



THE UNIVERSITY OF  
**NEWCASTLE**  
AUSTRALIA

## Chronic Care Service Enhancements Program Evaluation



### Summary Report

Report prepared by  
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## Abbreviations

|           |  |
|-----------|--|
| ACCHS(s)  | Aboriginal Community Controlled Health Services              |
| BMI       | Body Mass Index  |
| CAH       | Centre for Aboriginal Health                                 |
| CCSEP     | Chronic Care Service Enhancements Program                    |
| CReDDITSS | Clinical Research Design, IT and Statistical Support         |
| GP        | General practitioner   |
| MBS       | Medicare Benefits Scheme                                     |
| MD        | Medical Director   |
| MOU       | Memorandum of Understanding                                  |
| NACCHO    | National Aboriginal Community Controlled Health Organisation |
| NSW       | New South Wales  |
| PenCAT    | Pen Clinical Audit Tool                                      |
| RACGP     | Royal Australian College of General Practitioners            |

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# 1. What is the Chronic Care Service Enhancements Program (CCSEP)

The Chronic Care Service Enhancement Program (CCSEP) is a key project funded by the NSW Ministry of Health as part of the National Closing the Gap in Indigenous Health Outcomes ('Closing the Gap') initiative.

## 1.1 What led to the establishment of the CCSEP?

The significant health disparities between Aboriginal and non-Aboriginal Australians are well established. Aboriginal and Torres Strait Islander men and women have significantly shorter life expectancies and are more likely to die from chronic conditions, such as cardiovascular disease, kidney disease, chronic respiratory disease and diabetes, than non-Aboriginal people. ACCHSs play an important role in improving the health of Aboriginal people by providing culturally competent, holistic and comprehensive primary health care.

In 2010, NSW Health initiated Living Well: the NSW Aboriginal Health Chronic Care Initiative (the 'Living Well Initiative') as part of the Closing the Gap program. The CCSEP was one of the key projects funded through the Living Well Initiative.

## 1.2 What did the CCSEP hope to achieve?

The CCSEP aimed to:

- Improve access to, and uptake of, chronic care services by Aboriginal people with chronic disease in primary health care and Local Health District settings
- Enhance the capacity of services to deliver best-practice care for Aboriginal people with chronic disease
- Enhance planning and co-ordination of patient care within and between primary and secondary health services
- Improve the health outcomes of Aboriginal people with chronic disease.

## 1.3 What were the main components of CCSEP?

The CCSEP provided funding to existing ACCHSs to deliver and evaluate best-practice approaches to reduce the burden of chronic disease among Aboriginal people living in NSW.

An extensive collaborative process was undertaken to develop, implement and evaluate innovative strategies aimed at preventing and managing chronic disease among Aboriginal people. Technical guidance and support was provided by this collaborative group comprising participating ACCHSs in NSW, the NSW Ministry of Health, and a consortium of researchers led by the University of Newcastle.

Through the collaboration, participating ACCHSs identified four priority areas for evaluation: improving screening for chronic disease; improving diabetes management; improving data quality; and improving community reach of ACCHSs. ACCHSs selected a range of interventions for each priority area. Separate evaluation frameworks were then developed for each priority area, with individual ACCHSs choosing to participate in their priority area(s) of interest.

## 2. Why was an evaluation done?

A comprehensive and rigorous evaluation was developed subsequent to the provision of ACCHS funding which aimed to measure the impact of the CCSEP on health service delivery, improve health outcomes and contribute towards the development of evidence in Aboriginal health.

### 2.1 What did the CCSEP evaluation hope to achieve?

The CCSEP evaluation was designed to provide information to improve the health of Aboriginal people in NSW. The overall aims of the evaluation were to:

- Support ACCHSs' management and clinical staff to identify local priorities in chronic disease prevention and care
- Identify best-practice strategies based on current knowledge and experience
- Evaluate these strategies to develop evidence that is useful to ACCHSs, potentially with broader relevance to ACCHSs across NSW.

The evaluation sought to measure the effectiveness and acceptability of services delivered by ACCHSs to improve health systems in the delivery of chronic disease care, as well as measure improved health outcomes.

### 2.2 When did the CCSEP evaluation run?

Planning and development of the CCSEP evaluation began in December 2010 and continued up to August 2013. The implementation phase ran from September 2013 to December 2014.

### 2.3 Who was involved in the CCSEP evaluation?

Through an open competitive tender process, CAH (NSW Ministry of Health) commissioned a consortium of researchers led by the University of Newcastle to undertake the CCSEP evaluation. ACCHSs that secured CCSEP funding agreed to participate in the evaluation.

### 2.4 How many ACCHSs participated?

Seven ACCHSs worked in partnership with CAH and the University of Newcastle led Evaluation Team to design, implement and evaluate a range of strategies seeking to improve service delivery and health outcomes.



### 3.

## How did collaborative partners work together during the evaluation?

To ensure Aboriginal community control in the evaluation, key governance principles were followed as described by the *Aboriginal Health & Medical Research Council (AH&MRC) of NSW Guidelines for Research into Aboriginal Health (2009)* and the *National Health and Medical Research Council (NHMRC) Values and Ethics: Guidelines for Ethical Conduct in Aboriginal and Torres Islander Health Research (2003)*. A Data Governance Protocol was established for the evaluation that adhered to the *NSW Aboriginal Health Information Guidelines (1999)*.

A Memorandum of Understanding (MOU) was also established to formally outline the roles of participating ACCHSs and the University of Newcastle. The MOU ensured that the CCSEP evaluation was run as an effective collaboration that served the interests of ACCHSs.

The evaluation framework was developed and implemented through an extensive consultation and collaborative process. ACCHSs worked in partnership with CAH and the University of Newcastle led consortium to design, implement and evaluate a range of strategies seeking to improve service delivery and health outcomes.

### 3.1 How was an effective collaboration established?

A stepped approach to collaboration was employed. In the early phases of the evaluation, collaboration occurred in a larger group with representatives from all participating ACCHSs, CAH and the University of Newcastle Evaluation Team. As the evaluation progressed, collaboration funneled down to the smaller groups involved in each evaluation component, and finally to individual ACCHSs to ensure the specific needs and capacities of each were being supported.

#### Evaluation planning and development phases

**Step 1: Workshops.** To facilitate collaboration among the CCSEP partners in planning processes, a series of workshops were conducted during 2011 and 2012 in which all aspects of the CCSEP and its evaluation were addressed in an open forum. The workshops were vital for developing shared views about which items to measure as part of the evaluation. This process also provided ACCHSs with the opportunity to collaborate whilst still maintaining autonomy, as each ACCHS was able to select which priority areas to participate in. There was good engagement from representatives from all participating ACCHSs despite initial uncertainty about the degree of collaboration that would be achieved.

**Step 2: Small working groups.** Throughout the series of workshops, the Evaluation Team drafted an evaluation framework which was iteratively developed and refined to reflect ACCHSs' preferences for the evaluation. Following the development of the evaluation framework, small working groups, which included representatives from participating ACCHSs and the Evaluation Team, were established to oversee the development and implementation of each intervention. These groups provided opportunities for participants to review intervention plans, resolve any outstanding issues from the workshops, prepare ACCHSs for implementation and allow ACCHSs to identify any support needs for their participation.

**Step 3: Feedback from ACCHSs.** To assist with implementation, written materials outlining the agreed interventions and implementation plans were distributed to ACCHSs prior to commencing data collection. The Evaluation Team made follow-up phone calls to each ACCHS to obtain feedback, with all ACCHSs indicating

their approval for the implementation plans as presented.

Mock data analyses were presented to ACCHSs for feedback and help establish a useful format for presenting analyses. The first ACCHSs to start the implementation provided practical feedback that was used to prepare implementation plans for subsequent ACCHSs.

## Implementation phase

**Step 4: Shared experiences.** ACCHS representatives valued the process of sharing experiences among ACCHSs and collective problem solving. Therefore, this aspect of collaboration was integrated into the implementation phases for any ACCHSs wishing to continue sharing ideas and experiences about the practical aspects of implementing the approved strategies.

**Step 5: Working with individual ACCHSs.** The Evaluation Team worked with individual ACCHSs to address the specific needs of each ACCHS and support implementation of the interventions. The practical needs and circumstances of each ACCHS were discussed, with implementation plans arranged to be flexible in relation to time-frames, how the evaluation of each priority area would interact, and various other site-specific issues. Working with individual ACCHSs provided the opportunity for ACCHSs to adapt implementation plans to meet their specific needs.

