparities in chronic disease morbidity	Low birthweight babies [less than 2500 grams]	Hospitalisation data
	and mortality between Aboriginal and	Smoking attributable hospitalisations per 100,000	Hospitalisation data
	non-Aboriginal people are reduced	Alcohol attributable hospitalisations per 100,000	Hospitalisation data
		Age-specific diabetes separations as a percentage of all diabetes and	
		cardiovascular separations, comparisons by Aboriginality for Broken Hill & Far	Hospitalisation data
		West	
		Percentage of babies born with low birthweight	Maternal health audit data
		Percentage of well clients with abnormal blood pressure (BP), urinalysis,	Preventive care clinical
		blood glucose or lipid levels	audit data
		Percentage of clients with type 2 diabetes or chronic heart disease (CHD) who	Chronic illness care audit
		have an abnormal BP, cholesterol or HbA1c results	data
		Percentage of children with evidence of developmental delay or chronic ear	Child health data
		infection	
æ	Preventable chronic disease risk factors	Smoking during pregnancy among Aboriginal and non-Aboriginal mothers	Hospitalisation data
	among Aboriginal people are reduced	Percentage of well clients recorded as a) smokers, b) using alcohol at risky	Preventive health audit
		levels, and c) overweight or obese	data
		Percentage of women who a) smoked during pregnancy, b) consumed risky	Material beat the sudit data
		levels of alcohol during pregnancy	ואומרכו וומן ווכמונון מממור ממנמ
		Percentage of diabetic and CHD clients who a) smoke cigarettes, b) drink at	
		risky levels, or c) are overweight or obese	כוון טווור ווווובאא רמו ב מחמיר

Objectives and indicators for the evaluation of Maari Ma Chronic Disease Strategy

Re	edium-term Results		
4	Improve the quality of care provided to	Mean proportion of overall delivery of services for maternal health, child	Clinical audit data
	Aboriginal people	health, preventive health and chronic illness care	
ъ	Healthy Start – Improve access to and quality		
	of child and maternal care	Community and considing indirections accord the constant of seven	Maternal and child health
9	Healthy Start – Improve overall child	כטווףטאור אות אדכוור ווומוראנט אאריטא נווב אנטדב טו נאב	audits
	development and wellbeing		
2	Keeping Well Program – Improve chronic		
	disease prevention, management and follow-	Composite and specific indicators across the scope of care	unionic niness care and preventive health audits
	up care		
00	Increase number of Aboriginal people trained	Number and proportion of workforce who identify as Aboriginal, all and by	Dromram data
	and employed to provide health care	Aboriginal Health Worker, over time	r i Uği alılı data
		Median tenure, over time	Program data
		Number and type of training for Aboriginal people	Interview data
6	Increase capacity of workforce (skills and	Number and type of workforce, over time	Program data
	number of people) providing PHC and other services to Aboriginal people	Number and type of training delivered	Program data
10	Increase number of health care providers who		
	are equipped to assist Aboriginal people with,	Number and type of training delivered	Program data
	or at risk of, chronic disease to make nearthy lifestyle choices and to manage their health		
11	Strengthened community capacity and linkages	Perceptions of the extent to which the health service is linked with the	Interview data
	חבראבבוו רווב וובפורוו זבו אורב פווח רסוווווחווורא	CUITITIUTITY	
		Perceptions of the extent to which the health service is building community capacity	Interview data
		Type and number of activities/initiatives undertaken to strengthen community	- +
		capacity and linkages between health service and community	interview data
12	Improve access to primary health care	Perceptions of the extent that accessibility of the health service have improved over time	Interview data
		Attendance within the past 12 months and reason for last attendance	Clinical audit data
		Did Not Attend (DNA) rates	Program data
l			

10	Improve accore to reactalist convises where	Dorcontions of the extent that there has here improved access to succiplist	
3	The second s	רבו כבטינוטוס טו נווב באנכוור נוומו נווכוב וומס טכבוו ווווטו טעכע מננכסס נט סטכנומווסנ במעורמי מיומר לוומים	Interview data
	i equil eq		
		Number and types of specialities, by location	Program data
		Establishment of speciality services coordinator	Interview data
		Number of upskilling sessions provided by specialists	Program data
		Number of clients per specialty, by location, by year	Program data
14	Increase in number of Aboriginal people	Attended within the past 12 months	Clinical audit data
	actively participating in their own health care	Reason for last attendance	Clinical audit data
		Did not attend rates	Program data
		Number and proportion of patients registered with the PIP-IHI, by year	Program data
		Number of Tier 1 outcomes payments, by year	Program data
		Number and proportion of patients registered with the PIPIHI, by year	Program data
		Number and proportion of follow-up Allied Health Services for Aboriginal and	
		Torres Strait Islander people (Items 81300–81360), by year	ri ogi alli uata
		Number and proportion of follow-up health services provided by a Practice	
		Nurse or registered Aboriginal Health Worker for an Aboriginal or Torres Strait	eteb merson
		Islander person who has received a health assessment (MBS Item 10987), by	ri ugi alli uata
		year	
15	Increase inter-sectoral collaboration to address	Perceptions of the extent that there is inter-sectoral collaboration	Interview data
	poor health outcomes	Number and type of projects delivered inter-sectorally	Interview data
16	Improve the capacity of the organisation to	Type of activities undertaken to improve the capacity of organisation to	Program data
	deliver coordinated and comprehensive care	deliver coordinated and comprehensive care	
		Perceptions of improved capacity to deliver care and factors that have	Interview data
		enabled this	5555
17	Improve health promotion and education	Type of group, community or population level activities undertaken	Program data

Appendix B: Hospitalisation data

1 Notes on the data

- While data on hospitalisation rates provide some insights into the health status of a population, they have significant limitations as a measure to assess the extent of a health problem in the community: they only represent conditions that are serious enough to require hospitalisation, and are affected by patterns of access to hospital and by changes in practices for coding reasons for admission.
- Hospitalisation rates are based on the number of hospital episodes rather than on the number of individual people who are hospitalised. Therefore, a person who has frequent admissions for the same condition is counted multiple times.
- It is recognised that there is under-identification of Aboriginal people both in hospital and in Census data. Analysis of trends will be affected by changes in the quality of Aboriginal identification over time. For example, there was a marked increase in people identifying as Indigenous in New South Wales (NSW) between the 2006 and 2011 censuses (increased from about 139,000 to about 173,000 – an increase of almost 25 per cent in five years).
- The hospitalisation data presented in this report were provided by the NSW Ministry of Health in response to a request from Maari Ma to NSW Health. Data were provided at the Statistical Areas Level 3 (SA3),¹ which are geographical areas built from SA2 levels.
- NSW Health provided data for '10502 Broken Hill and Far West SA3',² which includes the SA 2 levels of Broken Hill, Central Darling and Upper Far West (see Figure 1). SA3 represents the evaluation area of interest, and Maari Ma refers to this area as the 'Broken Hill Cluster'.
- In some cases NSW Health provided State-wide comparison data but for the most part this was downloaded by the evaluation team from the HealthStats NSW website.³
- The data presented in the figures are for NSW overall and are inclusive of the '10502 Broken Hill and Far West SA3' data.
- Linear trend lines have been fitted to the BH&FW Aboriginal data. The linear trend line is a bestfit straight line that is used with simple linear datasets and has been fitted using Excel standard functions.
- Hypothesis testing has been conducted by fitting a Poisson generalised linear model (as done by Li et. al. 2009^{4,5}). A log link function was used for all models and count data were weighted by population. Where possible, sex was added as a co-variate to the model. Serial correlation

¹ Australian Bureau of Statistics (ABS), *Statistical Geography Fact Sheet – Statistical Areas Level 3 (SA3),* ABS, Canberra. Accessed on 15 February 2016 at:

http://www.abs.gov.au/websitedbs/D3310114.nsf/4a256353001af3ed4b2562bb00121564/6b6e07234c98365aca25792d0 010d730/\$FILE/Statistical%20Area%20Level%203%20-%20Fact%20Sheet%20.pdf.

² ABS 2011, Australian Statistical Geography Standard Volume 1 – NSW Maps, ABS, Canberra. Accessed on 15 February 2016 at:

http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/B7B9EA9FB45ADB90CA257801000DCE10/\$File/1270055001_a sgs_2011_nsw_maps.pdf.

³ Health Stats NSW, 'Health statistics in NSW'. Accessed on 16 February 2016 at: http://www.healthstats.nsw.gov.au/.

⁴ Shu Qin Li, Zhiqiang Want & Yuejen Zhao 2009, 'Avoidable mortality trends in Aboriginal and non-Aboriginal populations in the Northern Territory, 1985–2004', *Australian and New Zealand Journal of Public Health*, 33(6):544–50.

⁵ Shu Q. Li, Natalie J. Gray, Steve, L. Guthridge & Sabine L. M. Pircher 2009, 'Avoidable hospitalisation in Aboriginal and non-Aboriginal people in the Northern Territory', *Medical Journal of Australia*, 190(10):532–6.

between data points was ignored due to the small sizes of the datasets. Model diagnostics and residual analysis was conducted on all models. Models for which the p-value is marked with ⁺ were significantly over-dispersed (deviance > χ^2 (0.975)) and, in these cases, a quasi-Poisson model was fitted. Models for which the p-value is marked with ^{*} were identified as having heteroscedastic residuals – thus, caution must be taken when interpreting these models. The R software environment (R version 3.2.4) was used for all hypothesis testing.

- For the statistical significance testing we looked at both a) the whole of NSW and b) with the Broken Hill Cluster excluded (the rest of NSW). As BH&FW is a very small proportion of the NSW population, the statistical testing did not show any differences if the region was excluded from the whole of NSW. For this reason, when reporting the statistical significance it may be reported as for all of NSW or for the rest of NSW.
- Data provided by NSW Health for BH&FW SA3 is a direct standardised rate per 100,000 population using quinquennial age groups up to an upper grouping of 65+.



Figure 1 Map of SA3 10502 Broken Hill and Far West

2 Summary of key findings relevant to the Maari Ma Chronic Disease Strategy

The analysis of trends in mortality and hospitalisations for Aboriginal people in BH&FW is constrained by the relatively small population and therefore small numbers of events.

