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RAPID EVIDENCE SCAN

Diabetes programs for Aboriginal people

A Rapid Evidence Scan brokered by the Sax Institute for the Agency for Clinical Innovation.
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This report was produced using a rapid review methodology in response to specific questions from the commissioning agency.

It is not necessarily a comprehensive review of all literature relating to the topic area. It was current at the time of production (but not necessarily at the time of publication). It is reproduced for general information and third parties rely upon it at their own risk.

Acronyms and abbreviations

ACCHS	Aboriginal Community Controlled Health Service
ACCN	Aboriginal Chronic Conditions Network
ACI	Agency for Clinical Innovation
AHS	Aboriginal Health Service
AHW	Aboriginal Health Worker
AWAHS	Albury Wodonga Aboriginal Health Service
DR	Diabetic Retinopathy
DRFD	Diabetes Related Foot Disease
GBACC	Getting Better at Chronic Care
GP	General Practitioner
HbA1c	Test measuring blood glucose levels
IHW	Indigenous Health Worker
KDEHC	Kimberley Diabetes Eye Health Coordinator
PHC	Primary Health Care
POCT	Point of Care Test
QAAMS	Quality Assurance in Aboriginal and Torres Strait Islander Medical Services
RN	Registered Nurse
SARRAH	Services for Australian Rural and Remote Allied Health
UTDRFCS	University of Texas Diabetic Foot Risk Classification System
WDKP	Western Desert Kidney Project

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Executive summary

Background

Diabetes is a complex chronic condition that can lead to morbidity, disability, reduced quality of life and premature death. If undiagnosed or poorly managed diabetes can lead to a range of complications such as heart disease, stroke, kidney disease, eye disease and nerve disease. Diabetes is the world's fastest growing chronic disease, and Type 2 diabetes mellitus (T2DM) particularly has reached epidemic proportions both globally and in Australia. In Australia, Aboriginal and Torres Strait Islander people experience disproportionately high levels of diabetes.[1]

The Aboriginal Chronic Conditions Network (ACCN) Executive at ACI has identified diabetes as a priority area for driving innovation to improve Aboriginal health outcomes. As part of this, a rapid evidence scan has been commissioned to identify diabetes programs for Aboriginal people with a focus on education, early identification, treatment, self-management, foot care, amputation and other complications of diabetes.

Review Question

What initiatives for diabetes care (including education, early identification, treatment, foot care and self-management) that have a focus on Aboriginal populations have been implemented in Australia?

Methods

To answer the review question, rapid but systematic searches were conducted of both the peer reviewed and grey literature. For the peer reviewed literature, we searched six health databases: Cochrane, CINAHL, Medline, Informit (Health Collections, AIATSIS and ATSIHealth). Searches were restricted to papers published between 2013-18. For the grey literature we searched a list of pre-specified jurisdictional websites and the first 10 pages of a Google using the terms 'Aboriginal AND diabetes'.

Results

We identified a total of 20 peer reviewed publications that met the inclusion criteria for the review, one of which was a systematic review examining programs for Australia, New Zealand, Canada and the United States. The remaining 19 papers described a range of programs implemented for Aboriginal and Torres Strait Islander people diagnosed with diabetes in Australia.

More than half of the included papers (n=13) were focused on multiple aspects of diabetes care, with education (n=10) and self-management (n=9) reported most frequently. A total of 13 studies described the role of an Aboriginal Health Worker (AHW), 11 studies reported that their programs were culturally appropriate and five studies described their programs as holistic.

Studies reported on a range of health and service outcomes as well as patient and staff perspectives. The most commonly reported health outcome was improvement in diabetes control measured through HbA1c blood glucose testing. Health and wellbeing measures such as depression and quality of life were also reported. Service delivery outcomes included: patient attendance or participation; administration of diabetes care such as blood tests, screening and foot checks; and implementation of case management or care coordination plans. Patient and staff perspectives included perceptions of acceptability, engagement and cultural appropriateness.

Background

Diabetes is a disease marked by high levels of blood glucose caused by the body's inability to produce and or use insulin effectively. It is a complex chronic condition that can lead to morbidity, disability, reduced quality of life and premature death. Diabetes can affect the whole body and with no known cure, typically requires lifelong management. If undiagnosed or poorly managed diabetes can lead to a range of complications such as heart disease, stroke, kidney disease, eye disease and nerve disease. Type 2 diabetes mellitus (T2DM) is the most common form of diabetes. It mostly affects older people, however is increasingly occurring in young people and children.

Diabetes is the world's fastest growing chronic disease, and T2DM particularly has reached epidemic proportions both globally and in Australia. As with many chronic diseases, the greatest burden of disease typically falls on those who are socially disadvantaged and Indigenous peoples. In Australia, Aboriginal and Torres Strait Islander people experience disproportionately high levels of diabetes.