**Step 6: Feedback to ACCHSs.** Throughout the implementation phase, the Evaluation Team conducted regular analyses and provided site-specific feedback to ACCHSs. Each ACCHS was able to identify its own areas for potential improvement and guide training towards addressing these specific areas.

Practical feedback was also sought from ACCHSs about their experience of implementing the various enhancement strategies. This was imperative in helping prepare subsequent ACCHSs for commencement, establishing expectations of staff, and making slight alterations to the instructions provided.

## 3.2 Why was the collaboration effective?

A number of fundamental principles underpinning the evaluation were discussed and agreed to by all ACCHSs through the collaborative workshops and teleconferences. These included a need for:

- Improved health and delivery of services
- Collaborative and consultative processes
- Respect for management of data and information
- Building capacity within ACCHSs
- Methodological rigor to provide the best evidence
- Efficient data collection methods
- Cultural and ethical soundness.

## 3.3 Were there any challenges to the collaborative process?

Several challenges and limitations were experienced during the planning and development phase.

**Developing shared views takes time.** The four workshops proved vital for the consultation process and developing shared views about the evaluation components, intervention strategies and

Measured outcomes. However, the time and resources needed to enable such collaboration were significant.

**Complexity of clinical guidelines.** The clinical guidelines in relation to standards of care for Aboriginal people lack consensus and understanding. This lack of clarity complicated efforts to gain agreement about which

items the evaluation should target and how they should be measured, which prolonged the process of evaluation development.

**Ethics delays.** The time taken to gain ethics approval took considerably longer than anticipated due to extended discussions to resolve agreement on partners listed for the purposes of the application. This significantly delayed the evaluation and affected the collaborative momentum of the study.

**Timing of resource provision.** Given the delays that occurred during the development stages, ACCHSs were utilising enhancement funds for a significant period prior to the commencement of the evaluation. This meant that some of the agreed interventions were implemented prior to evaluation, which limited the extent to which the CCSEP could be rigorously evaluated.

**Staff turnover.** Numerous changes to key staff at ACCHSs occurred throughout the evaluation, creating challenges for ongoing collaboration, implementation of strategies and data collection.

**Formal communication frameworks.** Whilst emails, phone calls, teleconferences and videoconferences occurred throughout the study, there was a lack of consistency of formal communication channels to inform the wider group of progress. Initiatives such as a Webpage and a regular newsletter were either not introduced or not maintained as originally planned.

## Key learnings

- An extensive collaboration process is essential for engagement and effective participation of ACCHSs in research
- Culturally appropriate activities and respect for data management are fundamental aspects of health services research in Aboriginal health
- Effective collaboration underpins methodological rigor and data collection
- Opportunities for feedback from ACCHSs throughout the evaluation help to consolidate and refine the study design
- Challenges and limitations during planning and development, such as ethics delays and timing of resource provision, need to be accounted for in study design
- Staff turnover can significantly impact the collaborative process
- Formalised communication frameworks (e.g. newsletters) would help maximise the collaborative process and efficiency of the evaluation.

## 4.

### What local priority areas did ACCHSs identify?

As a result of the collaborative process, ACCHSs identified four key areas for the evaluation.

- Improving preventive health screening by increasing the number of patients who have Aboriginal Health Assessments (Medicare item 715) and screening for diabetes in line with evidence-based guidelines [Screening]
- Improving management of diabetes by improving the number of diabetic patients who are managed according to best-practice guidelines [Diabetes Management]
- Improving data quality by improving the recording of health information in patient information management systems in order to increase the accuracy of service level data for quality improvement processes [Data Quality]
- Improving the reach of ACCHSs by increasing the number of Aboriginal people who a) access the service for the first time; and b) re-engage with the service after a period of non-attendance [Reach]

#### 4.1 Screening

Chronic diseases such as cardiovascular disease, diabetes, and chronic kidney disease are among the most significant contributors to the poor health experienced by Aboriginal Australians. Improving screening and early detection of chronic disease is important for improving the health of Aboriginal people.

The Screening component aimed to examine the effectiveness of an **'organisational change'** strategy for increasing preventive health screening among patients by:

- Increasing the number of clients who have a Health Assessment for Aboriginal and Torres Strait Islander People (Medical Benefits Scheme (MBS) item 715).
- Increasing the number of clients who are appropriately screened in line with evidence-based guidelines for diabetes.

#### 4.2 Diabetes Management

Diabetes is an important cause of coronary heart disease and renal failure in Aboriginal people, contributing to the 17-year life expectancy gap between Aboriginal and non-Aboriginal Australians.

The Management component aimed to examine the effectiveness of an **'enhanced care'** strategy to improve diabetes management for ACCHS clients according to best-practice guidelines by examining the number of Aboriginal patients with confirmed diabetes who:

- Had a General Practitioner (GP) Management plan developed and updated annually.
- Received the complete annual cycle of care recommended in the Royal Australian College of General Practitioners (RACGP) guidelines.
- Had clinical indicators within the target ranges recommended in the RACGP guidelines.

### 4.3 Data Quality

Many of the outcomes to be explored in the evaluation rely on data recorded in MD and extracted via PenCAT. ACCHSs experience suggests that PenCAT might under-report the true activities of a service. The Data Quality component therefore aimed to:

- Establish the accuracy of the data extracted from PenCAT at each participating ACCHS.
- Identify which aspects of data recording can be improved at each service
- Implement training if needed to ensure recording of data is as accurate as possible.

### 4.4 Reach

Access to the culturally appropriate and effective health services provided by ACCHSs is a critical contributor to improving the health of Aboriginal Australians in at least two ways: preventing the development of disease risk factors in Aboriginal communities; and providing ongoing monitoring and management of existing patients. ACCHSs currently implement strategies aimed at increasing access to their services by engaging and screening people in the community and by monitoring and following up their existing patients. The effectiveness of these strategies, however, is yet to be quantified. This knowledge gap makes it difficult to recommend to ACCHSs the most cost-effective strategies for increasing access to their services. The Reach component therefore aimed to:

- Assess the effectiveness of strategies to improve access to ACCHSs by people in the community
- Re-engage patients who have not been to the ACCHS more than twice in the last 24 months.

### 4.5 How many ACCHSs participated in each priority area?

Of the seven participating ACCHSs, five participated in the Screening component, six participated in the Diabetes Management component and four participated in the Data Quality component of the CCSEP evaluation.

### 4.6 What happened with the Reach priority area?

Three ACCHSs originally opted to participate in the Reach component. Planning for implementation was underway when each ACCHS independently elected to withdraw prior to commencement, resulting in the abandonment of the Reach component.

ACCHSs withdrew for site-specific reasons. One ACCHS indicated that it was functioning near capacity and that attracting additional patients was no longer a priority. Another ACCHS indicated that it already had an outreach program aimed at increasing patient attendance, and the ACCHS preferred to focus on those efforts rather than implementing additional activities related to Reach. Given that a multi-site evaluation was no longer possible, the third ACCHS also elected not to proceed. Despite withdrawing from Reach, the three ACCHSs participated in other priority areas of the evaluation.

## 5. What were the interventions?

The CCSEP evaluation provided a framework to measure the impact of the CCSEP on health service delivery, improve health outcomes and contribute towards the development of evidence in Aboriginal health.

### 5.1 What examples of organisational change interventions were implemented to improve screening and diabetes management care?

Strategies to support preventive screening and standardised diabetes management were integrated into usual care for all clients. These included:

| Intervention                   | Screening   | Diabetes Management  |
|--------------------------------|---|--|
| <b>Staff training</b>          | Training on requirements for preventive health screening (in line with the NACCHO guidelines) and entering information into Medical Director (MD)   | Training in diabetes care according to RACGP guidelines, including the annual cycle of care requirements   |
| <b>Standardised care</b>       | Health Assessments for every client: Care for adult patients was administered with a <b>health assessment template</b>  | Staff received training in completing the <b>diabetes assessment template</b> in Medical Director (MD) (or Communicare) to ensure all required fields were populated with data |
| <b>Recall/Reminder systems</b> | A reminder system within MD or Communicare was used that flags records of patients who require preventive screening   | Staff members were trained in the development and maintenance of a Diabetes Register for the purpose of contacting patients to come in for an appointment as necessary         |
| <b>Audit and feedback</b>      | ACCHSs were provided with updated data analyses and summary feedback from the Evaluation Team in relation to performance and set goals  |  |
| <b>Problem solving</b>         | ACCHSs were encouraged to consult with each other about practical steps their clinical service was taking to achieve set targets, or to provide advice about successful strategies that had been used to increase adherence |  |

### 5.2 What steps were implemented to improve data quality?

Aboriginal health workers, chronic care coordinators, nurses and administrative staff carried out tasks for the Data Quality component which typically were shared among different staff members.