- In BH&FW there is no clear evidence that the gap in mortality between Aboriginal and non-Aboriginal people is decreasing over the period 2006/07 to 2013/14.
- Hospitalisation rates from all causes for Aboriginal people increased in BH&FW at a similar rate to that for Aboriginal people in the rest of NSW. This increase for Aboriginal people contrasts with the declining trend for non-Aboriginal people in BH&FW and NSW overall. The rates for Aboriginal people are generally higher than for non-Aboriginal people in BH&FW and in the rest of NSW – as would be expected with a relatively high burden of disease.
- The increase in overall hospitalisations for Aboriginal people in BH&FW appears to be largely due to an increase in hospitalisations among Aboriginal males, with a relatively slight increasing trend for females.
- The increase in overall hospitalisations for Aboriginal people in BH&FW appears to be largely due to an increase in non-preventable hospitalisations.
- The increasing trend in potentially preventable hospitalisations overall for Aboriginal people in BH&FW and in the rest of NSW appears to be due to an increase in PPHs in the acute category rather than PPHs due to chronic conditions.
- On average, the rate of PPH for chronic conditions in BH&FW Aboriginal people was about 50 per cent higher than for Aboriginal people in NSW overall. PPH for chronic conditions of Aboriginal people in BH&FW are about twice that of non-Aboriginal people in the region.
- Aboriginal women in BH&FW have high rates of PPH for chronic conditions when compared with males (about 60–70% higher).
- PPH for chronic conditions is the category of hospitalisations that should, theoretically, be most sensitive to the impact of the Maari Ma Chronic Disease Strategy.
- Although there is a slight decline in PPHs due to chronic conditions in the BH&FW Aboriginal
 population, this trend is similar to that for PPH chronic conditions of Aboriginal people in the rest
 of NSW and for the non-Aboriginal population of BH&FW. The relative lack of increase in PPH for
 chronic conditions of Aboriginal people in BH&FW compared to other causes of hospitalisation,
 therefore, cannot be clearly attributed to the Chronic Disease Strategy.
- Analysis of trends in hospitalisations related to pregnancy, childbirth and puerperium, diseases
 of the circulatory system, mental and behavioural disorders, or alcohol-related hospitalisations
 for Aboriginal people in BH&FW does not provide evidence that the Strategy is having an effect
 on trends in hospitalisations for these conditions.
- The categories of hospitalisation that show the most notable increases include:
 - overall hospitalisations for males compared to females
 - potentially preventable hospitalisations for acute conditions⁶

⁶ This category of PPH includes: dehydration and gastroenteritis, pyelonephritis, perforated/bleeding ulcer, cellulitis, pelvic inflammatory disease, ear nose and throat infections, dental conditions, appendicitis with generalised peritonitis, convulsions and epilepsy, and gangrene.

- factors including health status and contact with health services
- smoking-attributable hospitalisations.
- There are diverging trends in low birthweight between Aboriginal and non-Aboriginal people in BH&FW, which contrasts with a converging trend between Aboriginal and non-Aboriginal people in all NSW. The level of low birthweight babies is approximately double that for non-Aboriginal mothers.
- There appears to have been an increase in smoking in pregnancy among Aboriginal mothers in BH&FW since 2001, in contrast to a decline among Aboriginal mothers in NSW overall. The level of smoking in pregnancy among Aboriginal mothers in BH&FW appears to be at least 50 per cent higher than for Aboriginal mothers in NSW overall in recent years, and more than 150 per cent higher than for non-Aboriginal mothers in BH&FW. It is likely that smoking in pregnancy is an important contributor to the increasing trend in low birthweight among Aboriginal mothers in BH&FW.

The analysis of trends in hospitalisation data shows little clear evidence that the Chronic Disease Strategy is having an impact on these trends. However, given the small numbers in the dataset, changes in Aboriginal identification over time and a variety of other competing influences on trends in hospitalisation, caution should be used in interpreting the results as evidence that the Strategy is not having an effect on hospitalisations.

3 All-cause mortality

There is no clear decreasing or increasing trend in all-cause mortality for Aboriginal people in BH&FW, or NSW overall (see Figure 2). There is wide year-to-year variation in BH&FW due to the relatively small size of the region's Aboriginal population (2,157⁷ compared to about 173,000 for NSW overall).

There is no clear evidence that the mortality gap between Aboriginal and non-Aboriginal people is decreasing over time.



Figure 2 All-cause mortality per 100,000 population, comparison by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2013

⁷ BH&FW population figure is based on 2011 ABS data provided by Maari Ma for the Statistical Local Areas of Broken Hill and Central Darling.

4 Hospitalisations

Hospitalisation rates for Aboriginal people are consistently higher than for non-Aboriginal people in BH&FW and for NSW overall in the period 2006–2007 to 2013–2014. The rates for Aboriginal people in BH&FW are consistently higher than for Aboriginal people in NSW overall (see Figure 3).

Hospitalisation rates for Aboriginal people increased $(p<0.001^+)^8$ in BH&FW between 2006 and 2014 (see Figure 3). The trend is similar (p = 0.300^+) to that for Aboriginal people in all of NSW, but significantly different (p < 0.001^+) to the trend for non-Aboriginal people in BH&FW, which shows no clear increase.

The increasing trend for Aboriginal people in the rest of NSW is also statistically different ($p < 0.001^{+*}$) to the trend for non-Aboriginal people in the rest of NSW, which shows relatively little increase.

The increase in overall hospitalisations for Aboriginal people in BH&FW appears to be due largely to a rise in hospitalisations among Aboriginal males, with a relatively slight increasing trend for females (see Figure 4) (p=0.0015 for males vs females). The trend among Aboriginal males is statistically different to that of non-Aboriginal males in BH&FW (p < 0.001^{+}), while the trend among Aboriginal females is not statistically different to that of non-Aboriginal females in BH&FW (p = 0.278^{+}). There is little difference in the levels and trends for all-cause hospitalisations between non-Aboriginal males and females.



Figure 3 Hospitalisations for all causes per 100,000 population, comparison by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

⁸ Models for which the p-value is marked with ⁺ were significantly over-dispersed (deviance > χ^2 (0.975)) and, in these cases, a quasi-Poisson model was fitted. Models for which the p-value is marked with ^{*} were identified as having heteroscedastic residuals – thus, caution must be taken when interpreting these models.



Figure 4 Hospitalisations for all causes per 100,000 population, comparison by gender and Aboriginality, Broken Hill & Far West SA3 (BH&FW), 2006–2014

5 Potentially preventable hospitalisations

Potentially preventable hospitalisations have been defined⁹ as those that could have been avoided with access to timely and effective health care (including disease prevention and population health initiatives). It is important to note that hospitalisations for potentially preventable conditions are not a direct measure of the effectiveness of primary health care. Rates of PPH will also be impacted by higher or lower prevalence of certain conditions in the community and by the characteristics of the local population such as Aboriginal status, age, gender, socioeconomic status and remoteness.¹⁰ PPH data at the BH&FW SA3 level were available for chronic conditions, acute medical conditions and all PPH (which includes vaccine-preventable conditions).

5.1 Potentially preventable hospitalisations – Total

Rates of PPH for Aboriginal people are consistently higher than for non-Aboriginal people in BH&FW and for NSW overall during the period 2006–2007 to 2013–2014. The rates for Aboriginal people in BH&FW are consistently higher than for Aboriginal people in NSW overall (see Figure 5).

There is a similar and slightly increasing trend in PPH for both BH&FW and the overall NSW Aboriginal populations (see Figure 5). This contrasts with an apparent slightly declining trend for BH&FW non-Aboriginal populations and little apparent change over time in PPH for NSW non-Aboriginal populations. The difference in the trend for Aboriginal people in BH&FW compared to that for non-Aboriginal people in BH&FW is of borderline statistical significance ($p = 0.057^+$). Comparisons of the trends for Aboriginal people in the rest of NSW (or all of NSW) with that for non-Aboriginal people in the rest of NSW (or all of NSW) with that for non-Aboriginal people in the rest of NSW (or all of NSW) are statistically significant ($p < 0.001^{+*}$), most likely due to larger numbers.

⁹ Australian Institute of Health and Welfare 2016, 'National Healthcare Agreement: PI 18 – Selected potentially preventable hospitalisations, 2013', METeOR Metadata Online Registry. Available at: http://meteor.aihw.gov.au/content/index.phtml/itemId/497224.

¹⁰ R. Katterl, O. Anikeeva, C. Butler, L. Brown, B. Smith & P. Bywood 2012, *Potentially Avoidable Hospitalisations in Australia: Causes for Hospitalisations and Primary Health Care Interventions*, PHC RIS Policy Issue Review, Primary Health Care Research & Information Service, Adelaide.



Figure 5 Potentially preventable hospitalisations: total, per 100,000 population, comparison by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

The degree of increase in PPH for Aboriginal people in BH&FW over the period 2006–2013 is approximately 10 per cent. This is markedly less than the degree of increase for all hospitalisations reflected in Figure 3 above, which shows an increase of approximately 40 per cent over the same period. The increase in all hospitalisations shown in Figure 3, therefore, appears to be largely due to a rise in nonpreventable hospitalisations.

The rates of PPHs are 70–80 per cent higher for Aboriginal females compared to males in BH&FW (see Figure 6). There is a slight increasing trend for all Aboriginal people in BH&FW, which is more marked for males than females (not statistically significant ($p = 0.747^{+*}$). There is no clear difference in rates of hospitalisation between non-Aboriginal males and females in BH&FW.



Figure 6 Potentially preventable hospitalisations: total, per 100,000 population, comparison by Aboriginality, gender, Broken Hill & Far West SA3 (BH&FW), 2006–2014

5.2 Potentially preventable hospitalisations – Chronic conditions

PPH chronic conditions include the following: asthma, congestive heart failure, diabetes complications, chronic obstructive pulmonary disease, angina, iron deficiency anaemia, hypertension, nutritional deficiencies and rheumatic heart disease. While these chronic conditions may be preventable through behaviour modification and lifestyle change, they can also theoretically be managed in a primary health care setting to prevent the condition worsening and requiring hospitalisation.¹¹

There is a slight declining trend (not statistically significant) in PPH chronic conditions for Aboriginal people in BH&FW (see Figure 7), with no apparent decline for Aboriginal people in NSW overall. The difference in trend for Aboriginal people between BH&FW and all of NSW is not statistically significant. However, the difference in trend for Aboriginal people in NSW compared to that for non-Aboriginal people in NSW is of borderline statistical significance (p = 0.054*+), with a slight declining trend for non-Aboriginal people.

On average PPH for chronic conditions in Aboriginal people from BH&FW were about 50 per cent higher than for Aboriginal people in NSW overall. But when compared to the average for non-Aboriginal people

¹¹ Z. Ansari 2007, 'The concept and usefulness of ambulatory care sensitive conditions as indicators of quality and access to primary care', *Australian Primary Health*, 13(3):91–110. Accessed 16 May 2016 at: <u>http://www.publish.csiro.au/?act=view_file&file_id=PY07043.pdf</u>.



in BH&FW, PPH for chronic conditions in Aboriginal people from BH&FW were about double, and three to four times higher than for NSW non-Aboriginal people overall.

Figure 7 Potentially preventable hospitalisation: chronic conditions per 100,000 population, comparison by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

Aboriginal women in BH&FW have high rates of PPH for chronic conditions when compared with males (about 60–70% higher) (see Figure 8).

There is a slight declining trend for both Aboriginal females and males in BH&FW (see Figure 8). There are no statistically significant differences in trends between Aboriginal females and males, between non-Aboriginal females and males, between Aboriginal females and non-Aboriginal females, or between Aboriginal males and non-Aboriginal males.