Diabetes in Aboriginal people has an incidence rates three times higher than non-Aboriginal people, with associated hospitalisations around four times higher. Risk of diabetic foot disease and associated complications is also highest for Aboriginal peoples.

The Aboriginal Chronic Conditions Network (ACCN) Executive at ACI has identified diabetes as a priority area for driving innovation to improve Aboriginal health outcomes. As part of this, a rapid evidence scan has been commissioned to identify diabetes programs for Aboriginal people with a focus on education, early identification, treatment, self-management, foot care, amputation and other complications of diabetes.

Review question

What initiatives for diabetes care (including education, early identification, treatment, foot care and self-management) that have a focus on Aboriginal populations have been implemented in Australia?

Methods

We conducted a systematic search of both the peer reviewed and grey literature to inform this evidence scan.

Peer reviewed literature search

For the peer reviewed literature, we searched six health databases: Cochrane, CINAHL, Medline, Informit (Health Collections, AIATSIS and ATSIHealth); using combinations of search terms aligned to the key concepts and outlined in Table 1 below. The searches were conducted on 26 and 27 April.

Table 1 Search terms

Field 1	Field 2	Field 3	Field 4	Field 5
Aboriginal OR Indigenous	Diabetes mellitus OR type 2 diabetes OR diabetes	Educat* OR treatment OR intervention OR therapy OR control OR detect OR improve	Program OR intervention OR strategy OR support OR promotion	Australia
Combine fields with AND Limit from 2013 to present and English full text only				

The searches yielded a total of 74 papers, of which 8 were removed as duplicates. We also ran a supplementary search of Medline using only the terms Aboriginal AND diabetes and identified a further four papers to be assessed for inclusion. The final set of papers were then screened for inclusion using the criteria outlined in Table 2. A PRISMA flow chart of this process is located in Appendix A. After title and abstract screening, 45 papers were excluded leaving 29 papers for full text review. On reviewing full text, a further nine papers were excluded, leaving 20 papers for inclusion in the analysis. Data from these papers were extracted into tables, which are provided at Appendix B.

Table 2 Search strategy inclusion criteria

Inclusion	Exclusion
• Australian Aboriginal or Torres Strait Islander people diagnosed with diabetes • Focused on a program, initiative or service • Program focus is on diabetes education, early identification, treatment, self-management and foot care	• Programs addressing primary prevention or risk factors for diabetes • Full text not available • Not focused on a program, service or initiative

Grey literature search

The grey literature search consisted of a review of a number of pre-specified jurisdictional websites as outlined in Appendix C. We also conducted a search of the first 10 pages of Google using the terms 'Aboriginal AND diabetes'. The search identified five pieces of grey literature for review. In addition, the web searches identified several other programs where short descriptions were available and these are provided Appendix D.

Findings

A total of 20 publications met the inclusion criteria for this review. Information from each of the studies is provided in comprehensive data tables at Appendix A.

Of the 20 studies, one was a systematic review assessing the impact of primary health care systems or service level attributes on health outcomes of Indigenous people with T2DM. The review examined 13 studies of diabetes programs delivered in primary health care settings in Australia, New Zealand, Canada and the United States and published between 1985-2012. Four of the included studies described programs in Australia, all of which were published outside the search timeframe for this review. The synthesis identified three levels of primary care initiatives: 1) addition of a single service component to the existing service 2) system level improvement processes to enhance the quality of diabetes care and 3) change in primary health funding to support better access. The initiatives included were diverse covering comprehensive multi-disciplinary diabetes care, specific workforce development, systematic foot care and intensive individual hypertension management. Twelve studies reported HbA1c, of which one reported hospitalisations and another reported an incidence of lower limb amputation. The four Australian programs were: a diabetes care coordination program implemented between 2002-05 in 12 primary care centres in the Northern Territory (Bailie et al, 2007); an integrated diabetes specialist clinic implemented in an Aboriginal Medical Service (AMS) in rural Victoria (Simmons et al, 2003); a patient recall system to support evidence based guidelines for diabetes in 21 primary care centres in the Torres Strait (McDermott et al, 2001); and an Australian coordinated care trial conducted in two remote regions of the Northern Territory, implemented in late 1998 (Bailie et al, 2004). Despite the methodological quality of the studies being assessed as moderate to good, the authors concluded it was an inadequate evidence base for making policy and practice decisions to inform primary care initiatives. This was due to there being only a small number of published studies which were predominantly observational studies, which generally relied on intermediate health outcomes.[2]

The remaining 19 papers described a range of programs implemented for Aboriginal and Torres Strait Islander people diagnosed with diabetes in Australia. More than half of the included papers (n=13) were focused on multiple aspects of diabetes care, with education (n=10) and self-management (n=9) reported most frequently. A total of 13 studies described the role of an Aboriginal Health Worker (AHW), 11 studies reported that their programs were culturally appropriate and five studies described their programs as holistic.