Each ACCHS provided de-identified unit record data for **30 patients** on the following:

- **Touchscreen survey** of patient self-reported behaviours (e.g. smoking, nutrition) and recall of whether health care has been received (e.g. most recent screening tests and care plans).
- **Extract from medical record** all information relevant to the evaluation (e.g. diabetes diagnosis and related tests) from all fields within MD where such information could potentially be recorded – including notes
- **Extract from PenCAT** all relevant information relating to the evaluation.

The evaluation team analysed data and discussed the analysis with each ACCHS to identify areas for improvement in data quality.

### 5.3 How were the interventions implemented?

A multiple baseline design was implemented for the Screening and Diabetes Management components.

**What is a multiple baseline design?** Interventions were implemented using a multiple baseline design. In a multiple baseline design, interventions are implemented in a phased approach to multiple ACCHSs at different times; each participating ACCHS receives the interventions, but at different times. Due to time constraints, services were paired, with the implementation of interventions for each pair staggered over 3 months (see Figure 5.1).

**Why choose a multiple baseline design?** The multiple baseline design overcomes many of the disadvantages inherent in randomised controlled trials, and ensures that all groups have equal opportunity for achieving treatment changes – which was crucial for ACCHSs participating in the CCSEP. The multiple baseline approach acknowledges that there are significant differences in the populations, staff numbers and expertise within each ACCHS. As a consequence, the design allows individual clinical services to be treated as a single case. This approach increases the likelihood that any detected improvement in outcomes is due to the intervention, rather than some other factor.

**How was the multiple baseline approach utilised in this program?** Given the difficulties in getting change to occur in clinical practice, the intervention components were introduced in close succession, thereby consolidating the interventions in an effort to get a clinically significant treatment effect. Given the evaluation time limitations, it was not feasible to examine the contribution that each intervention component made towards achieving any found treatment effect. Instead, it was hoped that a synergistic effect would occur with all components producing desired clinical changes.

|              | 2013                                 |     |               |     |               | 2014 |               |     |     |     |     |     |     |     |     |     |     |
|--------------|--------------------------------------|-----|---------------|-----|---------------|------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|              | Mar-Aug                              | Sep | Oct           | Nov | Dec           | Jan  | Feb           | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|              | Continuous Data Collection (Monthly) |     |               |     |               |      |               |     |     |     |     |     |     |     |     |     |     |
| ACCHSs 1 & 2 | BASELINE                             |     | INTERVENTIONS |     |               |      |               |     |     |     |     |     |     |     |     |     |     |
| ACCHSs 3 & 4 | BASELINE                             |     |               |     | INTERVENTIONS |      |               |     |     |     |     |     |     |     |     |     |     |
| ACCHS 5      | BASELINE                             |     |               |     |               |      | INTERVENTIONS |     |     |     |     |     |     |     |     |     |     |

FIGURE 5.1: MULTIPLE BASELINE IMPLEMENTATION OF INTERVENTIONS (SCREENING AS EXAMPLE)

### 5.4 What organisational support for change was provided to ACCHSs?

The Evaluation Team worked closely with individual ACCHSs to:

- Address the specific needs of each ACCHS and support implementation of the interventions
- Provide regular site-specific feedback to ACCHSs about the analyses and summary feedback in relation to performance and set goals
- Encourage ACCHSs to consult with each other about practical steps their ACCHSs are taking to achieve set targets, or provide advice about successful strategies that had been used to increase adherence.

Systems were implemented within ACCHSs to help ensure that staff were supported to integrate the interventions into usual care for all clients. These included:

- Staff training including data entry into clinical software systems (e.g. Medical Director (MD), Communicare)
- Development of a tailored software system (PenCAT) to facilitate data collection of outcome measures across all evaluation components. ACCHSs were able to extract relevant data from existing clinical software systems that was stored at each service and subsequently emailed to the Evaluation Team as needed.
- Communication systems established to allow problem solving between matched sites
- Setting up, or updating, a reminder system in MD to support opportunistic screening
- Developing and maintaining a Diabetes Register and recall/reminder system
- Evaluation team members working with staff from each ACCHS to provide updated data analyses and summary feedback for each evaluation component.

## Key learnings

- **Robust methodological research design is feasible as part of health services research in Aboriginal health**
- **System variation across ACCHSs can be managed through flexible interventions and implementation plans**
- **Clinical software systems offer mechanisms to improve clinical delivery if appropriately implemented and relevant training made available**



## 6. What was the analysis approach?

Statistical analysis for both the Screening and Diabetes Management priority areas was undertaken by CReDDITSS, Hunter Medical Research Institute.

### 6.1 What were the main outcome measures?

Relevant patient records were identified and extracted from patient information management systems using PenCAT. The analysis assessed the impact of the interventions on outcomes which reflected National Aboriginal Community Controlled Health Organisation (NACCHO)/RACGP best-practice recommendations for Aboriginal people.

#### Screening priority area

For the Screening priority area, outcomes were recorded monthly throughout the CCSEP Evaluation at each ACCHS:

**Aboriginal Health Assessment (Medicare Item 715).** The proportion of active Aboriginal patients at least 15 years of age with an up-to-date Adult Aboriginal Health Assessment (Medicare Item 715) (i.e. recorded within the last 12 months).

- In patients aged 15-54 years
- In patients aged 55+ years.

**Screening for diabetes.** The proportion of active Aboriginal patients at least 15 years of age with up-to-date diabetes screening tests (i.e. recorded within the last 12 months) using:

- Random blood glucose
- Fasting blood glucose.

#### Diabetes Management priority area

For the Management priority area, outcomes were recorded monthly throughout the CCSEP evaluation at each ACCHS.

**Management of diabetes.** The proportion of active Aboriginal diabetes patients with up-to-date recordings of:

- GP Management Plan (Medicare item 721)
- Completion of the minimum requirements of an annual cycle of care (Medicare items 2517, 2521 or 2525).

**Control of diabetes:** The proportion of active Aboriginal diabetes patients with HbA1c results in the goal range of <7%.

#### Data Quality priority area

The tailored software for the Data Quality priority area enabled individual patient reports to be generated from

PenCAT. These reports indicated whether specific health check items had been recorded and the date they were recorded. The list included a host of general screening items related to chronic disease, as well as items specifically related to the treatment of diabetes. The following items were recorded for data quality:

- Diabetes care plan (date last recorded)
- Health Assessment (date last occurred)
- Tests: blood pressure, blood glucose, total cholesterol, HDL, LDL, triglycerides, microalbuminuria, HbA1c (whether occurred in last 12 months)
- Other screening: Body Mass Index (BMI), weight and height, waist circumference, smoking status, physical activity, alcohol intake (whether assessed in last 12 months and status for smoking [never/ex/smoker] and alcohol intake [non/drinker]). Status for smoking and alcohol intake was only recorded for patient self-report and MD; PenCAT does not record status but only whether they have been assessed (yes/no)
- Diabetes Management items: test items listed above, plus whether eye examination and foot examination occurred in the last 12 months.

## 6.2 How was the analysis performed?

### Screening and Management analyses

The impact of the interventions for the Screening and Management priority areas over time was assessed using segmented logistic regression. Figure 6.1 illustrates the regression variables from pre- to post-intervention which were used to assess the impact of interventions in the evaluation. Calculated odds ratios reflected the size and direction of each trend. In each instance, odds ratios with a p-value <0.05 were considered statistically significant.

In determining the impact of the interventions, the main variable of interest was 'Change in trend from pre-to post-intervention'. The odds ratio for this variable relates to the *difference* in slope between the 'Pre-intervention trend' and 'Post-intervention trend'.