Figure 8 Potentially preventable hospitalisation: chronic conditions per 100,000 population, comparison by gender and Aboriginality, Broken Hill & Far West SA3 (BH&FW), 2006–2014

5.3 Potentially preventable hospitalisations – Acute conditions

PPH acute conditions include the following: dehydration and gastroenteritis, pyelonephritis, perforated/bleeding ulcer, cellulitis, pelvic inflammatory disease, ear nose and throat infections, dental conditions, appendicitis with generalised peritonitis, convulsions and epilepsy, and gangrene. These conditions may not be preventable although, in theory, if high-quality primary health care is received in a timely manner they should require fewer hospitalisations.¹²

There is a statistically significant increasing trend (p=0.0035) for PPH for acute conditions among Aboriginal people in BH&FW, and the increasing trend is similar to that for Aboriginal people in all of NSW (p = 0.73^+) (see Figure 9).

There is no clear evidence of an increasing or decreasing trend for non-Aboriginal people in BH&FW or in the rest of NSW. The trend for Aboriginal people in BH&FW is statistically different to the trend for non-Aboriginal people in the region (p=0.0052⁺), as is the trend for Aboriginal people in the rest of NSW compared to that for non-Aboriginal people (p < 0.001^{+}).

¹² ibid.

There is a higher level of PPH for acute conditions among Aboriginal people in BH&FW compared to Aboriginal people in NSW overall. The level in BH&FW for Aboriginal people is 2–3 times higher than for non-Aboriginal people in NSW.



Figure 9 Potentially preventable hospitalisation: acute conditions per 100,000 population, comparisons by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

Figure 10 below shows that Aboriginal females are more likely than males in BH&FW to be admitted for PPH for acute conditions. There is an increasing trend for Aboriginal males and females – about 50 per cent increase between 2006–2007 for males compared to about 25 per cent increase for females – but the difference in trend is not statistically significant (p=0.30). The trend for Aboriginal females is statistically different to that for non-Aboriginal females in BH&FW (p = 0.018⁺), but the trend for Aboriginal males is not statistically different to that for non-Aboriginal females in BH&FW (p = 0.018⁺), but the trend for Aboriginal males is not statistically different to that for non-Aboriginal males (p = 0.095⁺).



Figure 10 Potentially preventable hospitalisation: acute conditions per 100,000 population, comparisons by gender and Aboriginality, Broken Hill & Far West SA3 (BH&FW), 2006–2014

5.4 Summary assessment of the impact of the Maari Ma CDS on trends in PPH

Potentially preventable hospitalisation due to chronic conditions is the category of hospitalisation that is likely to be most sensitive to the impact of the Maari Ma Chronic Disease Strategy.

If the Strategy is impacting on hospitalisations for Aboriginal people, then we hypothesise that PPH chronic conditions for Aboriginal people in BH&FW will show a lower rate of increase than:

- 1. PPH acute conditions for Aboriginal people in BH&FW
- 2. All hospitalisations for Aboriginal people in BH&FW
- 3. PPH chronic conditions for Aboriginal people in the rest of NSW
- 4. PPH chronic conditions for non-Aboriginal people in BH&FW.

The following table shows that there are no statistically significant differences in the trend for PPH chronic conditions for Aboriginal people in BH&FW compared to the trends for any of the above four measures.

Table 1 Summary assessment of trends in PPH Chronic Conditions in relation to other causes of hospitalisation, 2006–2014

	General assessment of trends	Statistical significance
PPH chronic conditions for Aboriginal	No change/slight decline	No significant change over time;
people in BH&FW		p=0.767*†
PPH acute conditions for Aboriginal people	Increasing trend: ~2200 to ~3300	Not significantly different to PPH CC
in BH&FW		for Aboriginal people in BH&FW
		P=0.134 ⁺
All hospitalisations for Aboriginal people in	Increasing trend: ~40000 to ~70000	Not significantly different to PPH CC
BH&FW		for Aboriginal people in BH&FW
		P=0.185*†
PPH chronic conditions for Aboriginal	No change: ~2900 to ~3000	Not significantly different to PPH CC
people in the rest of NSW		for Aboriginal people in BH&FW
		P=0.911*†
PPH chronic conditions for non-Aboriginal	Decreasing trend: ~2000 to ~1800	Not significantly different to PPH CC
people in BH&FW		for Aboriginal people in BH&FW
		P=0.182 ⁺

It appears that the increase in PPHs overall is due primarily to an increase in the acute category rather than due to chronic conditions, although the difference in trends between these PPH categories in BH&FW is not statistically significant ($p = 0.134^+$). The difference in trends between PPH for chronic conditions and all other hospitalisations for Aboriginal people in BH&FW is also not statistically significant ($p = 0.185^{*+}$).

Figure 11 below shows the trend over time for all PPHs and for those due to acute conditions and to chronic conditions. This figure shows that, for Aboriginal people in BH&FW, PPH for chronic conditions are higher than for acute conditions. The third category of PPHs (not shown separately) is 'vaccine-preventable' conditions (including influenza and pneumonia). Data were not available at the BH&FW SA3 level due to small numbers, and it is clear that a very small proportion of all PPHs are due to conditions other than those in the chronic and acute categories.

Although the trend for PPHs for chronic conditions among Aboriginal people in BH&FW is not statistically different to that for acute conditions ($p = 0.134^+$), the corresponding comparison for the rest of NSW shows a statistically significant difference ($p < 0.001^+$) (data not shown). Similarly, while the trend for PPHs for chronic conditions among Aboriginal people in BH&FW is not statistically different to that for all other hospitalisations ($p = 0.185^{*+}$), the corresponding comparison for the rest of NSW shows a statistically significant difference ($p < 0.001^+$).

The slight decline in PPHs due to chronic conditions in the BH&FW Aboriginal population contrasts with trends both for other PPHs and for overall hospitalisations in this population. However, this trend is similar to that for PPH for chronic conditions among Aboriginal people in the rest of NSW and in the BH&FW non-Aboriginal population. The relative lack of increase in PPHs for chronic conditions among Aboriginal people in BH&FW compared to other causes of hospitalisation cannot be clearly attributed to the Strategy.



Figure 11 Potentially preventable hospitalisations for chronic conditions, acute conditions and total per 100,000 population, comparisons by Aboriginality, Broken Hill & Far West SA3 (BH&FW), 2006–2014

6 Causes of hospitalisations, by principal diagnosis

6.1 Hospitalisations – Overall

For Aboriginal people in BH&FW the most common reason for hospitalisation was for International Classification of Disease (ICD) Code Z (see Figure 12), which refers to 'factors including health status and contact with health services'. This ICD Code category can arise in two ways:

a) When a person who may or may not be sick encounters the health services for some specific purpose, such as to receive limited care or service for a current condition, to donate an organ or tissue, to receive prophylactic vaccination (immunisation), or to discuss a problem which is in itself not a disease or injury; b) When some circumstance or problem is present which influences the person's health status but is not in itself a current injury or illness.¹³

Many of the separations involve repeat admissions for the same people – for care such as dialysis.¹⁴

Separations for pregnancy-related conditions (most of which involve normal deliveries) (ICD Code, O) were the next leading cause of hospitalisation for Aboriginal people in BH&FW. There was relatively little difference between rates of hospitalisations for the rest of the ICD Codes, with 'injury, poisoning and certain other consequences of external causes' (including motor vehicle accidents, assaults, self-inflicted harm and falls) generally being the highest of these (see Figure 13).

¹³ MVP Health Care, *Factors Influencing health status and contact with health services*. Accessed on 17 February 2016 at: https://www.mvphealthcare.com/provider/documents/MVP_Health_Care_Chapter21_FactorsInfluencingHealthStatus_ContactHealthServices.pdf.

¹⁴ Australian Indigenous Health InfoNet 2015, 'Overview of Australian Indigenous health status, 2014'. Accessed on 17 February 2016 at: http://www.healthinfonet.ecu.edu.au/health-facts/overviews/hospitalisation.



Figure 12 Hospitalisations by principal diagnosis (ICD Codes), per 100,000 population, Aboriginal population of Broken Hill & Far West SA3 (BH&FW), 2006–2014

ICD Codes – Z: Factors influencing health status and contact with health services; S-T: Injury, poisoning and certain other consequences of external causes; O: Pregnancy, childbirth and the puerperium; K: Diseases of the digestive system; J: Diseases of the respiratory system; R: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; I: Diseases of the circulatory system; V: Mental and behavioural disorders.



Figure 13 Hospitalisations by principal diagnosis (Selected ICD Codes), per 100,000 population, Aboriginal population of Broken Hill & Far West SA3 (BH&FW), 2006–2014

ICD Codes – S-T: Injury, poisoning and certain other consequences of external causes; O: Pregnancy, childbirth and the puerperium; K: Diseases of the digestive system; J: Diseases of the respiratory system; R: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; I: Diseases of the circulatory system; V: Mental and behavioural disorders.

In comparison to non-Aboriginal people in BH&FW, 'Factors including health status and contact with health services' account for a considerably larger proportion of hospitalisations for Aboriginal people. For non-Aboriginal people in BH&FW, the leading causes of hospitalisation were separations for pregnancy-related conditions, which were followed by 'Factors including health status and contact with health services' and diseases of the digestive system (see Figures 14 and 15).



Figure 14 Hospitalisations by principal diagnosis (ICD Codes)15, per 100,000 population, non-Aboriginal population of Broken Hill & Far West SA3 (BH&FW), 2006–2014

ICD Codes – Z: Factors influencing health status and contact with health services; S-T: Injury, poisoning and certain other consequences of external causes; O: Pregnancy, childbirth and the puerperium; K: Diseases of the digestive system; J: Diseases of the respiratory system; R: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; I: Diseases of the circulatory system; V: Mental and behavioural disorders.



Figure 15 Hospitalisations by principal diagnosis (Selected ICD Codes), per 100,000 population, non-Aboriginal population of Broken Hill & Far West SA3 (BH&FW), 2006–2014

ICD Codes – S–T: Injury, poisoning and certain other consequences of external causes; O: Pregnancy, childbirth and the puerperium; K: Diseases of the digestive system; J: Diseases of the respiratory system; R: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; I: Diseases of the circulatory system; V: Mental and behavioural disorders.

6.2 Hospitalisations – Pregnancy, childbirth and puerperium

There is a slight increasing (but not statistically significant: p = 0.56) trend for hospitalisations related to pregnancy, childbirth and puerperium (ICD Code, O) for Aboriginal women in BH&FW (see Figure 16), a similar level and trend to that for Aboriginal people in NSW overall ($p = 0.816^{+}$). However, this trend for Aboriginal women contrasts with a declining trend for non-Aboriginal women in BH&FW (not statistically significant: p=0.29) and for NSW overall ($p = 0.0133^{+}$).

This analysis does not provide evidence that the Strategy is having an effect on hospitalisations related to pregnancy, childbirth and puerperium for Aboriginal people in BH&FW.