The range of study designs was mixed and included: retrospective audits of clinical records (n=6), qualitative studies (n=4), mixed methods studies (n=2), cluster randomised controlled trial (n=1) an economic evaluation of a cluster RCT (n=1), before-after studies (n=2), cross sectional studies (n=2) and a longitudinal study (n=1).

Studies reported on a range of health and service outcomes as well as patient and staff perspectives. The most commonly reported health outcome was improvement in diabetes control measured through HbA1c blood glucose testing. Health and wellbeing measures such as depression and quality of life were also reported. Service delivery outcomes included: patient attendance or participation; administration of diabetes care such as blood tests, screening and foot checks; and implementation of case management or care coordination plans. Patient and staff perspectives included perceptions of acceptability, engagement and cultural appropriateness.

Table 3 Summary overview of included papers and programs

Program, Service, Intervention	Author, year	Study design	Region	Program target area							Features			
				Education	Early identification	Treatment	Self-management	Care coordination	Foot-care	Amputation and other complications of diabetes	Holistic	Integrated	Culturally competent	Aboriginal Health Worker
Home-based outreach case management program	Askew et al, 2016	Mixed methods	Brisbane				X	X			x	x	x	x
Moorditj Djena foot care program	Ballestas et al, 2014	Mixed methods	Perth	X			X		X		x	x	x	x
Albury Wodonga AHS podiatry services	Blatchford et al, 2015	Retrospective clinical audit	Regional Vic/NSW		X				X			x	x	
Project Ferret Chronic disease management register	Forbes et al, 2013	Retrospective clinical audit	Remote Torres Strait			X								
Kimberly diabetic eye health screening	Moynihan et al, 2017	Retrospective clinical audit	Remote Kimberley		X							X		X
Self-management glucometers	Taylor et al, 2016	Qualitative study	Regional Qld	X			X				X	X		X
Diabetes foot care education movies	Schoen, 2015	Program description - no evaluation	Remote Kimberley	X	X				X	X			x	
Western Desert Kidney Project - diabetes screening and education	Sinclair et al, 2016	Qualitative study	Remote WA	X	X						X	X	X	X

Program, Service, Intervention	Author, year	Study design	Region	Program target area							Features			
				Education	Early identification	Treatment	Self-management	Care coordination	Foot-care	Amputation and other complications of diabetes	Holistic	Integrated	Culturally competent	Aboriginal Health Worker
Diabetes care in 4 ACCHS	Stoneman et al 2014	Retrospective clinical audit	Remote Kimberley			X	X		X					X
Winnunga diabetes clinic	Chung et al 2014	Retrospective clinical audit	Canberra	X					X					
Diabetes care coordination	Harvey et al, 2014	Longitudinal analysis random effects modelling	Adelaide and Port Lincoln, SA	X			X	X						
Diabetes educator course	King et al, 2013	Qualitative study	Far Western NSW	X										
Diabetes self management support group	Payne et al, 2013	Before -After	Regional QLd	X			X				X		X	X
Getting better at chronic care intensive case management	Segal et al, 2016	Economic evaluation of a cluster RCT	Rural/ remote North Qld			X		X				X	X	X
	McDermott et al, 2015	Cluster RCT	Rural/ remote North Qld	X			X	X	X					X
Fitzroy Valley Health Service Partnership	Reeve et al, 2015	Cross sectional study	Remote Kimberley					X				X	X	X
POCT HbA1c testing	Marley et al, 2015	Cross sectional study	Remote Kimberley		X									
QAAMS POCT HbA1c testing	Spaeth, 2014	Before -After	Remote NT			X	X						X	X

Program, Service, Intervention	Author, year	Study design	Region	Program target area							Features			
				Education	Early identification	Treatment	Self-management	Care coordination	Foot-care	Amputation and other complications of diabetes	Holistic	Integrated	Culturally competent	Aboriginal Health Worker
QAAMS POCT HbA1c testing - Review of cultural safety	Shephard et al, 2016	Qualitative study	Rural/remote Australia	X	X		X						X	X

Summary of diabetes programs found in the peer reviewed literature

1. Case management and care coordination programs

Inala primary care centre outreach case management program in Brisbane: Askew et al (2016) described a home-based outreach case management program aimed at Aboriginal patients with a confirmed chronic condition, including diabetes. The program was facilitated through a primary care centre in Inala Queensland and was run by two case managers, both registered nurses (RNs). One of the case managers was Aboriginal, the other was not Aboriginal however had relevant cultural experience. The program aimed to support clients to achieve their own health or lifestyle goals. During a home visit, the case manager worked with patients to identify their health or lifestyle goals for the next six months. The case managers then facilitated a case conference with relevant multi-disciplinary providers to identify strategies and a care plan to support the patient. The case manager both advocated for clients to ensure they received appropriate care and encouraged and empowered them to be active members of their care team.