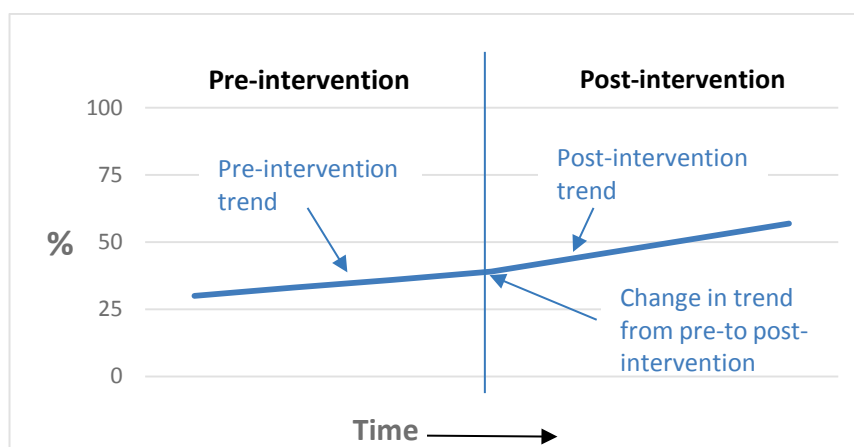


FIGURE 6.1. VISUAL DEPICTION OF REGRESSION MODELLING ANALYSIS

### Data Quality analysis

The Data Quality priority area was intended to be implemented using a pre-post design, where data quality of patient records related to chronic disease screening and diabetes management could be assessed before and after the implementation of improvement strategies if ACCHSs elected. Improvement strategies included site-specific feedback reports and staff training in using MD or Communicare. However, due to time and resource

constraints at ACCHSs, data were not collected again post-intervention, and the Data Quality priority area was therefore evaluated as a cross-sectional study.

Analyses compared the level of agreement between data extracted from clinical audits of MD or Communicare versus PenCAT and patient self-report:

**MD – PenCAT comparisons:** Analysis involved identifying potential under-reporting of clinical activity when relying on PenCAT for outcome measures.

**Patient self-report – MD/Communicare comparisons:** Smoking and alcohol intake status as recorded in MD/Communicare was compared against that self-reported by the patient.

## 7.

# What were the main outcomes and achievements?

## 7.1 Screening outcomes

### Screening outcome measure #1: Uptake rates of Adult Aboriginal Health Assessment (Medicare Item 715)

Patients 15-54 years

**All sites combined:** Among patients aged **15-54 years**, aggregated across all sites the trend in screening using Aboriginal Health Assessments (MBS Item 715) remained relatively constant from pre- to post-intervention, with the interventions having no detectable impact (see Table 7.1).

TABLE 7.1. ABORIGINAL HEALTH ASSESSMENT (15-54 YEARS) LOGISTIC REGRESSION RESULTS - AGGREGATED ACROSS ALL 5 SCREENING SITES (ADJUSTED FOR OVERDISPERSION)

| Variable                                       | Odds ratio | Lower 95% CI | Upper 95% CI | p-value* |
|--|------------|--------------|--------------|----------|
| Trend in screening pre-intervention            | 1.0131     | 0.9901       | 1.0365       | 0.2661   |
| Change in trend from pre- to post-intervention | 0.9985     | 0.9741       | 1.0235       | 0.9059   |
| Trend in screening post-intervention           | 1.0116     | 1.0019       | 1.0213       | 0.0190   |

\* <0.05 considered statistically significant

**Individual sites:** Of the five screening sites, only one site demonstrated a statistically significant increase in the screening trend from pre- to post-intervention for patients aged 15-54 years (Site 1: OR=1.09 per month,  $p<0.001$ ). Another site experienced a statistically significant decrease in the screening trend from pre- to post-intervention (Site 4: OR=0.97 per month,  $p=0.02$ ). The remaining three sites showed no significant changes in trend from pre- to post-intervention, although 2 of these sites yielded post-intervention screening trends that were slightly increasing at statistically significant levels (Site 3: OR=1.01 per month,  $p=0.03$ ; Site 5: OR=1.04 per month,  $p=0.0003$ ).

Patients 55+ years

**All sites combined:** As shown in Table 7.2, among patients aged 55+ years, from pre- to post-intervention there was a very small positive change in the trend of screening using Aboriginal Health Assessments, although this change was not statistically significant (OR=1.01,  $p=0.55$ ). This yielded post-intervention screening rates that were slightly increasing at statistically significant levels (OR=1.015 per month,  $p=0.02$ ).

TABLE 7.2. ABORIGINAL HEALTH ASSESSMENT (55+ YEARS) LOGISTIC REGRESSION RESULTS - AGGREGATED ACROSS ALL 5 SCREENING SITES (ADJUSTED FOR OVERDISPERSION)

| Variable                                       | Odds ratio | Lower 95% CI | Upper 95% CI | p-value* |
|--|------------|--------------|--------------|----------|
| Trend in screening pre-intervention            | 1.0053     | 0.9761       | 1.0353       | 0.7276   |
| Change in trend from pre- to post-intervention | 1.0097     | 0.9779       | 1.0425       | 0.5537   |
| Trend in screening after intervention          | 1.0150     | 1.0022       | 1.0280       | 0.0219   |

\* <0.05 considered statistically significant

**Individual sites:** For patients aged 55+ years, only one site demonstrated a statistically significant positive change in trend from pre- to post-intervention (Site 1: OR=1.09, p=0.0067), yielding post-intervention screening rates that were significantly increasing (OR=1.05, p<0.0001). One other screening site also yielded a post-intervention screening trend that was significantly increasing for patients aged 55+ years (Site 3: OR=1.03, p=0.018). No statistically significant trends or changes in trends were detected at the remaining three sites for patients in this age group.

**For Aboriginal Health Assessments, aggregated across all five sites:**

- There was no change in the trend of screening from pre- to post-intervention
- Post-intervention, the trend of screening was significantly increasing for patients aged 15-54 years and 55+ years

**For Aboriginal Health Assessments, at individual sites:**

- No change in trend from pre- to post-intervention was found at four of five sites (for patients 15-54 years) and three of five sites (for patients 55+ years)
  - One site demonstrated a positive change in screening from pre- to post-intervention (for patients 15-54 years and patients 55+ years)
  - One site demonstrated a decrease in screening from pre- to post-intervention (for patients 15-54 years)

**Gender and age associations with uptake rates of Adult Aboriginal Health Assessments**

Overall across sites post-intervention, significant differences were found between the likelihood of males and females (see Table 7.3) receiving Health Checks, and also between younger and older patients (see Table 7.4).

- For all sites combined, men had a 15% greater odds of having an up-to-date Health Assessment than women, with this difference found to be statistically significant (p=0.01). There was a

tendency for men to be screened slightly more frequently than women across four of the five individual sites, although the association was only significant at one site.

- For all sites combined, younger patients aged 15-54 years had 38% lower odds of having an up-to-date Health Assessment than patients 55+ years, and this difference was also statistically significant ( $p < 0.0001$ ). This association was also significant at four of the five individual Screening sites.

TABLE 7.3 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF BEING SCREENED USING ABORIGINAL HEALTH ASSESSMENTS FOR MEN, VERSUS WOMEN

| Screening site | Odds ratio (95% CI) | p-value* |
|----------------|---------------------|----------|
| 1              | 1.16                | 0.24     |
| 2              | 1.37                | 0.005    |
| 3              | 0.85                | 0.24     |
| 4              | 1.21                | 0.16     |
| 5              | 1.16                | 0.31     |
| All combined   | 1.15 (1.03, 1.28)   | 0.01     |

\*  $< 0.05$  considered statistically significant

TABLE 7.4 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF BEING SCREENED USING ABORIGINAL HEALTH ASSESSMENTS FOR PARTICIPANTS AGED 15-54 YEARS, VERSUS 55+ YEARS

| Screening site | Odds ratio (95% CI) | p-value*   |
|----------------|---------------------|------------|
| 1              | 0.58                | 0.001      |
| 2              | 0.48                | $< 0.0001$ |
| 3              | 0.34                | $< 0.0001$ |
| 4              | 1.10                | 0.70       |
| 5              | 0.66                | 0.015      |
| All combined   | 0.62 (0.54, 0.71)   | $< 0.0001$ |

\*  $< 0.05$  considered statistically significant

#### Aggregated across all five sites, post-intervention:

- Men had a 15% greater odds of having an up-to-date Aboriginal Health Assessment than women
- Younger patients (15-54 years) had 38% lower odds of having an up-to-date Aboriginal Health Assessment than older patients (55+ years)

## Screening outcome measure #2: Screening for diabetes using blood glucose

### Random blood glucose

**All sites combined:** As shown in Table 7.5, prior to the interventions, aggregated across sites there was a tendency for diabetes screening using random blood glucose to decrease, albeit non-significantly (OR=0.98,  $p=0.06$ ). From pre- to post-intervention there was a statistically significant positive change

in the trend of screening across all sites combined (OR=1.03, p=0.0025). This resulted in a post-intervention trend which was slightly increasing at a statistically significant level (OR=1.01, p=0.0018).