Figure 16 Hospitalisations by principal diagnosis: pregnancy, Childbirth and the Puerperium (ICD Code O) per 100,000 population, comparisons by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

6.3 Hospitalisations – Diseases of the circulatory system

Rates of hospitalisation for diseases of the circulatory system (ICD Code I) for Aboriginal people in BH&FW show wide variation from year to year, with no clear increasing or declining trend (p=0.45⁺) (see Figure 17). The general trend is similar to that for Aboriginal people in NSW overall, but the level in BH&FW is approximately 40 per cent higher on average. The trend for hospitalisations for diseases of the circulatory system (ICD Code I) among Aboriginal people in BH&FW is not statistically different to that:

- for injury, poisoning and certain other consequences of external causes (ICD Codes: S-T) among Aboriginal people in BH&FW (p = 0.877⁺);
- for diseases of the Circulatory System among non-Aboriginal people in BH&FW (p = 0.0915*†); or
- for diseases of the Circulatory System among Aboriginal people in the rest of NSW (p = 0.983⁺).

This analysis does not provide evidence that the Chronic Disease Strategy is having an effect on hospitalisations for diseases of the circulatory system (ICD Code I) among Aboriginal people in BH&FW.



Figure 17 Hospitalisations by principal diagnosis: diseases of the circulatory system (ICD Code I) per 100,000 population, comparisons by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

6.4 Hospitalisations – Mental and behavioural disorders

There is a marked declining trend in hospitalisation for mental and behavioural disorders for Aboriginal people in BH&FW (see Figure 18), which contrasts with a slight increase for Aboriginal people in NSW overall. The level of hospitalisations for Aboriginal people in BH&FW has been similar to that for Aboriginal people in NSW overall for the years 2009 to 2014. The level of hospitalisation for mental and behavioural disorders has been roughly twice the rate for non-Aboriginal people in BH&FW, which also shows a declining trend.

Rates of hospitalisation for mental and behavioural disorders (ICD Code V) show a statistically significant decline over time for Aboriginal people in BH&FW ($p < 0.001^{+}$). The trend for hospitalisations for mental and behavioural disorders among Aboriginal people in BH&FW is statistically different to the trend for hospitalisations for injury, poisoning and certain other consequences of external causes (ICD Codes: S-T) ($p = 0.000371^{+}$. It is also different to the trend for hospitalisations for mental and behavioural disorders among Aboriginal people in the rest of NSW ($p = 0.0113^{*+}$), but is not statistically different to the trend for hospitalisations for mental and behavioural disorders among Aboriginal people in the rest of NSW ($p = 0.0113^{*+}$), but is not statistically different to the trend for hospitalisations for mental and behavioural disorders among non-Aboriginal people in BH&FW ($p = 0.711^{+}$).

This analysis indicates that the declining trend in hospitalisations for mental and behavioural disorders for Aboriginal people in BH&FW may be due to processes of care or other factors within the BH&FW environment; the decline cannot be clearly attributed to the Strategy.



Figure 18 Hospitalisations by principal diagnosis: mental and behavioural disorders (ICD Code V) per 100,000 population, comparisons by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

7 Smoking-attributable hospitalisations

Tobacco smoking is a well-recognised risk factor for many diseases. Hospitalisations attributable to smoking for Aboriginal people in NSW have been approximately two times higher than for non-Aboriginal people since 2006–2007 (see Figure 19). The marked peak in 2012–2013 for Aboriginal people in BH&FW is most likely due to coding practices, as there is no clear increasing or decreasing trend over this period more generally.



Figure 19 Smoking attributable hospitalisations per 100,000 population, comparisons by Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

The apparent increasing trend in smoking-attributable hospitalisations among males in BH&FW (see Figure 20) is strongly influenced by the overall peak for BH&FW in 2012–2013 (see Figure 19). The likely influence of changes in coding practices makes it difficult to determine clearly any trends in these data.


Figure 20 Smoking attributable hospitalisations per 100,000 population, comparisons by gender, Aboriginality, NSW and Broken Hill & Far West SA3 (BH&FW), 2006–2014

8 Alcohol-attributable hospitalisations

There has been a decline in alcohol-attributable hospitalisations among Aboriginal people in BH&FW (see Figure 21), with the level 50–100 per cent higher on average than for Aboriginal people in NSW overall. This is, in turn, approximately 100 per cent higher than for non-Aboriginal people in BH&FW and NSW overall.

The declining trend for Aboriginal people in BH&FW is not statistically significant ($p = 0.109^+$). Nor is it statistically different to the trend for Aboriginal people in the rest of NSW ($p = 0.162^+$), for non-Aboriginal people in BH&FW ($p = 0.720^+$) or for non-Aboriginal people in the rest of NSW ($p = 0.071^+$).

The declining trend in alcohol-attributable hospitalisations is due to a decline among Aboriginal women (see Figure 22). The trend for males is strongly influenced by a peak in 2012–2013, a peak that may reflect a change in coding practices, which makes clear interpretation of trends difficult.

This analysis does not provide clear evidence that the Strategy is having an effect on alcohol-attributable hospitalisations for Aboriginal people in BH&FW.



Figure 21 Alcohol attributable hospitalisations per 100,000 population, comparisons by Aboriginality, Broken Hill & Far West SA3 (BH&FW), 2006–2014



Figure 22 Alcohol attributable hospitalisations by gender and Aboriginality, Broken Hill &Far West SA3 (BH&FW), 2006–2014

9 Age-specific hospital separations

9.1 Age-specific hospital separations – Diabetes separations

The increase in diabetes separations over the life-course occurs at a markedly different age for Aboriginal people than for non-Aboriginal people in BH&FW, with the most marked increase occurring between the ages of 25–40 years (see Figure 23).



Figure 23 Age-specific diabetes separations as a percentage of all diabetes separations, comparisons by Aboriginality for Broken Hill & Far West SA3 (BH&FW), 2011–2014

9.2 Age-specific hospital separations – Cardiovascular separations

The pattern of hospital separations for cardiovascular disease for Aboriginal people compared to non-Aboriginal people is similar to that for diabetes (see Figure 24).



Figure 24 Age-specific cardiovascular disease separations as a percentage of all cardiovascular separations, comparisons by Aboriginality for Broken Hill & Far West SA3 (BH&FW), 2011–2014

10 Low birthweight and smoking in pregnancy

There appears to have been an increase in low birthweight babies among Aboriginal mothers in BH&FW (see Figure 25), but this increasing trend is not statistically significant (p = 0.243). Neither is the trend significantly different to that of Aboriginal people in the rest of NSW (p = 0.0998). The increasing trend contrasts with an apparent decline in low birthweight babies for non-Aboriginal mothers in BH&FW, and this difference is statistically significant (p = 0.044).

The diverging trends between Aboriginal and non-Aboriginal women with low birthweight babies in BH&FW contrast with a statistically significant (p = 0.0026*) converging trend between Aboriginal and non-Aboriginal people in the rest of NSW. The level of low birthweight babies for Aboriginal mothers in BH&FW is approximately double that for non-Aboriginal mothers.

While these trends may be influenced by changes in identification of Aboriginal mothers and babies over time, and the difference between regions, the relative increase in low birthweight babies among Aboriginal mothers in BH&FW indicates this is an area requiring further attention.



Figure 25 Low birthweight (<2,500g) babies among Aboriginal and non-Aboriginal mothers, NSW and Broken Hill & Far West SA3 (BH&FW), 2001–2014

Smoking in pregnancy is widely recognised as a major cause of low birthweight among Aboriginal mothers.¹⁶ While there is wide year-to-year variation in the data, there appears to have been an increase in smoking during pregnancy among Aboriginal mothers in BH&FW. This is in contrast to the apparent decline among Aboriginal mothers in NSW overall. The level of smoking among Aboriginal mothers in BH&FW appears to be at least 50 per cent higher than in NSW overall in recent years, and more than 150 per cent higher than for non-Aboriginal mothers in BH&FW. It is likely that smoking in pregnancy is an

¹⁶ M. Scollo & M. Winstanley 2015, *Tobacco in Australia: Facts and Issues*, Cancer Council Victoria, Melbourne. Accessed on 17 February 2016 at: http://www.tobaccoinaustralia.org.au/.





Figure 26 Smoking in pregnancy among Aboriginal and non-Aboriginal mothers, NSW and Broken Hill & Far West SA3 (BH&FW), 2001–2014

Appendix C: Clinical indicator data

This Report on Clinical Indicator Data forms part of the Maari Ma evaluation of its Chronic Disease Strategy. The focus of the data in this report is from an agreed set of indicators identified in the evaluation framework.

In this Appendix we present data on the following areas of care:

- preventive health
- vascular and metabolic
- maternal health
- child health

Maari Ma has been participating in the Audit and Best Practice for Chronic Disease (ABCD) Continuous Quality Improvement (CQI) program for more than 10 years. We present de-identified trend data, where available, from Broken Hill Cluster health services. For Maari Ma there are a number of years where there are no data presented; these are years in which there was no ABCD auditing activity at Maari Ma.

As a basis for comparison we also present data from all health services participating in the ABCD National Research Partnership that conducted clinical audits over the period 2005–2014. These 'national data' include the data from Maari Ma.

The audit tools used have been developed by working groups made up of experts and health service staff. Designed to enable health services to assess their practice against best practice standards, each of the audit tools is accompanied by a protocol that includes reference to the guidelines and standards that form the basis of the tool. The tools and protocols are available on the One21seventy website¹⁷.

Where the eligible population for a clinical audit at a health centre is 30 clients or less, the One21seventy audit protocol recommends including all records. Where the eligible population is greater than 30, the protocol provides guidance on the random selection of a number of records, with the number depending on the precision of estimates required by health service staff. Refer to the training manual *Improving the Quality of Primary Health Care*¹⁸ for more information on sampling procedures. The criteria for inclusion in the audits are noted at the start of each section of this Report.

The data reflect what has been documented in electronic and paper-based client records, depending on the record systems used in each health centre. There has been a trend in recent years to increase the use of electronic records, but many health centres are still using paper-based systems and some a mix of paper and electronic systems. The quality of recording of clinical care is variable in both systems, and the audit data may not provide a true reflection of actual care. However, we have no way of collecting data or reporting on services that are not recorded. Accurate and clear recording of care is a crucial aspect of quality of care, with important implications for continuity and coordination of care, for medico-legal purposes and for efficient use of resources.

How to interpret 'box and whisker plots'

In assessing quality of care it is important to get an understanding of the variation in delivery of care in accordance with best practice guidelines. There may be variation in delivery between different aspects of

¹⁷ http://www.one21seventy.org.au/

¹⁸ J. Brands, J. Griffin & R. Bailie (eds) 2009, *Improving the Quality of Primary Health Care: A Training Manual for the One21seventy Cycle*, Menzies School of Health Research, Brisbane.

care, between health centres, as well as variation over time. 'Box and whisker plots' (or 'box plots') are a useful way of presenting data on variation in a graphical form.