A mixed methods evaluation of the program examined the feasibility, acceptability and appropriateness of the model of care from both patient and staff perspectives. Participants reported feeling positive about the model of care. They felt their health and safety needs were met and that they became increasingly involved in their own care. The home visiting component was identified as important, as it increased their sense of safety and reduced the inconvenience of travel. Staff reported that the case conferences were useful for ensuring patients did not fall through the gaps and that the model overcame the problems of fragmented care that were often reported by clinic only patients. Significant improvements in diabetes control were documented, as measured through reduced HbA1c levels (mean difference -0.5% 95% CI -1.0 - 0.0 % p=0.05). Improvements in depression scores and blood pressure were also observed.[3]

Getting Better at Chronic Care Project (GBACC): The GBACC project was a cluster RCT piloted to improve the care of those with poorly controlled diabetes residing in 12 rural and remote Indigenous communities in North Queensland. Participants were existing patients of these sites with poorly controlled T2DM and at least one other chronic condition. The intervention was intensive chronic condition management for 18 months, which was delivered by an Indigenous health worker (IHWs) in conjunction with standard primary care. The IHWs were recruited from within the communities and received additional training from the clinical team to provide care for chronic conditions. The Indigenous health worker-supported (IHW-S) model was family-centred and focused on community outreach. IHW roles included helping patients to make and keep appointments, understand their medications and nutrition and the effects of smoking, and work with the patient to support self-management. Home visits and out of clinic care were provided according to patient preferences. Two studies reported on this trial, McDermott et al, 2015 reported solely on the clinical findings[4] and Segal et al, 2016 reported an economic evaluation.[5]

McDermott et al (2015) found that at follow up 45.2% of the intervention group patients had a management plan for diabetes compared to 35.5% in the control group receiving usual care (OR 1.23 95% CI 0.72-2.22). The intervention group were also more likely to have seen a dietician and dentist and slightly more likely to have seen a diabetes educator, be taking insulin and been vaccinated for influenza. This study also reported a significant decrease in HbA1c of 1% from baseline in the intervention group from 10.8% to 9.8% compared to the control (p 0.018). More patients in the intervention group were also reported as achieving at least a 0.5% interval reduction in HbA1c.[4]

By contrast, the economic evaluation conducted by Segal et al (2016) reported that change in HbA1c levels in the two groups was non-significant. The authors acknowledge this in their paper, and attribute this to further exclusions applied to participants who did not meet the inclusion criteria for the study. The study also reports a minor fall in quality of life in both groups, non-significant differences in the rate of disease progression, and an increase in the rate of hospitalisations in both groups. Their cost sequence analysis revealed only a small

reduction in annual hospitalisation costs for most care components, with the difference only approaching significance for diabetes. The authors conclude that given the IHW-S model achieved no significant improvement in HbA1c levels, the expenditure of $6,700 per patient per year for the program was probably a poor investment.[5]

Chronic disease care planning in South Australia: Harvey et al (2014) conducted a longitudinal analysis of clinical records from two Aboriginal communities in South Australia. The study aimed to document the connection between the application of structured systems of care and their long term health status. Repeated measures clinical data were collected for individual patients using a range of clinical indicators for diabetes (type 1 and 2) and related chronic conditions. The researchers then worked with consenting patients to understand their journey through illness, diagnosis, treatment and ongoing self-management. The data sources were combined to form a longitudinal record of health status which was then analysed for trends over time using random effects modelling. The participating communities had a range of chronic illness management strategies in places. One community reported well established processes for preparing and monitoring chronic condition management care plans along with other self-management initiatives based on a modified Stanford University self-management model. Other initiatives underway, included the introduction of formal care planning processes and community education and support programs to encourage people with chronic conditions to make lifestyle and dietary changes. All patients were involved in some form of structured chronic condition management systems. This ranged from effective self-management with clinical support at one extreme, to simple diagnosis and medication support at the other end. The results of the modelling showed that where care planning had been in place for longer, overall improvements in body mass index, cholesterol and HbA1c were recorded.[6]