TABLE 7.5 RANDOM GLUCOSE REGRESSION RESULTS, AGGREGATED ACROSS ALL 5 SCREENING SITES (ADJUSTED FOR OVERDISPERSION)

| Variable                                       | Odds ratio | Lower 95% CI | Upper 95% CI | p-value* |
|--|------------|--------------|--------------|----------|
| Trend in screening pre-intervention            | 0.9824     | 0.9642       | 1.0008       | 0.0614   |
| Change in trend from pre- to post-intervention | 1.0321     | 1.0112       | 1.0535       | 0.0025   |
| Trend in screening post-intervention           | 1.0139     | 1.0052       | 1.0228       | 0.0018   |

\* <0.05 considered statistically significant

**Individual sites:** Three of the five Screening sites demonstrated statistically significant increases in the trend of screening using random blood glucose from pre- to post-intervention (Site 1: OR=1.04, p<0.001; Site 3: OR=1.03, p=0.0016; Site 5: OR=1.11, p<0.0001). Another site demonstrated a small, but non-significant increase in trend (Site 2: OR=1.01, p=0.23), resulting in a post-intervention trend that was very slightly increasing over time with statistical significance (OR=1.01, p=0.004). The remaining site experienced a statistically significant decrease in the trend from pre- to post-intervention (Site 4: OR=0.96, p=0.003), with rates of random glucose measurement then significantly decreasing post-intervention (OR=0.97, p<0.0001).

**For random blood glucose:**

- Aggregated across all five sites, there was a significant increase in the trend of patients screened for diabetes from pre- to post-intervention
- Individually, three of five sites demonstrated a positive change, one site demonstrated no change, and one site demonstrated a decrease in the screening trend from pre- to post-intervention

**Fasting blood glucose**

**All sites combined:** Aggregated across all Screening sites (see Table 7.6 below), diabetes screening using fasting blood glucose remained relatively constant both before and after the intervention (OR=1.0), with no statistically significant trends or changes in trends detected.

TABLE 7.6 FASTING GLUCOSE REGRESSION RESULTS - AGGREGATED ACROSS ALL 5 SCREENING SITES (ADJUSTED FOR OVERDISPERSION)

| Variable                                       | Odds ratio | Lower 95% CI | Upper 95% CI | P-value* |
|--|------------|--------------|--------------|----------|
| Trend in screening pre-intervention            | 1.0028     | 0.9792       | 1.0269       | 0.8204   |
| Change in trend from pre- to post-intervention | 0.9999     | 0.9749       | 1.0256       | 0.9955   |
| Trend in screening post-intervention           | 1.0027     | 0.9936       | 1.0119       | 0.5634   |

\* <0.05 considered statistically significant

**Individual sites:** From pre- to post-intervention, two sites showed statistically significant increases in the trend of diabetes screening using fasting blood glucose (Site 1: OR=1.04, p=0.0056; Site 5: OR=1.15, p<0.0001). Two sites experienced significant decreases in trend from pre- to post-intervention (Site 3: OR=0.95, p=0.0004; Site 4: OR=0.89, p=0.0008). The remaining site demonstrated no significant changes or trends.

### For fasting blood glucose:

- Across all five sites combined, there was no change in the trend of screening for diabetes from pre- to post-intervention
- Individually, two of five sites demonstrated a positive change, one site demonstrated no change, and two sites demonstrated a decrease in the screening trend from pre- to post-intervention

### Gender and age associations with diabetes screening

Aggregated across sites post-intervention, men and women were equally likely to be screened for diabetes (for both random blood glucose and fasting blood glucose) (see Table 7.7).

TABLE 7.7 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF BEING SCREENED FOR DIABETES (USING RANDOM BLOOD GLUCOSE OR FASTING BLOOD GLUCOSE) FOR ACTIVE<sup>^</sup> ABORIGINAL MALE PATIENTS, VERSUS FEMALE PATIENTS

| Screening site | Random Blood Glucose |          | Fasting Blood Glucose |          |
|----------------|----------------------|----------|-----------------------|----------|
|                | Odds ratio (95% CI)  | p-value* | Odds ratio (95% CI)   | p-value* |
| 1              | 0.90                 | 0.54     | 0.84                  | 0.25     |
| 2              | 1.17                 | 0.15     | 1.01                  | 0.95     |
| 3              | 0.89                 | 0.28     | 1.09                  | 0.65     |
| 4              | 1.10                 | 0.50     | 0.43                  | 0.09     |
| 5              | 1.17                 | 0.12     | 1.47                  | 0.014    |
| All combined   | 1.04 (0.94, 1.14)    | 0.48     | 1.02 (0.89, 1.17)     | 0.76     |

\* <0.05 considered statistically significant

<sup>^</sup>Active patient is defined as having at least 3 attendances to site in last 2 years

Post-intervention, there was a strong association between age and screening for diabetes, with younger patients significantly less likely to be screened than older patients (see Tables 7.8 and 7.9). For both random blood glucose and fasting blood glucose, across all sites combined, patients aged 15-44 years were screened at about one third of the rate of patients aged 45-64 years, and only about a quarter the rate of patients aged 65+ years. In each instance, these discrepancies were statistically significant ( $p < 0.0001$ ).

At most individual sites, for random blood glucose and fasting blood glucose, patients aged 15-44 years were significantly less likely to be screened than patients aged 45-64 years or 65 years and older.



TABLE 7.8 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF BEING SCREENED FOR DIABETES (USING RANDOM BLOOD GLUCOSE OR FASTING BLOOD GLUCOSE) FOR ACTIVE<sup>^</sup> ABORIGINAL PATIENTS AGED 15-44 YEARS, VERSUS 45-64 YEARS

| Screening site | Random Blood Glucose |         | Fasting Blood Glucose |          |
|----------------|----------------------|---------|-----------------------|----------|
|                | Odds ratio (95% CI)  | p-value | Odds ratio (95% CI)   | p-value* |
| 1              | 0.58                 | 0.002   | 0.33                  | <0.0001  |
| 2              | 0.49                 | <0.0001 | 0.25                  | <0.0001  |
| 3              | 0.15                 | <0.0001 | 0.17                  | <0.0001  |
| 4              | 0.51                 | <0.0001 | 1.80                  | 0.35     |
| 5**            |                      |         |                       |          |
| All combined   | 0.37 (0.32, 0.42)    | <0.0001 | 0.30 (0.26, 0.36)     | <0.0001  |

\* <0.05 considered statistically significant

\*\* missing data from Site 5

<sup>^</sup> Active patient is defined as having at least 3 attendances to site in last 2 years

TABLE 7.9 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF BEING SCREENED FOR DIABETES (USING RANDOM BLOOD GLUCOSE OR FASTING BLOOD GLUCOSE) FOR ACTIVE ABORIGINAL PATIENTS AGED 15-44 YEARS, VERSUS 65+ YEARS

| Screening site | Random Blood Glucose |         | Fasting Blood Glucose |         |
|----------------|----------------------|---------|-----------------------|---------|
|                | Odds ratio (95% CI)  | p-value | Odds ratio (95% CI)   | p-value |
| 1              | 0.45                 | 0.04    | 0.22                  | <0.0001 |
| 2              | 0.32                 | 0.0001  | 0.11                  | <0.0001 |
| 3              | 0.07                 | <0.0001 | 0.20                  | <0.0001 |
| 4              | 0.85                 | 0.61    | 1.20                  | 1       |
| 5**            |                      |         |                       |         |
| All combined   | 0.27 (0.20, 0.36)    | <0.0001 | 0.24 (0.18, 0.32)     | <0.0001 |

\* <0.05 considered statistically significant

\*\* missing data from Site 5

<sup>^</sup> Active patient is defined as having at least 3 attendances to site in last 2 years

#### At post-intervention:

- Men and women were equally as likely to be screened for diabetes
- Younger patients (aged 15-44 years) were significantly less likely to be screened for diabetes than older patients (aged 45-64 years and 65+ years)

## 7.2 Diabetes Management outcomes

### Post-intervention management outcomes

#### Minimum annual cycle of care

**All sites combined:** Aggregated across all Management sites (see Table 7.10 below), the proportion of diabetes patients receiving the minimum annual cycle of care remained relatively constant both before and after the interventions, with no statistically significant changes detected ( $p > 0.05$ ).