In the analysis of the audit data, the mean (average) percentage delivery of items of clinical care relevant to each indicator is calculated for each health service. These mean percentages are displayed in a box plot for a given year to show the distribution or range in recorded delivery of care between health services. The following is an explanation on how to interpret box plots.

Box and whisker plots show (see Figure 1):

- Health services with the minimum and maximum mean percentage in recorded delivery of care in accordance with best practice guidelines (ends of whiskers show highest value if no outliers)
- Outliers health services that are far away from most others in the dataset (or a distance that is greater than 1.5 times the length of the box)
- The level of variation between health services in recorded delivery of care by dividing scores into quarters:
 - the box represents the middle 50 per cent of health services, and the line within the box represents the median (or middle health service)
 - the 'whisker' at the top of the box (and outliers if present) represents the top 25 per cent of health services
 - the 'whisker' at the bottom of the box (and outliers if present) represents the bottom 25 per cent of health services
 - the longer the box plot, the greater the range of care delivery (or variation) between health services.



In assessing data trends for indicators, it is helpful to focus on:

- a) the trend for the mean (average) and median (middle) values for health services in particular whether the mean and median are increasing, staying steady or decreasing; and
- b) the trend in the variation between health services in particular whether the variation is getting less (shorter boxes, shorter whiskers) and, importantly, whether there is an improvement in the values for the health services at the lower end of the range (higher level for the bottom end of whiskers under boxes).

11 Preventive health

11.1 Criteria for inclusion of records in the preventive health audit

To be eligible for inclusion in a preventive health clinical audit, a client must:

- be between 15 and up to 54 years
- have no diagnosis of diabetes, hypertension, coronary heart disease (CHD), chronic heart failure, rheumatic heart disease or chronic kidney disease
- not be pregnant or less than six weeks postpartum at the time of the audit
- have been resident in the community for six months or more in the last 12 months.

11.2 General Information

The data presented in this chapter are from health services that conducted preventive health audits in the Broken Hill Cluster and those participating in the ABCD National Research Partnership. A total of 1,015 client records between 2005 and 2015 were audited in the three health services of Menindee, Broken Hill and Wilcannia. The ABCD national comparison data is taken from 137 health services and 17,108 client records between 2005 and 2014. Seventy-nine per cent of the health services were located in remote locations and 73 per cent were government managed.

Location	Audit year									
	2005	2006	2007	2008	2009	2010	2011	2015	Total	
Menindee	30	30	30	30	30	80	80	19	329	
Broken Hill	30	30	30	30	50	77	80	30	357	
Wilcannia	30	30	30	30	30	74	75	30	329	
Total	90	90	90	90	110	231	235	79	1,015	

Table 1Preventive health audits completed in the Broken Hill Cluster health services between 2005 and 2015

11.3 Attendance at the health service

Time since a patient's last attendance at the health service is a useful indicator of the level of client engagement. Their attendance also encourages early detection, diagnosis and intervention for common and treatable conditions such as chronic diseases.

Table 2 Percentage attendance (for any reason) in last 24 months, Broken Hill Cluster health services, 2005–2015

	2005		2006		2007		2008		2009		2010		2011		2015		Total	
	n	%	n	%	n	%	n	%	Ν	%	n	%	n	%	n	%	n	%
Menindee	27	90	30	100	30	100	29	97	30	100	77	96	78	98	18	95	319	97
Broken Hill	21	70	22	73	22	73	27	90	38	76	54	70	56	70	30	100	270	76
Wilcannia	27	90	27	90	28	93	28	93	29	97	66	89	70	93	30	100	305	93

(Denominators based on sample numbers as per Table 1)



Figure 2 Percentage attendance (for any reason) in last 24 months, Broken Hill Cluster health services, 2005–2015

		20	05	20	06	20	07	20	08	200	9	201	0	201	1	20	15	Tota	al
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Menindee	Yes																		
	No	3	100					1	100			3	100	2	100	1	100	10	100
Broken Hill	Yes					4	50	1	33	2	17	2	9	7	29			16	18
	No	9	100	8	100	4	50	2	66	10	83	21	91	17	71			71	82
Wilcannia	Yes					2	100					1	12.5					3	12.5
	No	3	100	3	100			2	100	1	100	7	87.5	5	100			21	87.5

Table 3Record of unsuccessful follow-up attempt for client not seen within last 24 months, 2015–2015

Table 4Reason for last attendance, 2015

	Menind	ee	Broker	n Hill	Wilcan	nia
	n	%	n	%	n	%
Acute care	170	51.7	128	35.9	163	49.5
Mental Health	21	6.4	35	9.8	28	8.5
Immunisation	19	5.8	27	7.6	23	7.0
Sexual Health	15	4.6	23	6.4	10	3.0
Well person's check	12	3.6	12	3.4	12	3.6
Antenatal	1	0.3	4	1.1	1	0.3
Other	87	26.4	73	20.4	83	25.2
Client has not attended	4	1.2	55	15.4	9	2.7

11.4 Overall preventive health service delivery

Figure 3 shows trends in a composite indicator of overall service delivery to well clients in accordance with best practice guidelines. The composite indicator includes services such as physical checks, clinical examinations and brief interventions. Indicators that reflect follow-up actions for abnormal findings have not been included in the composite indicator as they relate to specific sub-groups of the client population



Figure 3 Overall adherence to preventive care to well clients, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Overall adherence to preventive care composite figure includes the following indicators: weight, waist circumference, BP, urinalysis, blood glucose level, sexually transmitted infections (gonorrhoea and chlamydia; syphilis), Pap smear, oral health, nutrition, physical activity, smoking and alcohol status recorded, brief intervention if smoker and/or high-risk alcohol user.

11.5 Health assessments



11.6 Risk factors

Tobacco use



Figure 5 Recording of smoking status in the last 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data



(n=number of health services; number of client records audited who attended in previous 24 months)

Figure 6 Percentage of clients recorded as smoking cigarettes in the last 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who had their smoking status recorded in previous 24 months)



Figure 7 Recording of brief intervention in the last 24 months for documented smokers, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who were documented as smokers in previous 24 months)

Alcohol use



Figure 8 Recording of alcohol use in the last 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data



Figure 9 Percentage of clients recorded as being high-risk alcohol users in the last 24 months, by audit year: Mean, median and range between health services, 2010–2015, Broken Hill Cluster and ABCD national data

(*n*=number of health services; number of client records audited who had alcohol use level recorded). Indicator for level of alcohol use added to preventive audit tool in August 2010.



users, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(*n*=*number of health services; number of client records audited who were documented as higher risk alcohol users in previous 24 months). Alcohol use referral indicator added to preventive audit tool in August 2010.*

Body Mass Index (BMI)



Figure 11 Recording of clients BMI in the last 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data





Figure 12 Percentage of clients recorded as overweight or obese in the last 24 months, by audit year: Mean, median and range between health services, 2011–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Clients are classified overweight/obese if BMI \geq 25 or if waist circumference is \geq 94cm (males), \geq 80cm (females). Recording of BMI and waist circumference values added to the audit tool in August 2010 and May 2013 respectively.



gure 13 Recording of brief interventions and referrals in the past 24 months for clients with BMI greater or equal to 25, or waist circumference indicating increased risk, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data.

(n=number of health services; number of client records audited with BMI greater or equal to 25, or waist circumference indicating increased risk). If audit date before 6/5/2013, graph shows recorded brief interventions/referral for BMI greater or equal to 25 only. At-risk waist circumference brief intervention and/or referral added in 2013. The brief intervention and referral for overweight/obese indicators were introduced to the preventive audit tool in August 2010.

Brief interventions for lifestyle risk factors



gure 14 Overall delivery of brief interventions in the last 24 months for lifestyle risk factors to clients, by audir year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Overall delivery of brief interventions composite indicator includes the following indicators: smoking and alcohol status recorded; brief intervention if smoker and/or high-risk alcohol drinker; brief intervention if overweight; and reproductive and sexual health discussion. Sexual health discussion was introduced to the preventive audit tool in August 2010.





Physical activity



median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months)

Cardiovascular risk





(n=number of health services; number of client records audited who attended in previous 24 months). Eligibility for CVR risk assessment is Indigenous and \geq 35 years of age. This indicator was included in the preventive audit tool in August 2010.

11.7 Scheduled services

Basic measurements

Figure 18 shows trends for overall delivery of basic measurements.



between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Overall delivery of basic measurements composite indicator includes the following: weight, BMI, waist circumference, BP, pulse rate, urinalysis, and blood glucose levels. Pulse rate was introduced August 2010.

Ear, eye, oral checks



Figure 19 is a composite indicator for delivery of eye, ear and oral checks.

Figure 19 Overall delivery of ear, eye and oral checks in the past 24 months, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in previous 24 months). Eye, ear and oral checks composite indicator includes: oral health check; ears and hearing assessment; and visual acuity. Oral health check introduced 2008; ears and hearing, and visual acuity introduced August 2010.



Figure 20 Delivery of oral checks in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

Laboratory tests

Figure 21 is a composite indicator for delivery of laboratory tests such as sexually transmitted infections, mammography and lipid profiles.



Figure 21 Overall delivery of laboratory tests in the past 24 months, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Laboratory tests composite indicator includes: sexually transmitted infection tests (gonorrhoea and chlamydia; syphilis), serum lipids, Pap smear, and mammography. Sexually transmitted infection tests and Pap smear tests were introduced to the preventive audit in 2008; lipid profiles and mammography introduced 2010.

Blood pressure



Figure 22 Recording of BP in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data



Figure 23 Percentage of clients who had a BP recorded as abnormal in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who had a BP test in previous 24 months). Abnormal BP is >=140/90.

Urinalysis



Figure 24 Recording of urinalysis in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data



Figure 25 Percentage of clients who had an abnormal urinalysis in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(*n*=number of health services; number of client records audited who had a urinalysis test in previous 24 months). A urinalysis is abnormal if there is 1+ or more protein indicated on the dipstick.



Blood glucose levels

Figure 26 Recording of blood glucose levels in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data



Figure 27 Percentage of clients with an abnormal blood glucose level recorded in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who had a BGL test in previous 24 months). A blood glucose level is abnormal if \geq 5.5mmol.

Lipid profile



Figure 28 Recording of lipid profile in the past 24 months, by audit year: Mean, median and range between health services, 2010–2015, Broken Hill Cluster and ABCD national data





(n=number of health services; number of client records audited who had a lipid profile in previous 24 months). Abnormal LDL >2.5mmol; HDL > 1.0mml; Triglycerides >1.5mmol. Lipid profile and abnormal lipid results were introduced to the preventive audit in August 2010.

11.8 Follow-up of abnormal findings

Figure 30 is a composite indicator showing when there is a record of follow-up if a client has an abnormal reading for indicators such as BP, lip profile and urinalysis.



Figure 30 Recording of follow-up of abnormal findings in the past 24 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Follow-up of abnormal findings composite indicator includes - follow-up for abnormal serum lipid profile, abnormal BP, abnormal blood glucose, protein on urinalysis. Lipid profile and abnormal lipid results were introduced to the preventive audit in August 2010.