Fitzroy valley health service partnership: Reeve et al (2015) reported on a cross sectional evaluation of a health service partnership between an ACCHS, a hospital and a community health service in the Fitzroy Valley in the remote Kimberley, Western Australia. The aim of the partnership was to reorient the services toward a more comprehensive primary health care approach. Prior to the partnership, care was largely episodic and reactive to patient initiated presentations.[7]

The partnership agreement enabled the three services to have a single governance structure for allocating funding, sharing a single medical record and delineating areas of responsibility: responsibility for health promotion, environmental health and cultural safety belonged to the ACCHS; responsibility for acute inpatient care, primary care clinic and specialist care to the state district hospital; and responsibility for public health, screening and primary care community clinics and programs was given to the state operated Population Health Unit. Funding was accessed to facilitate the implementation of the shared electronic medical record and additional primary health care positions to provide chronic disease management and care planning. A special exemption was made to allow Medicare billing for all primary care patient visits, which was a significant driver of increased primary care activity, providing additional resources and incentives to commence adult Indigenous health checks and care plans. In parallel, the community led implementation of alcohol restrictions was underway, which resulted in a decreased acute care workload.[7]

The evaluation showed an increase in primary care activity over the 6-year period, alongside an overall increase in service activity. Hospitalisations remained relatively constant. The trend in non-urgent Emergency Department presentations which had been increasing also reversed. Increased access to primary care led to an increase in health checks in accordance with guidelines and a subsequent increase in the proportion of patients identified with chronic disease or risk factors. The ACCHS provided regular feedback from the Aboriginal community enabling services to provide more culturally appropriate and respectful services, including increased employment of Aboriginal staff and cultural training for all staff. Despite increasing numbers of patients receiving diabetes care, improvements in glycated haemoglobin levels (>7%) or in blood pressure levels reaching target values were not significant.[7]

2. Foot care programs

Moorditj Djena community-based outreach program in Perth: Moorditj Djena is an Aboriginal community initiative which provides a culturally sensitive, high-risk foot and diabetes outreach service for Aboriginal people to identify, manage and prevent foot complications resulting from chronic disease and to learn diabetes self-management skills. Clinic staff also assist with transport, arrange medication reviews, and help with social issues. HbA1c testing is offered to all clients with diabetes. The program is led by the Aboriginal health team of the South Metropolitan Population Health Unit. The operational team consists of a coordinator, two podiatrists, one Aboriginal diabetes educator, one Aboriginal health professional and one Aboriginal administration secretary. The program receives client referrals from general practices, hospitals, community health centres, word of mouth, self-referrals and community referrals.[8]

Ballestas et al (2014) reported on an early evaluation of the program in terms of its implementation, the organisational context, structures and procedures and the program's cultural sensitivity from staff perspectives. The findings demonstrate the benefits of an accessible and culturally appropriate health service, evidenced by the high level of attendance and the high regard for the program at the community-level. A clinical outcome evaluation was reported to be underway, which was to include a data linkage study to assess hospitalisation rates among high risk clients before and after enrolment in the program.[8]

Albury-Wodonga Aboriginal Health Service (AWAHS) podiatry services: AWAHS implemented podiatry services in 2011 for Aboriginal or Torres Strait Islander patients with T2DM. At the commencement of this service, the University of Texas Diabetic Foot Risk Classification System (UTDFRCS) was used to identify Aboriginal diabetes patients' risk for future foot-related complications. The clinical information documented at the first consultation and used to determine patient risk status included a T2DM diagnosis, an assessment of protective sensation using a 10g monofilament, presence or absence of foot pulses on palpation, an Ankle-Brachial Pressure Index (ABPI), the presence of deformity, and current or prior history of ulceration and/or Charcot's joint.[9]

The paper by Blatchford et al (2015) reported on a retrospective clinical audit to ascertain adherence to the National Evidence-Based Guideline for podiatric review timeframes according to their risk status. The audit found there was excellent overall adherence (94%) within the study population (n=729 patients). The authors suggest this could be attributable to the strategy of the AWAHS, which strives to ensure services are culturally appropriate. They also operate a flexible clinic which allows for drop in appointments and provides transport services for patients.[9]

3. Diabetes education programs

Foot care education movies in the Kimberley: Schoen et al (2015) describes two diabetes foot care education movies, which present a practical way to support foot health in Aboriginal people living in the Kimberley region. The first foot care education movie, Bran nue leg, is directed towards Aboriginal people 'at-risk' of developing diabetes. The second movie, Deadly (and not in a good way), is aimed at Aboriginal people living with an amputation. These movies were produced in collaboration with Goolarri Media Enterprises, an Aboriginal media company and they draw upon local knowledge to ensure the content is appropriate, respectful and evidence-based. Both movies strive to improve viewers' health literacy with respect to 'at-risk' feet and promote earlier engagement with health services for foot problems. The resources have no reported evaluation.[10]