TABLE 7.10 MINIMUM CYCLE OF CARE RESULTS - AGGREGATED ACROSS ALL 6 MANAGEMENT SITES (ADJUSTED FOR OVERDISPERSION)

| Variable                                    | Odds ratio | Lower 95% CI | Upper 95% CI | P-value* |
|---|------------|--------------|--------------|----------|
| Trend in cycle of care pre-intervention     | 0.9651     | 0.9030       | 1.0314       | 0.2948   |
| Change trend from pre- to post-intervention | 1.0592     | 0.9872       | 1.1364       | 0.1095   |
| Trend in cycle of care post-intervention    | 1.0222     | 0.9986       | 1.0464       | 0.0657   |

\*  $< 0.05$  considered statistically significant

**Individual sites:** Of the six Management sites, two sites exhibited significant increases in the trend of patients with a completed minimum cycle of care from pre- to post-intervention (Management site 2: OR=1.10,  $p=0.01$ ; Management site 6: OR=1.25,  $p=0.001$ ). One site was experiencing a significant increase in the trend of patients receiving a minimum cycle of care prior to the interventions (Management site 1: OR=1.26,  $p<0.0001$ ). However, there was a significant decrease in this trend from pre- to post-intervention (OR=0.80,  $p<0.0001$ ) which resulted in the proportion of patients with a minimum cycle of care remaining relatively constant throughout the intervention period. At the remaining three Management sites, no statistically significant changes in trend between pre- and post-intervention were detected, although the post-intervention trend at two of these sites was increasing significantly (Management site 4: OR=1.11,  $p=0.0002$ ; Management site 5: OR=1.08,  $p=0.0489$ ).

#### For diabetes management using the minimum cycle of care:

- Across all six sites combined, there was no change in the trend of completed minimum cycles of care from pre- to post-intervention
- Individually, one site demonstrated an increase in the trend of completed minimum cycles of care, three sites demonstrated no change, and two sites demonstrated a decrease in the trend from pre- to post-intervention
- Post-intervention, three sites were demonstrating an increase in the trend of completed minimum cycles of care

## GP Management Plan

**All sites combined:** Aggregated across all Management sites (see Table 7.11), the proportion of diabetes patients with an up-to-date GP Management Plan remained relatively constant both before and after the interventions.

TABLE 7.11 CURRENT GP MANAGEMENT PLAN RESULTS - AGGREGATED ACROSS ALL 6 MANAGEMENT SITES

| Variable                                       | Odds ratio | Lower 95% CI | Upper 95% CI | P-value* |
|--|------------|--------------|--------------|----------|
| Trend in GP Management Plans pre-intervention  | 1.020      | 0.9965       | 1.0455       | 0.0937   |
| Change trend from pre- to post-intervention    | 0.983      | 0.9575       | 1.0097       | 0.2119   |
| Trend in GP Management Plans post-intervention | 1.003      | 0.9927       | 1.0147       | 0.5164   |

\* <0.05 considered statistically significant

**Individual sites:** From pre-to post-intervention, none of the six Management sites showed a statistically significant positive change in trend of GP Management Plans. One site experienced a statistically significant decrease in trend of diabetic patients with a GP Management Plan from pre- to post-intervention (Management site 6: OR=0.83, p=0.0058). However, this site maintained the second highest proportion of patients with a GP Management Plan of all six sites. The proportion of patients with a GP Management Plan at the remaining five sites was relatively steady from pre- to post-intervention with no statistically significant changes detected.

### For diabetes management using a GP Management Plan:

- Across all six sites combined, there was no change in the trend of up-to-date GP Management Plans from pre- to post-intervention
- Individually, five sites showed no change in the trend of up-to-date GP Management Plans. One site demonstrated a decrease in the trend from pre- to post-intervention

## Age and gender associations with diabetes management

Post-intervention there was no association between patient gender and having a completed minimum cycle of care. However, aggregated across sites, men had 25% lower odds than women of having a current GP Management Plan, with this difference being statistically significant (see Table 7.12).

TABLE 7.12 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF RECEIVING MINIMUM CYCLE OF CARE OR A CURRENT GP MANAGEMENT PLAN FOR MALE DIABETES PATIENTS, VERSUS WOMEN

| Management site | Minimum cycle of care |         | GP Management Plan  |          |
|-----------------|-----------------------|---------|---------------------|----------|
|                 | Odds ratio (95% CI)   | p-value | Odds ratio (95% CI) | p-value* |
| 1               | 0.86                  | 0.84    | 0.91                | 0.77     |
| 2               | 0.61                  | 0.17    | 0.85                | 0.80     |
| 3               | NA**                  | NA**    | 0.55                | 0.02     |

|              |                   |      |                   |       |
|--------------|-------------------|------|-------------------|-------|
| 4            | 1.76              | 0.31 | 1.30              | 0.56  |
| 5            | 0.94              | 1    | 0.53              | 0.015 |
| 6            | 1.15              | 1    | 0.63              | 0.74  |
| All combined | 0.93 (0.63, 1.37) | 0.78 | 0.75 (0.58, 0.97) | 0.022 |

\* <0.05 considered statistically significant

\*\* Odds ratio not estimable due to a zero cell count in the denominator, i.e. zero patients received the minimum cycle of care at Management site 3

Age was strongly associated with the likelihood of diabetic patients having a completed minimum cycle of care and a GP Management Plan. Across the individual sites, and across all sites combined, diabetes patients were less likely to have completed a minimum cycle of care if they were aged 15-44 years, compared to participants aged 45-64 years or 65+ years (see Table 7.13). Across all combined sites, the effect was significant (OR=0.35, p=0.0003; OR=0.29, p=0.0002).

TABLE 7.13 POST-INTERVENTION ODDS RATIOS SHOWING THE RELATIVE ODDS OF RECEIVING THE MINIMUM CYCLE OF CARE FOR DIABETES PATIENTS AGED 15-44 YEARS, VERSUS 45-64 YEARS

| Management site | 15-44 yrs v 45-64 yrs |         | 15-44 yrs v 65+ yrs |          |
|-----------------|-----------------------|---------|---------------------|----------|
|                 | Odds ratio (95% CI)   | p-value | Odds ratio (95% CI) | p-value* |
| 1               | 0.28                  | 0.05    | 0.29                | 0.095    |
| 2               | 0.66                  | 0.48    | 0.21                | 0.0085   |
| 3               | NA**                  | NA**    | NA**                | NA**     |
| 4               | 0.44                  | 0.50    | 0.17                | 0.048    |
| 5               | 0.31                  | 0.15    | 0.62                | 0.67     |
| 6               | 0                     | 0.02    | 0                   | 0.51     |
| All combined    | 0.35 (0.18, 0.66)     | 0.0003  | 0.29 (0.14, 0.59)   | 0.0002   |

\* <0.05 considered statistically significant

\*\* Odds ratio not estimable due to a zero cell count in the denominator

Across the individual sites, there was a tendency for diabetes patients to be less likely to have a current GP Management Plan if they were aged 15-44 years, compared to participants aged 45-64 years or 65+ years, however this was not statistically significant at most sites (see Table 7.14). Across all sites combined, this effect was significant (OR=0.64, p=0.0037; OR=0.45, p<0.0001). Overall across sites, diabetic patients aged 15-44 years were 36% less likely than diabetic patients aged 45-64 years to have a GP Management Plan. Patients aged 15-44 years were less than half as likely to have a GP Management Plan compared to patients aged 65+ years.

TABLE 7.14 ODDS RATIOS SHOWING THE RELATIVE ODDS OF HAVING A CURRENT GP MANAGEMENT PLAN FOR DIABETES PATIENTS AGED 15-44 YEARS, VERSUS 45-64 YEARS & PATIENTS AGED 15-44 VERSUS 65+ YEARS

| Management site | 15-44 yrs v 45-64 yrs |         | 15-44 yrs v 65+ yrs |          |
|-----------------|-----------------------|---------|---------------------|----------|
|                 | Odds ratio (95% CI)   | p-value | Odds ratio (95% CI) | p-value* |
| 1               | 0.61                  | 0.17    | 0.49                | 0.13     |
| 2               | 0.66                  | 0.54    | 0                   | 0.022    |
| 3               | 0.33                  | 0.0009  | 0.32                | 0.0081   |
| 4               | 0.88                  | 0.82    | 0.43                | 0.23     |
| 5               | 1.20                  | 0.64    | 0.90                | 0.85     |
| 6               | 0.48                  | 0.43    | 0.11                | 0.059    |
| All combined    | 0.64 (0.47, 0.87)     | 0.0037  | 0.45 (0.31, 0.67)   | <0.0001  |

\* <0.05 considered statistically significant

For patients with diabetes, combined across all six sites at post-intervention:

- Men and women were equally as likely to have a completed minimum cycle of care
- Men were significantly less likely than women to have a GP Management Plan
- Younger patients were significantly less likely than older patients to have a completed minimum cycle of care or GP Management Plan

### Diabetes Control (HbA1c <7%)

HbA1c was used to indicate how well people with diabetes have their blood glucose under control, with levels less than 7% considered optimum for diabetes management.