11.9 Emotional wellbeing



Ye 31 Recording of screening for emotional wellbeing (using standard tool) in the past 24 months, by audit year: Mean, median and range between health services, 2010–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended in previous 24 months). Emotional and social wellbeing screening and follow-up indicators were introduced to the audit tool in August 2010. Examples of standard screening tools include Kessler 5, 6, 10, Client Health Questionnaire.

12 Maternal health

12.1 Criteria for inclusion of records in the maternal health audit

To be eligible for inclusion in a maternal health audit, a client must:

- have an infant between two and 14 months
- have been resident in the community for six months of the infant's gestation
- be expected to use the health service as her usual source of primary health care.

12.2 General information

The data presented in this chapter are from health services that conducted maternal health audits in Maari Ma – North (Wilcannia and Broken Hill), and those participating in the ABCD National Research Partnership. A total of 319 client records between 2007 and 2015 were audited in the health services of Wilcannia and Broken Hill. The ABCD national comparison data is from 91 health services and 4,402 client records from 2007–2014. Seventy-six per cent of the health services were located in remote locations and 69 per cent were government managed.

Location	Audit year									
	2007	2008	2009	2010	2011	2012	2013	2015	TOTAL	
Broken Hill	30	25	20	29	31	33	33	22	223	
Wilcannia	15	17	16	6	9	9	8	16	96	
Total	45	42	36	35	40	42	41	38	319	

Table 5	Maternal health audits completed at Maari Ma – North health services between 2005 and 2015
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12.3 Attendance at the health service



Figure 32 Record of antenatal and postnatal attendance (percentage of maternal health clients audited)

12.4 Overall maternal health service delivery

Figure 33 is a composite figure showing overall adherence to antenatal care guidelines.



Figure 33 Overall adherence to service delivery for antenatal care, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited). Overall adherence to service delivery for antenatal care composite indicator includes: \geq 7 antenatal visits, estimated gestational age \leq 13 weeks at first antenatal visit, BP (1st, 2nd and 3rd trimester), urinalysis (1st and 2nd trimester), BMI (1st trimester), fundal height (2nd and 3rd trimester), fetal movements (3rd trimester), blood glucose (2nd trimester), MSU, full blood examination, Syphilis serology, smoking status recorded (1st and 3rd trimester), drinking status recorded (1st and 3rd trimester), social risk assessment, emotional wellbeing assessment, discussion of plans for care and birthing, breastfeeding, domestic and social environment.

Figure 34 is a composite figure showing overall service delivery of antenatal counselling and education.



median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited). Antenatal counselling and education composite indicator includes: plans for care and birthing, antenatal education, breastfeeding, nutrition, physical activity, oral health, domestic social environment, and social family.



Figure 35 is a composite figure showing the overall service delivery of postnatal counselling.

Figure 35 Overall service delivery of postnatal counselling, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended for a postnatal visit). Postnatal Counselling Composite indicator includes: smoking, nutrition, breastfeeding, infection prevention, injury prevention, SIDS prevention, alcohol and other substance abuse, physical activity, mood depression, contraception, domestic social, social family support, financial situation, housing condition, food security.

12.5 General information

Birthweight

Table 6Birthweight (grams) of infants from index pregnancy if gestational age 36 weeks or more at birth
(number of infants, birthweight mean, standard deviation (sd) and range)

	Broke	en Hill				Wilcannia					
	n	mean	sd	min.	max.	n	mean	sd	min.	max.	
2007	29	3353.8	518.5	2180	4120	<5					
2008	25	3316.4	419.8	2520	4240	14	3224.6	621.5	1815	4610	
2009	15	3177.3	437.6	2280	4320	6	3098.7	235.6	2780	3360	
2010	22	3127.8	539.8	2120	4678	5	2914	416.5	2460	3470	
2011	22	3458.6	486.5	2720	4240	7	3051.4	280.7	2620	3320	
2012	26	3329.2	444.4	2380	4240	5	3200	393.4	2740	3700	
2013	29	3260.3	567	2340	4460	5	3195	221.1	2915	3515	
2015	19	3263.7	555.3	2300	4175	12	3130.8	450.5	2315	3760	

Note: we have not reported data for years where the number of deliveries is <5



Figure 36 Mean birthweight (grams) of infants from index pregnancy if gestational age 36 weeks or more at birth, Broken Hill and Wilcannia

Broken Hill Wilcannia n mean sd min. max. n mean sd min. max. 2007 <5 no observations 2008 3302.2 397.5 2959.6 1815 23 2520 4240 13 545.3 3660 2009 3092 537.9 5 3046.4 15 1960 4320 221.1 2780 3280 2010 <5 20 3043.7 432.6 2120 3660 2011 3285.6 669.0 1650 4240 6 3010 283.1 2620 25 3320 2012 3298.3 455.8 4240 5 2950 393.4 23 2380 2450 3460 2013 758 850 4460 6 2866.7 828.2 1225 3515 31 3114.4 2015 18 3270.3 570.7 2300 4175 13 3013.1 605.2 1600 3760

Table 7Birthweight (grams) for index pregnancy of Aboriginal infants (number of infants, birthweight mean,
standard deviation (sd) and range)



Figure 37 Mean birthweight (grams) for index pregnancy of Aboriginal infants, Broken Hill and Wilcannia

12.6 Attendance for antenatal care and routine supplements



Antenatal visits



(n=number of health services; number of client records audited)



Gestational age at first antenatal visit

(n=number of health services; number of client records audited). First antenatal visit is defined as the date the pregnancy is confirmed and first recorded in the woman's medical record.

Care plan



Figure 40 Recording of the presence of an antenatal care plan, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)

Routine supplements



Figure 41 Recording of folate prescription prior to conception, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)


Figure 42 Recording of folate prescription before 20 weeks pregnancy, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)



Figure 43 Recording of an iron prescription, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)

12.7 Record of pregnancy risk factors and brief interventions

Figure 44 is a composite indicator showing overall recording of risk factors such as smoking status and drug use.



between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(*n*=number of health services; number of client records audited). Risk Factors Composite Indicator includes: social risk, medical risk, smoking status recorded (1st and 3rd trimester) drinking status recorded (1st 3rd trimester), and drug use recorded (1stand 3rd trimester).

Smoking



igure 45 Percentage of women who smoked cigarettes during pregnancy, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(*n*=*number* of health services; number of client records audited for clients who had their smoking status recorded during pregnancy)



Figure 46 Recording of a brief intervention for women identified as smoking during pregnancy, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who were documented smokers during pregnancy)

Alcohol use



Figure 47 Percentage of women consuming alcohol during pregnancy, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(*n*=number of health services; number of client records audited for clients who had their alcohol use status recorded during pregnancy)



national data

(n=number of health services; number of client records audited with documented alcohol use during pregnancy)

Medical risks





(n=number of health services; number of client records audited)



Figure 50 Recording of follow-up for women with documented medical risk factors during pregnancy, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited with documented medical risk factors during pregnancy)

12.8 Emotional wellbeing screening and care



Figure 51 Recording of women assessed for emotional wellbeing, by audit year for all health services: Mean, median and range between health services, 2010–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)



Figure 52 Recording of any follow-up action for women whose emotional wellbeing assessed as being at risk, by audit year: Mean, median and range between health services, 2010–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited with recorded concern about their emotional wellbeing). Follow-up action includes brief interventions, counselling, cognitive behaviour therapy, medication prescription, referral to external services or any other action.

12.9 Routine antenatal checks and abnormal findings



services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited). Antenatal checks composite indicator includes: weight (1st trimester), BMI (1st trimester), BP (1st, 2nd, 3rd trimester), urinalysis (1st, 2nd trimester), fundal height (2nd, 3rd trimester), foetal heart rate (2nd, 3rd trimester)

12.10 Laboratory investigations



Figure 54 Overall delivery of laboratory tests for antenatal care, by audit year for all health services: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited). Laboratory tests composite indicator includes: blood group RH, antibodies, MSU, FBE, Rubella, HepBsAg, Syphilis Serology, HIV, glucose challenge/tolerance test FBE between 20–26weeks LVS between 34–37weeks.



Figure 55 Recording of blood group, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)



Figure 56 Recording of antibodies status, by audit year: Mean, median and range between health services, 2007– 2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)



Figure 57 Recording of mid-stream urine, by audit year: Mean, median and range between health services, 2007– 2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)



Figure 58 Recording of full blood examination, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited)



Mean health service documentation of full blood examination between 26 and 30 weeks, by audit year: Figure 59 Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended between 26 and 30 weeks of pregnancy)



Documentation of ultrasound before 16 weeks and between 19 and 21 weeks, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited who attended before 16 weeks or between 19 and 21 weeks of pregnancy)

12.11 Postnatal visit



Figure 61 Recording of postnatal visit, by audit year: Mean, median and range between health services, 2007– 2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of clients records audited)

13 Vascular and metabolic – Type 2 diabetes and coronary heart disease

13.1 Criteria for inclusion of records in the vascular and metabolic audit

To be eligible for inclusion in a vascular and metabolic audit, a client must:

- have a clear, documented diagnosis of the condition(s) being audited
- be 15 years or older
- have been a resident in the community for six months or more in the last 12 months.

If auditing for T2 diabetes care, clients are excluded if they have type 1 diabetes, gestational diabetes or nephropathy (excluded from this tool because of its link to type 1 diabetes and immunoglobulin A (IgA) nephropathy).

13.2 General information

The data presented in this chapter are from health services that conducted vascular and metabolic audits (diabetes and CHD) in the Broken Hill Cluster and those participating in the ABCD National Research Partnership. A total of 723 client records for diabetes and 263 for CHD) between 2005 and 2015 were audited in the three health services of Menindee, Broken Hill and Wilcannia. The ABCD national comparison data are from 137 health services and 17,108 client records from 2005–2014. Seventy-four per cent of the health services were located in remote locations and 75 per cent were government managed.