Diabetes educator training in Far West NSW: King et al (2013) conducted a descriptive qualitative study examining the issues that compromise the clinical practice of rural and remote AHWs and RNs who undertake an accredited diabetes educator course. The study was conducted in two ACCHS and seven mainstream health services in Far Western NSW. Participants were experienced diabetes educators (RNs and AHWs), managers and students currently enrolled in the course (n=17). The AHWs and RNs completed the diabetes course to

enable them to deliver care to Indigenous Australians. This was reported as the first time that a regional health services had supported diabetes specialist AHWs and RNs working in partnership to help improve the diabetes health status of Indigenous Australians. Participants who attended the course reported several issues that compromised their practice. Barriers included confusing funding practices by NSW Health, the duplication of health services, the lack of recognition for the diabetes qualification, the lack of a universal data system and the working with communities that were mobile. Strategies to improve practice included a need for continuous and dedicated funding, strategic diabetes planning by managers, improved communication between managers and educators and Aboriginal involvement with the delivery of services.[11]

4. Diabetes care programs

Project Ferret chronic disease register in the Torres Strait: Project Ferret is a chronic disease information system used frequently in the Torres Strait. Forbes et al (2013) conducted a retrospective review of diabetes care in a small community in the Torres Strait Islands, with a demographic representative of the wider Torres Strait Island population. As part of the audit, all clinical records data for patients with diabetes registered between 2009-10 were extracted. The results were compared with an earlier audit undertaken in 2004.[12]

The audit assessed data for n=77 people with T2DM in the community, a 17-person increase in the number of diagnosed cases since 2004. All patients were Indigenous, 52% were women, and the mean age was 52 years. The audit found that diabetes care processes had declined from 2004, including a 5% reduction in serum creatinine measurement and a 32% reduction in foot checks. Glycaemic control remained poor overall. In terms of optimal management goals for diabetes, only 34% of diabetics were identified as meeting target blood pressure guidelines and over 67% were found to have albuminuria.[12]

Diabetes care programs in the Kimberley: Stoneman et al (2014) conducted a retrospective audit of primary care records providing a descriptive evaluation of care for patients with T2DM across four ACCHS in the Kimberley. A total of n=348 medical records of Aboriginal patients aged 15 and over with a confirmed T2DM diagnosis were included in the review. A series of interviews with staff (n=19) and focus groups with patients (n=16) were also conducted to gather their perspectives.[13]

The audit found service delivery levels were high across three of the ACCHS for most diabetes care processes including HbA1c testing, blood pressure and cholesterol checks. The fourth ACCHS had lower levels of service provision. Recall systems to contact patients for a diabetes review if they had not attended in more than three months were reported to be in place in two ACCHS. In the other two ACCHS, no formal recall systems were in place, however some General Practitioners (GPs) performed intermittent searches to identify patients due for recall. Two of the ACCHS has chronic disease clinics where diabetes reviews took place resulting in reduced waiting times for patients. ACCHS 3 and ACCHS 4 had allocated GP time for chronic disease management however a lack of coordination of this time was noted to decrease their effectiveness, and acute presentations were often prioritised over chronic disease management. Recorded service delivery rates for retinal screening, brief foot checks, assessment of diet and physical activity, assessment of smoking status and general practice management plans were low across all four clinics.[13]

Both patients and staff perceived the diabetes clinics as favourable. Patients reported that the AHWs were an important facilitator of diabetes care as they broke down communication and cultural barriers. Staff noted high nursing staff turnover and lack of clarify around roles as barriers. GPs suggested that to improve efficiency of diabetes care, patient recalls followed by initial review by an AHW or RN for self-management support was needed prior to GP review. Access to allied health services was perceived as important in delivering diabetes care although reportedly this did not always function well.[13]

Winnunga diabetes care program in Canberra: Chung et al (2014) conducted a retrospective audit of adult patients with T2DM in Winnunga AHS in Canberra. The centre operates a diabetes clinic which acted as a 'one stop shop' for diabetes care. In addition to facilitating peer support, the clinic conducts cooking

demonstrations, patient education on lifestyle changes and diabetes management. Patients can also access podiatry, dietetics and a diabetes educator without an appointment. The audit compared Aboriginal patients who attended the diabetes clinic with those who did not. The audit identified a statistically significant difference between diabetes clinic attenders and non-attenders in meeting diabetes check guidelines, pneumococcal vaccination and use of hypoglycaemic medication. Despite these differences, clinical outcomes between the two groups were not statistically different.[14]