**All sites combined:** Aggregated across all six Management sites (see Table 7.15), the proportion of diabetes patients with HbA1c in the goal range of less than 7% remained relatively constant both before and after the interventions.

TABLE 7.15 HbA1c RESULTS - AGGREGATED ACROSS ALL 6 MANAGEMENT SITES (ADJUSTED FOR OVERDISPERSION)

| Variable                                  | Odds ratio | Lower 95% CI | Upper 95% CI | p-value |
|---|------------|--------------|--------------|---------|
| Effect of time, before intervention       | 0.9971     | 0.9646       | 1.0307       | 0.8652  |
| Change in time effect, after intervention | 1.0206     | 0.9846       | 1.0580       | 0.2656  |
| Effect of time, after intervention        | 1.0177     | 1.0040       | 1.0317       | 0.0114  |

**Individual sites:** From pre- to post-intervention, one of the six Management sites showed a statistically significant increase in the trend of patients with HbA1c in the goal range (Management site 1: OR=1.17, p=0.0012). Another site experienced a statistically significant decrease in trend of diabetic patients with HbA1c in the goal range (Management site 5: OR=0.88, p<0.05).

For diabetes control:

- There was no change in the trend of patients with HbA1c levels in the goal range from pre- to post-interventions

## 7.3 Data Quality outcomes

### Agreement between clinical software systems Medical Director and PenCAT

**All sites combined:** There were a total of 110 patient records using each data source (PenCAT, MD)/Communicare and self-report survey) across all four sites for Data Quality. Despite variation across ACCHSs, overall there was reasonable agreement between MD/Communicare and PenCAT data in terms of the screening interval or time since clinical items had been assessed. As shown in Figure 7.1, six of the items had

agreement rates of 90%-100% (BMI, waist circumference, blood pressure, smoking, alcohol, eGFR) according to the set criteria (see Data Quality Analysis section above), and a further three items had agreement rates of 80%-90% (cholesterol, triglycerides, ACR).

**Variation across individual sites:** The study identified some site-specific inaccuracies where agreement between MD and PenCAT data was particularly low at certain sites only (e.g. physical activity, HDL cholesterol). This significantly skewed the aggregated rates of agreement on these items. Other items such as glucose (5%-83%) and LDL cholesterol (65%-90%) showed relatively consistent low levels of accuracy at most sites. Conversely, across all sites certain items consistently showed high levels of accuracy (e.g. BMI, waist circumference, blood pressure).

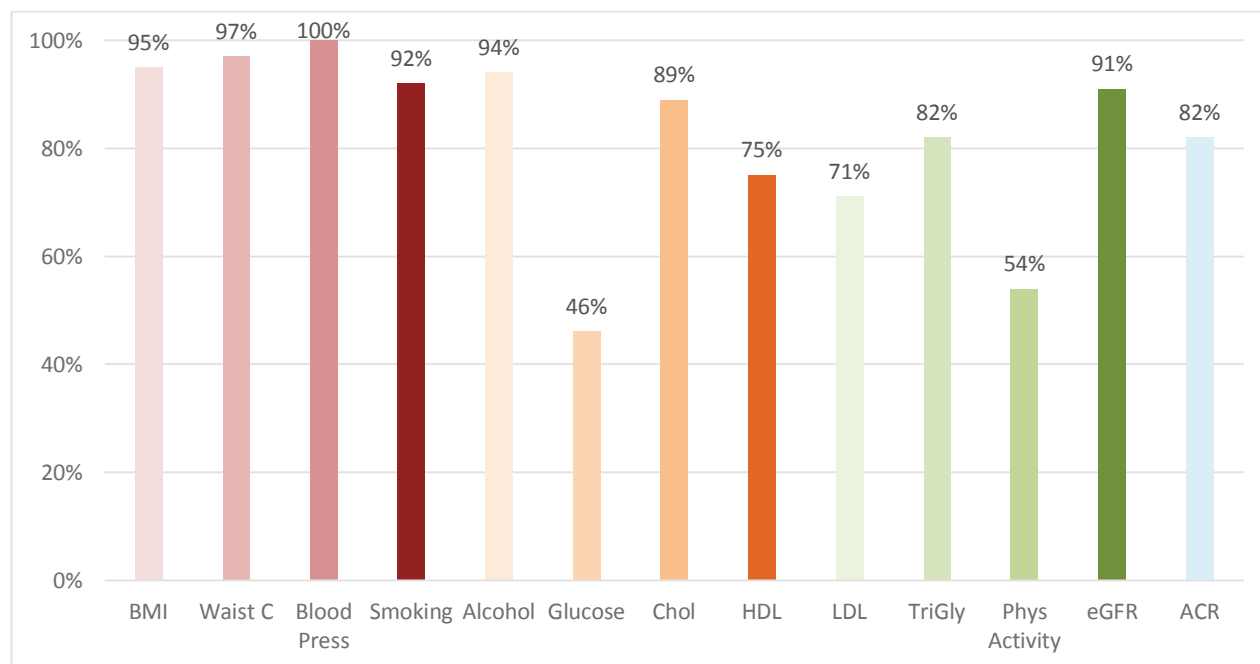


FIGURE 7.1 AGREEMENT BETWEEN MD AND PENCAT DATA FOR CLINICAL ITEMS (ASSESSED IN LAST 12 MONTHS) AVERAGED ACROSS ALL 4 SITES

### Agreement between patient self-report and Medical Director for smoking and alcohol intake

For patient smoking and alcohol status, agreement between patient self-report and MD/Communicare was 75% and 69% respectively, aggregated across all sites (see Figure 7.2).

These results indicate that more than one in four patients have inaccurate records in terms of their smoking and drinking behaviour, meaning that clinicians will not be aware of the risk status of these patients.

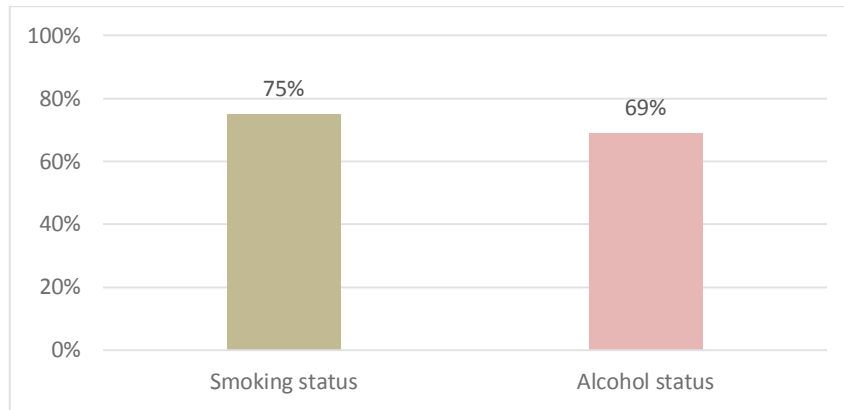


FIGURE 7.2 AGREEMENT BETWEEN SELF-REPORT AND MEDICAL DIRECTOR RECORDS FOR SMOKING STATUS AND ALCOHOL INTAKE ACROSS ALL DATA QUALITY SITES COMBINED

### Implications of data quality outcomes

Most data across sites appear reasonably accurate, although there is room for improvement. Most ACCHSs have one or two specific items for which accuracy needs to be addressed. Potential sources of error affecting data accuracy may include:

- **Incorrect data entry.** It is possible that patient information is not being recorded in the correct data entry field in the MD record, and therefore not being picked up by PenCAT. Feedback provided to ACCHSs suggests specific items for which staff should make efforts to enter data into the correct area of MD.
- **Incompatibility issues between PenCAT and MD.** Software errors can occur when PenCAT extracts data from the MD data. The PenCAT software does not pick up patient data that are entered in an incompatible font.
- **Under-reporting of lifestyle risk factors.** Many ‘at-risk’ patients cannot be identified because smoking and alcohol data are often inaccurate or outdated.

It is noted that data accuracy may also be limited due to limitations in the methodology of the Data Quality component. For example, human error in conducting the MD audit, the limited sample size at each site (n=30 patients) and the items selected for testing may limit the accuracy and generalisability of findings.