Location	2005	2006	2007	2008	2009		20	10	20	15	Total		
	T2D	T2D	T2D	T2D	T2D	CHD	T2D	CHD	T2D	CHD	T2D	CHD	
Menindee	30	30	30	30	30	14	38	30	34	14	222	58	
Broken Hill	30	30	30	30	30	31	53	42	54	45	257	118	
Wilcannia	30	30	30	30	30	25	43	29	51	33	244	87	
Total	90	90	90	90	90	70	134	101	139	92	723	263	

Table 8Vascular and metabolic audits (T2 diabetes and CHD) completed at Broken Hill Cluster health services
between 2005 and 2015

13.3 Attendance at health service

Table 9Percentage attendance (for any reason) in last 6 months at Broken Hill Cluster health services for clients
with T2 diabetes and CHD, 2005–2015

	2005		2006		2007		2008		2009		2010		2015		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Menindee	29	97	27	90	30	100	30	100	43	98	46	98	37	95	242	97
Broken Hill	27	90	28	93	28	93	25	83	47	81	61	82	69	93	285	87
Wilcannia	25	83	26	87	29	97	29	97	50	98	52	91	65	89	276	92

(Denominators based on sample numbers as per Table 8)



Figure 62 Percentage attendance (for any reason) in last 6 months at Broken Hill Cluster health services for clients with T2 diabetes and CHD, 2005–2015

Table 10Percentage attendance (for any reason) in last 12 months at Broken Hill Cluster health services for
clients with T2 diabetes and CHD, 2005–2015

	2005		2006		2007		2008		2009		2010		2015		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Menindee	29	97	29	97	30	100	30	100	44	100	47	100	39	100	248	99
Broken Hill	30	100	30	100	29	97	27	90	55	95	65	88	72	97	308	94
Wilcannia	29	97	27	90	30	100	29	97	51	100	55	96	70	96	291	97

(Denominators based on sample numbers as per Table 8)



Figure 63 Percentage attendance (for any reason) in last 12 months at Broken Hill Cluster health services for clients with T2 diabetes and CHD, 2005–2015

13.4 Scheduled services



Figure 64 Overall service delivery to T2 diabetes and CHD clients, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in previous 12 months). Composite indicators include: GP management plan, chronic disease management and medication discussion, influenza vaccination within last 12 months, pneumococcal vaccination, BP within last 6 months, smoking status and alcohol use recorded, brief intervention if smoker or high-risk alcohol user, weight, BMI and waist circumference recorded in last 6 months, nutrition and physical activity discussion within last 12 months, and albumin/creatinine ratio, estimated glomerular filtration rate, lipids and total cholesterol/HDL ratio within last 12 months. Additional indicators within T2 diabetes composite are: visual acuity, dilated eye check and foot check within last 12 months and HbA1c within last 6 months. Additional indicator within CHD composite is blood glucose level check within the last 12 months.



Figure 65 Recording of absolute cardiovascular risk assessment, by audit year: Mean, median and range between health services, 2012–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in previous 12 months). Absolute cardiovascular risk assessment was introduced to the vascular and metabolic audit tool in December 2011.

13.5 Management plans



Figure 66 Delivery of MBS 721 (or 723) GP Management Plans or alternative plans, by audit year: Mean, median and range between health services, 2009–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in previous 12 months)



Broken Hill Cluster and ABCD national data

⁽n=number of health services; number of client records audited for clients who attended in previous 12 months)



2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in previous 12 months)

13.6 Risk factors, brief intervention and referral

Tobacco and alcohol use



Broken Hill Cluster and ABCD national data

(n=number of health services; number of clients record audited for clients who attended in previous 12 months)



health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records that had smoking status recorded in previous 12 months)



services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client recorded as smoking in previous 12 months)



Broken Hill Cluster and ABCD national data

⁽n=number of health services; number of client records audited for clients who attended in previous 12 months)



between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited that had alcohol risk recorded in previous 12 months)



between health services, 2005–2015, Broken Hill Cluster and ABCD national data

⁽n=number of health services; number of client records with high-risk alcohol use documented in previous 12 months)

Body Mass Index



Figure 75 Recording of BMI, by audit year: Mean, median and range between health services, 2008–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in previous 12 months)





(n=number of health services; number of client records audited for clients who had a BMI check in previous 12 months)



13.7 Emotional wellbeing screening and care

Figure 77 Recording of an emotional wellbeing screen (using a standard tool) or discussion, by audit year: Mean, median and range between health services, 2009–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in the previous 12 months)

13.8 Investigations, results and medications



Blood pressure

Figure 78 Recording of BP within the last 12 months, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in the previous 12 months)



median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of clients who had a BP test in previous 12 months). Abnormal BP for a client with a chronic disease (except Chronic Kidney Disease) is 130/80 or higher.



and range between health services, 2008–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who had an abnormal BP documented in the previous 12 months). The indicator for documentation of a follow-up plan (within 2 to 4 weeks of an abnormal BP finding) was introduced to the vascular and metabolic audit tool in December 2007. Abnormal BP for a client with a chronic disease (except Chronic Kidney Disease) is 130/80 or higher.

ACR and eGFR



Figure 81 Record of an ACR, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in the previous 12 months)



Figure 82 Record of an eGFR, by audit year: Mean, median and range between health services, 2008–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in the previous 12 months)



median and range between health services, 2008–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of clients who had an eGFR check in the previous 12 months)

Total cholesterol/HDL ratio



Figure 84 Recording of full lipid profile, by audit year: Mean, median and range between health services, 2005– 2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in the previous 12 months)



Figure 85 Recording of total cholesterol, by audit year: Mean, median and range between health services, 2005– 2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who attended in the previous 12 months)




(n=number of health services; number of client records audited for clients who had a total cholesterol test in the previous 12 months). Abnormal total cholesterol/HDL ration >=4.5, if audit date is before 23/12/2011, abnormal total cholesterol is >=4.0mmol/L.



range between health services, 2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who had a documented abnormal total cholesterol test in the previous 12 months). Follow-up plan for abnormal cholesterol was introduced to the vascular and metabolic audit tool in December 2011.

HbA1c (glycosylated haemoglobin)



Figure 88 Recording of a HbA1c, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

⁽n=number of health services; number of client records audited for clients who attended in the previous 12 months)



Figure 89 Percentage of clients whose most recent HbA1c result was abnormal by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(*n*=number of health services; number of client records audited for clients who had an HbA1c test in the previous 12 months). Abnormal HbA1c is >7%.



result, by audit year: Mean, median and range between health services, 2005–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of client records audited for clients who had an abnormal Hba1c result in the previous 12 months). Follow-up plan indicator for abnormal HbA1c was introduced to the vascular and metabolic audit tool at the end of 2011.

14 Child health audit

14.1 Criteria for inclusion of records in the child health audit

To be eligible for inclusion in a child health audit, a child must:

- have been resident in the community for six months or more of the past 12 months (or if the child is <12 months old, resident in the community for at least half of the time since birth)
- have no major health anomaly such as Down Syndrome, cerebral palsy, heart defects or inherited disorders.

14.2 General information

The data presented in this chapter are from health services that conducted child health audits in Broken Hill Cluster (Broken Hill and Wilcannia) and those participating in the ABCD National Research Partnership. A total of 690 client records between 2007 and 2015 were audited in the two health services of Broken Hill and Wilcannia. The ABCD national comparison data is from 132 health services and 10,405 client records from 2005–2014. Eighty per cent of the health services were located in remote locations and 75 per cent were government managed.

Location	2007	2008	2009	2010	2011	2012	2013	2015	Total
Broken Hill	30	30	30	60	59	60	60	30	359
Wilcannia	30	30	29	46	63	54	51	28	331
Total	60	60	59	106	122	114	111	58	690

Table 11Child health audits completed between 2007 and 2015

14.3 Attendance at health service

Table 12 Child attendance within the last 12 months of the audit date

(Denominators based on sample numbers as per Table 11)

	200	7	2008	8	2009	Ð	201	D	2011	L	2012	2	2013	3	2015	5	Tota	I
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Broken Hill	29	97	24	80	24	80	49	82	53	90	57	95	60	100	30	100	326	91
Wilcannia	30	100	30	100	29	100	45	98	63	100	53	98	50	98	27	96	327	99



Figure 91 Child attendance within the last 12 months of the audit date



14.4 Overall child health service delivery

(*n*=*number* of health services; number of child records audited for clients who attended in the previous 12 months). Overall child health service delivery composite indicator includes: weight, height, head circumference, hip exam, testes check, ear exam, breastfeeding, nutrition advice, SIDS prevention, and developmental check.

14.5 Child health assessments



median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of child records audited for clients who attended in the previous 12 months)



14.6 Medical summary

health services, 2007–2015, Broken Hill Cluster and ABCD national data

(*n*=number of health services; number of child records audited). Health service medical summary composite indicator includes: the child being on a recall system, record of growth chart, immunisation chart and Medicare number.

14.7 Immunisation



Figure 95 Immunisation coverage for children under 5 years, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of child records audited)

14.8 Developmental milestones



Figure 96 Developmental milestones check for children under 6 years (prior to 2011) or under 4 years (2011 onwards), by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data



Figure 97 Children with developmental delay who had documented evidence of 1) referral, and 2) follow-up assessment, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data



14.9 Hearing and oral assessments

Figure 98 Children who in the last 12 months had a recorded a) hearing test, and b) oral examination (children greater than 6 months), by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data



14.10 Recording of ear examinations and chronic ear infections

ear infection, 3) follow-up ear exam, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

14.11 Brief interventions



Figure 100 Record of delivery of a brief intervention, by audit year: Mean, median and range between health services, 2007–2015, Broken Hill Cluster and ABCD national data

(n=number of health services; number of child records audited for clients who attended in the previous 12 months). Brief intervention composite indicator includes: discussion on breastfeeding, nutrition; SIDS prevention; passive smoking; oral health, injury prevention, domestic/social environment, social/family support, housing condition, physical and mental stimulation.

Appendix D: Comparison of trends for clinical indicators

This Appendix presents tables that show the relative performance based on the clinical indicator data presented in Appendix C, for the following areas:

- Preventive care
- Maternal care
- Chronic illness care
- Child health

For each of these areas of care the indicators for the Maari Ma data are categorised as follows:

- Consistently in the optimal range (e.g. 80% +)
- Improving trends
- No clear trend (but not consistently in the optimal range)
- Declining trend or consistently low (e.g. less than 30%)

For each indicator the Maari Ma data are also compared with the national ABCD data using the following colour coding:

Maari Ma data better than national	
Maari Ma data similar to national	
Maari Ma data not as good as national	

Our categorisation of trends, and the comparison with the ABCD national data, is based on a simple visual inspection of figures and not on any statistical analysis. National data are included to provide a benchmark for assessment – this should not necessarily be seen as a gold standard.

These tables are intended to assist with reflecting on and reviewing the quality of care provided by Maari Ma, as part of the evaluation of the Chronic Disease Strategy. Considerations for Maari Ma include:

- assessment of the relative importance of different indicators
- the extent to which the levels and trends shown in the data are an accurate and meaningful reflection of actual practice
- any action that may follow from assessment of these clinical indicator data.

Reflection on indicators that show relatively high levels of delivery of care or marked improvement may help to identify aspects of the service's organisation or systems that are working well, and could be useful in considering how to strengthen these and other areas of care.

Reflection on indicators that show relatively low levels of delivery of care or declining trends may help to identify priority areas for ongoing work, but it still may not be appropriate to apply the same level of priority to all areas of care. Feedback from Maari Ma on the above points has been incorporated into the final evaluation report.