5. Early identification

The Western Desert Kidney Project (WDKP): The WDKP is an arts health project that has been implemented in 10 predominantly Aboriginal communities in the Goldfields region of Western Australia. The program aims to reduce the prevalence and burden of diabetes and kidney disease through early identification and education about prevention. A truck equipped to deliver a screening program visits each community for about two weeks, aiming to screen all community members for diabetes and kidney disease. The clinical team is comprised of AHWs, including one worker with close family ties and cultural authority within the communities. Alongside this, a second truck provides education via a community arts program disseminating positive and culturally appropriate messages about kidney disease prevention. One arts intervention involved traditional sand-drawing techniques which were used to generate community-led stories with locally relevant health messages about kidney health. Each arts residency ended with participants sharing their creative work within their respective communities.[15]

A qualitative evaluation of the program assessed patient perspectives as well as service outcomes. Rates of participation were high for both the clinical screening and arts health components of the project. The interviews with participants found the program was well received and effective in addressing the needs of the community. Community leaders publicly endorsed the project, many participants committed to changing their lifestyle, and all participants endorsed the preventive messages for others. Community members valued the integration of skilled Aboriginal health workers in this intervention.[15]

Kimberley diabetic eye health program: In the Kimberley region, screening for diabetic retinopathy (DR) has been carried out using retinal photography since 1996. However, from 2006, the program suffered the loss of the regional eye health coordinator, resulting in decreased screening activity. This prompted the joint establishment of a Kimberley diabetic eye health coordinator (KDEHC). The KDEHC provides training to AHWs, nurses and other clinic staff, who perform retinal photography and visual acuity measurements, as well as providing screening services in areas with no permanent retinal camera or camera operator staff.[16]

Moynihan et al (2017) conducted a retrospective audit of the program between 2010-14 to determine its coverage and the impact of the KDEHC on program quality and reach. Data were collected from 17 primary care services in the Kimberley on patient characteristics, screening locations, visual acuity and the presence and severe retinopathy. Over the course of the audit, program coverage increased from 9.44% to 29.8% as did the number of sites involved (from four up to 17), which was attributed to the KDEHC role. The rate of visual acuity recording also increased after the recruitment of the KDEHC (50.7% up to 83.9%).[16]

6. Point of care HbA1c testing

Point of care testing (POCT) for early identification of diabetes in the Kimberley: Marley et al (2015) examined a program to improve early identification of diabetes through point of care testing for HbA1c. Delayed diagnosis of diabetes is often in part due to the use of a complicated pathology testing algorithm (the glucose algorithm). By contrast, the POCT is easy to deliver and no fasting is required, making opportunistic testing feasible and reducing the chances of missed diagnoses. A cross sectional study comparing the two procedures was conducted through six primary health care sites in the Kimberley region. Existing patients (n=255), who were identified as being eligible for diabetes testing (i.e. they had not previously

been diagnosed with diabetes) were recruited from each site. Clinic staff recorded patient consent, determined fasting status, conducted an initial POCT HbA1c test and collected blood for confirmatory laboratory HbA1c and glucose tests. The study found that patients were more likely to have a definitive result with 7 days, be followed up appropriately, and be diagnosed with diabetes using the POCT compared with the laboratory glucose algorithm, demonstrating it as both a timely and accurate means of diagnosing diabetes in remote Aboriginal communities.[17]

POCT for diabetes self-management in remote Northern Territory: Spaeth et al (2014) compared the POCT with laboratory testing and its role in diabetes self-management in 30 remote health centres in the Northern Territory participating in the Quality Assurance in Aboriginal and Torres Strait Islander Medical Services (QAAMS) Program. QAAMS has provided POCT for HbA1c in remote Northern Territory health centres for diabetes management of Indigenous patients since 2008. Operators performing the tests included remote area nurses and Aboriginal Health Practitioners who undergo training and competency certification through the QAAMS Program.[18]

The study examined patients who had three or more HbA1c results performed by POCT who were then assessed to determine their overall change in glycaemic control. The mean turnaround time from sample collection to receipt of the result was 2.3 days with laboratory testing, compared to 6 minutes with the POCT. Similarly, for laboratory testing, the mean time to return for a follow up appointment (i.e. to get the results) was 24 days in the remote setting, compared to immediately when the POCT was conducted in the consultation. For the 181 patients who underwent three or more POCTs during the study period, the mean reduction in HbA1c was from 9.2% to 8.8%, 40 of which showed a reduction greater than 1.5%. The study demonstrates POCT is not only convenient, but improves glycaemic control for Aboriginal patients with diabetes in remote settings.[18]