## Key learnings

- Significant variation exists across ACCHSs in rates of preventive health screening and management of diabetes
- Individual sites showed varying levels of improvement for outcomes related to preventive health screening and management of diabetes

### ***Combining all five sites for Screening:***

- Rates of Aboriginal health checks did not significantly change from pre- to post-intervention
- The interventions were associated with significant improvements in diabetes screening using random blood glucose, but no change for fasting blood glucose

### ***Combining all six sites for Diabetes Management:***

- There was no change in completion rates of the annual cycle of care
- There was no change in the use of GP Management Plans from pre- to post-intervention
- No clear changes in patient health outcomes in terms of achieving recommended goals for optimum diabetes management were observed

### ***For Data Quality across all four sites:***

- PenCAT records appear to be reasonably accurate for most data items. However, some items need improvement where the level of agreement between PenCAT and MD or Communicare is low
- Data inaccuracies may be addressed by i) improving data entry into MD, which will directly result in improved accuracy in PenCAT; ii) ongoing data audits; iii) staff training; iv) implementation of system-level approaches to data entry; and v) routine data cleaning
- Detection and recording of lifestyle behaviours can be improved by increasing the level of GP detection and ensuring the collected information is accurate and up-to-date
- Limitations of the Data Quality component may limit the accuracy and generalisability of findings



## 8.

# What insights and recommendations can we offer for future improvements in Aboriginal health?

## Future directions for service delivery and provision of care

### *Recommendations*

- 1. Further efforts are needed to increase annual health checks using MBS item 715.** There is a critical need to explore mechanisms to increase the provision of MBS 715 Aboriginal health assessments to i) support the improved health of Aboriginal people, and ii) provide additional revenue to ACCHSs from Medicare rebates.
- 2. Efforts are needed to increase detection by GPs, health workers and other ACCHS staff of risk behaviours in patients, particularly smoking and alcohol misuse.** It is widely acknowledged that health professionals have a role to play in minimising harm from tobacco and alcohol, in both ACCHSs and mainstream health services. Given the established discrepancies between patient self-reported smoking and alcohol consumption and what is recorded in the patient's medical record, efforts are needed to increase the level of detection so that patients with 'at-risk' lifestyle behaviours are identified and can be offered appropriate preventive care.
- 3. Clinical improvements could be targeted towards younger adult Aboriginal patients** given that these age groups are considerably less likely to receive screening and/or management care in line with evidence-based guidelines.
- 4. Continuous quality improvement approaches could include mechanisms to further capitalise on available revenue opportunities.** ACCHSs could be encouraged to utilise and monitor organisational systems (including clinical software systems) and support within health services to maximise MBS revenue opportunities that come with increasing rates of screening and chronic disease management. There is a need to better understand the ways in which improved use of MBS items in ACCHSs influences service quality and health outcomes for Aboriginal patients.
- 5. System-based mechanisms to improve clinical quality offers benefits.** Due to likely changes in ACCHS staff over time, enhancement efforts should be targeted towards systems change rather than focusing on individual-based approaches.

## *Recommendations*

- 6. Staff education and training is likely to be more effective if able to be offered on an ongoing rather than a one-off basis.** ACCHS staff would benefit from the opportunity of ongoing education and training in the use of clinical software systems, with courses repeated every six to twelve months to refresh established staff and to ensure that all new staff are trained. Improvement efforts could allow for successive approximations to support success. ACCHSs could be encouraged to identify any specific needs or resources that may assist them in meeting their screening targets, potentially in consultation with the Ministry of Health. This will provide an opportunity for each ACCHS and the Ministry to identify and agree to steps required for success, and make plans for achieving these.
- 7. Collaboration between health professionals and patients could be supported to optimise service delivery and provision of care.** Clinicians and patients have a shared responsibility for addressing patient health issues which relies upon a range of support mechanisms. Potential mechanisms to engage with younger Aboriginal people in particular (e.g. through social media) could be explored.
- 8. Interventions that can be readily integrated into usual care offer key opportunities for clinical improvements.** Interventions that have been designed to enhance usual care whilst minimising disruption are likely to be more feasible and acceptable to ACCHSs and patients. Efforts could also be undertaken to identify and address barriers to change among ACCHS staff prior to interventions being implemented.

## Future directions that could improve data quality

### *Recommendations*

- 9. Clinical software systems that are Health Level-7 (HL-7) compliant can improve data accuracy.** Such systems allow sharing of data across systems, reduce manual data entry (minimising the opportunity for human error) and streamline identification of patients requiring follow up.
- 10. System-level approaches within ACCHSs for addressing data quality are more effective if well resourced.** Priority could be given to data management roles either through multi-skilling of workforce for data entry tasks, funding schemes for dedicated staff and/or regular in-house training on enhanced features of existing software systems.
- 11. Regular audits of medical records could be undertaken to monitor adherence and effectiveness of system-based approaches to maintaining data quality.** Continuous quality improvement systems could be implemented using data extraction software to internally monitor trends and provide information for audit and review. For optimal effectiveness, audits should draw on existing service systems and procedures where possible and be performed at unscheduled intervals to help ensure adherence is consistently maintained.
- 12. Data cleansing could be undertaken to rectify any identified systematic errors.** Once any sources of data inaccuracy have been identified, staff should, wherever possible, amend all records which have been entered incorrectly. A trained member of staff could be tasked with updating and correcting any identified sources of error within medical records to ensure that these data may be appropriately extracted.
- 13. ACCHSs could ensure records are updated every time a patient is screened for smoking and alcohol intake, even if the patient's status has not changed from previously.** This will improve the accuracy of reported screening rates, and increase the likelihood that patients will be screened at intervals consistent with evidence-based guidelines.

## Establishing an effective research collaboration

### *Recommendations*

- 14. Substantial time and resources should be dedicated to reaching agreement in the early stages of collaboration prior to commencing evaluation.** Given the complexities faced in the early stages of establishing the evaluation, substantial collaborative effort should be applied to research development, allowing at least twelve months for planning the study and obtaining ethics approval, prior to study commencement.
- 15. A formal means for establishing agreement could be considered as part of the collaborative process.** A formal means of establishing group consensus would assist with determining the level of group support for ideas before investing resources into their realisation, and facilitate the process of determining which initiatives should be pursued.
- 16. A willingness by stakeholders to be flexible and open to negotiation is crucial for addressing potential issues and challenges.** Given the likelihood of unforeseen issues emerging during multi-site research conducted over an extended period, it is important that stakeholders are given opportunities for negotiation in relation to set goals and timelines.

## Developing the evidence in Aboriginal health

### *Recommendations*

- 17. The multiple baseline design is a feasible approach for producing meaningful changes through multi-site interventions with Aboriginal communities.** Due to inherent variation across ACCHSs and Aboriginal communities, a one-size-fits-all intervention approach is unlikely to be feasible or effective. The multiple baseline design allows for variation across ACCHSs and overcomes many of the disadvantages inherent in randomised controlled trials by ensuring that all groups have equal opportunity for achieving treatment changes.
- 18. The collaborative model used in this evaluation could be applied to other Aboriginal health endeavours.** Robust methodological research is feasible with Aboriginal health organisations if evaluations are established through collaboration which harnesses the collective expertise, skills and experience of Aboriginal stakeholders and established researchers.

## Possible areas of future research

### *Recommendations*

- 19. Screening activities could be linked with evaluations of treatments and patient outcomes.** Whilst screening is an important first step in establishing a patient's health status, screening alone does not ensure better patient outcomes. It is also crucial to determine the standard of care provided to patients who require treatment, and to investigate the extent to which these treatments improve patient outcomes. Future evaluations could seek to integrate screening activities with ACCHSs' subsequent provision of care and measures of patient health.
- 20. Future research could aim to identify the types of individuals who are less likely to receive recommended screening and/or management care.** A more thorough examination of patient characteristics could be undertaken to identify any potential biases in which types of patients are less likely to receive recommended screening and/or management care. Characteristics such as existing co-morbidities, lifestyle behaviours and family history may be of interest.
- 21. Quality feedback loops could be enhanced.** Given that feedback on quality is a low-cost intervention strategy, future research could allow more time to examine the differential effect of feedback prior to subsequent intervention strategies being implemented. For example, feedback could be provided more regularly (potentially monthly), by a central agency or a managed Continuous Quality Improvement network of ACCHSs, and be tailored to highlight relevant information to different stakeholders.