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 Table 1
 Indicators of delivery of preventive care

		Comparison*
Fig.	Indicators that are consistently in optimal range (e.g. 80%+)	
	None	
	Indicators that show an improving trend	
4	Adult health check (MBS 715) or alternative adult health check in the last 24 months	
7	Recording of brief intervention in the last 24 months for documented smokers	
∞	Recording of alcohol use in the last 24 months	
10	Recording of a) brief intervention and b) referral in the last 24 months for documented higher risk alcohol users	
11	Recording of clients BMI in the last 24 months	
13	Recording of a brief intervention in the past 24 months for clients with BMI >= 25/waist circumference indicating increased risk	
14	Overall delivery of brief interventions in the last 24 months for lifestyle risk factors to clients	
15	Recording of a brief intervention regarding nutrition in the last 24 months	
16	Recording of a brief intervention regarding physical activity in the last 24 months	
21	Overall delivery of laboratory tests in the past 24 months	
28	Recording of lipid profile in the past 24 months	
	Indicators that show no clear trend (and that may not be consistently in optimal range)	
с	Overall adherence to preventive care to well clients	National improving
2	Recording of smoking status in the last 24 months	
18	Overall delivery of basic measurements in the past 24 months	
20	Delivery of oral checks in the past 24 months	
26	Recording of blood glucose levels in the past 24 months	
22	Recording of BP in the past 24 months	

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	Indicators that show a declining trend or that are consistently low (e.g., less than 30%)
13	Recording of referrals in the past 24 months for clients with BMI >= 25/waist circumference indicating increased risk
17	Recording of eligible clients with a documented cardiovascular risk (using a standard tool) in the last 24 months
19	Overall delivery of ear, eye and oral checks in the past 24 months
24	Recording of urinalysis in the past 24 months
30	Recording of follow-up of abnormal findings in the past 24 months
31	Recording of screening for emotional wellbeing (using standard tool) in the past 24 months
	RISK FACTORS: Indicators of prevalence of risk in the service population
9	Percentage of clients documented to be smokers: 55–80% in 2015, no clear trend
6	Percentage of clients documented to be high-risk alcohol users: 50–70% in 2015, no clear trend
12	Percentage of clients documented as having BMI >=25 or waist circumference in overweight/obese range: 40–75% in 2015, no clear trend
	INTERMEDIATE HEALTH OUTCOMES: Indicators of intermediate outcomes in the service population
23	Percentage of clients with a BP recorded as abnormal in the past 24 months: zero to 20% of clients in 2015, no clear trend
25	Percentage of clients with an abnormal urinalysis recorded in the past 24 months: zero to 50% of clients in 2015, no clear trend
27	Percentage of clients with an abnormal blood glucose level recorded in the past 24 months: around 30% in 2015, no clear trend
29	Percentage of clients with an abnormal lipid reading in the past 24 months: 80–95% in 2015, no clear trend
*Com	arison with national average – colour code: Maari Ma data better than national – green; Maari Ma data similar to national – amber; Maari Ma data not as good as national – red

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		Comparison*
Fig.	Indicators that are consistently in optimal range (e.g. 80%+)	
40	Antenatal care plan in clinical record	
49	Recording of medical risk factors assessment	
52	Recording of women assessed as being at risk of emotional wellbeing and with a record of follow-up	Maari Ma decline 2015
61	Recording of postnatal visit	
56	Recording of antibodies status	
	Indicators that show an improving trend	
33	Overall adherence to guidelines for antenatal care	
53	Overall delivery of routine antenatal checks	
35	Overall delivery of postnatal counselling	
38	Women attending for five or more antenatal visits	
42	Recording of folate prescription before 20 weeks of pregnancy	
43	Recording of an iron prescription	
46	Recording of a brief intervention for women identified as smoking during pregnancy	
48	Recording of women with documented alcohol use having received a brief intervention/counselling for alcohol use	
50	Recording of follow-up of documented medical risk factors during pregnancy	Maari Ma improve 2015
51	Recording of women assessed for emotional wellbeing	
54	Overall delivery of laboratory tests for antenatal care	
55	Recording of blood group	
58	Recording of full blood examination	
59	Mean health service documentation of full blood examination between 26 and 30 weeks	Maari Ma improve 2015
60	Documentation of ultrasound before a) 16 weeks & b) between 19 and 21 weeks	
	Indicators that show no clear trend (and that may not be consistently in optimal range)	
34	Overall recording of antenatal counselling and education	
39	Gestational age at first antenatal visit	
44	Overall recording of risk factor status for antenatal care	National improving

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57	Recording of mid-stream urine	Maari Ma decline 2015
	Indicators that show a declining trend or that are consistently low (e.g., less than 30%)	
41	Folate prescription prior to conception	
	RISK FACTORS: Indicators of prevalence of risk in the service population	
45	Percentage of women recorded to be smoking cigarettes during pregnancy: more than 65% in 2015, no clear trend	
47	Percentage of women recorded to be consuming alcohol during pregnancy: 20% in 2015, decline from 2011–2013	
	HEALTH OUTCOMES: Indicators of outcomes of antenatal care	
36,37	Mean birthweight: varies year to year between 2914g and 3458g, no clear trend over time	1
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Comparison with national average – colour code: Maari Ma data better than national – green; Maari Ma data similar to national – amber; Maari Ma data not as good as national – red

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Table 3 Indicators of delivery of chronic illness care (diabetes and CHD)

		Comparison *	
	Indicators that are consistently in optimal range (e.g. 80%+)		
69	Recording of tobacco use – diabetes and CHD: one MM service relatively lower		
78	Recording of blood pressure within the last 12 months – diabetes and CHD		
82	Record of an eGFR – diabetes and CHD: <i>note variation by centre for CHD</i>	Diabetes CHD	
88	Recording of a HbA1c – diabetes		
	Indicators that show an improving trend		
66	Delivery of MBS 721 (or 723) GPMP or alternative plans – CHD		
67	Recording of clinical goals – diabetes		
68	Recording of self-management goals – diabetes		
80	Recording of follow-up plan documentation for patients with abnormal BP – diabetes and CHD: <i>wide variation by centre</i>		
06	Recording of medication review or adjustment following an abnormal HbA1c result: note variation by centre		
	Indicators that show no clear trend (and that may not be consistently in optimal range)		
64	Overall service delivery – CHD		
66	Delivery of MBS 721 (or 723) GPMP or alternative plans – diabetes		
67	Recording of clinical goals – CHD		
68	Recording of self-management goals – CHD		
72	Recording of alcohol use – diabetes and CHD		
74	Delivery of brief interventions for high-risk alcohol use – diabetes and CHD		
77	Recording of an emotional wellbeing screen (using a standard tool) or discussion – diabetes and CHD	National improving for diabetes	
81	Record of an ACR – diabetes and CHD		
87	Recording of a follow-up plan for an abnormal cholesterol result – diabetes and CHD	Diabetes CHD	
		Page 12	5

06	Recording of a follow-up plan for abnormal HbA1c result	
	Indicators that show a declining trend or that are consistently low (e.g., less than 30%)	
64	Overall service delivery – diabetes	National shows improvement
65	Recording of absolute cardiovascular risk assessment – diabetes and CHD	
71	Delivery of brief interventions for smoking – diabetes and CHD	Diabetes CHD
75	Recording of BMI – diabetes and CHD	
84	Recording of full lipid profile – diabetes and CHD	
85	Recording of total cholesterol – diabetes and CHD	
	RISK FACTORS – Indicators of prevalence of risk in the service population	
70	Percentage of clients documented to be smokers – diabetes and CHD: around 50% in 2015	
73	Percentage of clients documented to be high-risk alcohol users: around 30% in 2015	
76	Percentage of clients documented as having BMI >=25 – diabetes and CHD: over 90% in 2015	
	INTERMEDIATE HEALTH OUTCOMES – Indicators of intermediate outcomes in the service population	
79	Percentage of clients with most recent BP recorded as abnormal: 40–50% of clients in 2015, declining trend	
83	Percentage of clients with most recent eGFR recorded as abnormal: zero to 25% of clients in 2015, no clear trend	
86	Percentage of clients with most recent cholesterol recorded as abnormal: 10–30% of clients in 2015, declining trend	
89	Percentage of clients with most recent HbA1c recorded as abnormal: 50–60% of clients in 2015, no clear trend	
*Con	narison with national average – colour code. Maari Ma data hetter than national – green. Maari Ma data similar to national – amber: Maari Ma data not as goor	t as national – red

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Table 4 Indicators of delivery of care for children

	CHILD HEALTH – Indicators of delivery of care for children	Comparison*
	Indicators that are consistently in optimal range (e.g. 80%+)	
66	Children with record of evidence of chronic ear infection who have record of follow-up ear exam – <i>note small numbers</i>	
	Indicators that show an improving trend	
92	Overall service delivery for child health	
93	Recording of child health check completed in the last 12 months (MBS 708/715)	
94	Health service medical summary documentation	
96	Developmental milestones check	
98	Children who have a recorded hearing test in the last 12 months	
98	Children who have a recorded oral examination in the last 12 months	
66	Children who had an ear exam recorded within the previous 12 months	
100	Overall recording of delivery of brief intervention/counselling re child health	
	Indicators that show no clear trend (and that may not be consistently in optimal range)	
95	Immunisation coverage for children under five years of age	
97	Children with developmental delay who had documented evidence of referral – <i>note small numbers</i>	
97	Children with developmental delay who had documented evidence of follow-up assessment – <i>note small numbers</i>	
	Indicators that show a declining trend or that are consistently low (e.g., less than 30%)	
	None	
	RISK FACTORS – Indicators of prevalence of risk in the service population	
	N/A	
	HEALTH OUTCOMES – Indicators of outcomes in the service population	
97	Children with record of evidence developmental delay	
66	Children with record of chronic ear infection	
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Comparison with national average – colour code: Maari Ma data better than national – green; Maari Ma data similar to national – amber; Maari Ma data not as good as national – red

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We undertook 36 individual interviews and seven group interviews. This represents 39 per cent of the total number of staff employed by Maari Ma (as at 23 March 2016).

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Table 1

Intervie	w method	Total
Groups		7 (32 individuals)
Individua	als:	36
•	face-to-face	17
•	over the phone	17
•	self-administered	2

Note: There were four individuals who participated in both a group and individual interviews. Some individuals were recontacted a number of times to clarify aspects of the interview – these have not been double counted.

Table 2 Interview categories

	Employmer	nt status		Position ca	tegories							Aboriginality
	Current	Former	Externally	Corporate	Team	Practice	GP /	Nurse/	Primary	Board	Allied	Identify as Aboriginal
	employee/	employee	employed		management	administration	Specialist	Midwife	Health	member	health	
	contracted								Worker			
Individual	23	6	4	13	7	0	11	2	0	0	3	4
Group	30	0	2	4	9	3	0	4	8	4	3	20

Note: There were four individuals who participated in both a group and individual interviews. Some individuals were recontacted a number of times to clarify aspects of the interview – these have not been double counted.

'Corporate': Corporate services staff, CEO, consultants, senior management

'Team management': program managers of teams

'Practice administration': administration, practice support teams

'Allied health': primary care specialist service team members, such as dietician, psychologist, social workers, tobacco action workers, oral health team, and pharmacist