Review of the cultural safety of the QAAMS POCT program: Shephard et al (2016) conducted a qualitative review of the cultural safety of the QAAMS program. As outlined above, QAAMS provides culturally safe, convenient and accessible 'one stop' pathology services for Indigenous clients with diabetes, and empowers AHWs to have a direct role in the care of their patients with diabetes. The POCT is conducted at the time and place of patient care and results are available at the time of consultation. An Indigenous leaders team is responsible for ensuring the programs' cultural safety and providing training and resources for patients. POCT operators (AHWs, nurses, diabetes educators or other allied health professionals) work in communities delivering testing and education.[19]

The review consisted of a focus group with the Indigenous leaders and an electronic survey of the operators. The Indigenous leaders team reported the importance of administering a culturally safe program and the role they played in connecting QAAMS with the community and participants. The leaders noted that AHWs in QAAMS developed a sense of autonomy and pride in being able to deliver the program and contribute more to the clinical management of diabetes clients in their community. Indigenous leaders reported that for patients, being tested in their own community by an AHW was important. For POCT operators, more than 80% believed QAAMS was well regarded by health professionals and more than 90% believed it raised awareness of diabetes in the community, and was effective in improving clinical outcomes. The POCT itself was noted to be an important opportunity for engagement and education, with results provided on the spot. It was perceived both as convenient and having a motivational effect on clients to improve their health.[19]

7. Diabetes self-management

Glucometers for self-management in regional Queensland: Although self-administered glucose monitoring is widely regarded as an important part of diabetes self-management, home medication reviews in Mount Isa, Queensland identified that many patients with poorly controlled diabetes did not have enough

knowledge of glucometers to use them effectively. This prompted a small qualitative study to elicit the barriers and enablers to effective glucose self-monitoring in Indigenous patients in the local community.[20]

Two focus groups were conducted with n=9 Indigenous patients, although only seven owned a glucometer. Of the seven with a glucometer, only four were confident that they were working properly, and several barriers were reported, including: getting high numbers on the readings but not understanding them; lack of encouragement from health care providers; feeling lazy, worried, ashamed, and pain; not owning strips and/or lacking the finances needed to purchase strips; not remembering; not being able to collect any blood; and fear of results. Enablers included: having an explanation as to the glucometers importance; having more strips; daily checking during home visits done by Aboriginal health workers; engaging with telehealth; and holistic diabetes care. The study highlights that further work is needed to ensure adequate education and resourcing is provided so glucometers can be effectively used.[20]

Diabetes support group for Nywaigi women in Queensland: Payne et al (2013) documented a community based support group for women with T2DM created by a group of Nywaigi female Elders. The women participated in the design and conduct of the support group, which was then facilitated by non-Indigenous allied health clinicians. The aim of the program was to provide informative content and enable sharing of strategies to promote effective self-management practices. The final programme consisted of eight weekly sessions covering an introduction to concepts of change, health ownership, disease self-management strategies, and a focus group style debriefing component. The teaching plans were flexible, which allowed participants to interact during the sessions and provide feedback that could be implemented in subsequent sessions.[21]

A before-after evaluation of the program looked at the impact on depression using self-administered questionnaires and a validated depression instrument. After participation in the group, participants reported that their awareness of depression and its symptoms had increased and they were more confident to discuss issues openly and connect with others in terms of self-management. Most participants reported that the translation of knowledge into sustained behaviour change was more challenging. Post intervention evidence also demonstrated an increase in regular health checks with their care provider as well as more frequent contact with the diabetes educator. Although this was not the main aim of the program, one participant was able to improve her self-management to the extent of significantly reducing her blood glucose level.[21]

Grey literature

The search of the grey literature identified two reports,[22, 23] one operational plan for Central Coast Local Health District (LHD)[24] and two programs briefly described on websites.[25, 26] The QAAMS website also came up in the searches, however this has been sufficiently covered in the peer reviewed literature and no additional information was identified. In addition to this, a complete list of all identified diabetes programs implemented through the ACCHS and in the LHDs are provided in tables in Appendix D. Many of these were very brief descriptions found on websites, so have not been considered in the body of the report. A summary of the included grey literature is below.

The first report found was an evidence scan commissioned in 2016 by the Ministry of Health, Addressing diabetes related foot disease (DRFD) in Indigenous NSW. The report was prepared by SARRAH, Services for Australian Rural and Remote Allied Health[22] and examines a number of interventions for DRFD undertaken in NSW. The report summarises a range of strategies for lessening the burden of DRFD that have been implemented successfully. Primary prevention strategies, which focus on patient education and foot screening have been associated with fewer amputations. Treatment for people with established DRFD requires the involvement of a multidisciplinary foot care team, which has been shown to improve outcomes for patients, reduce amputations and decrease the likelihood of re-ulceration and infection. Podiatrists were identified as being vital to the treatment of patients with DRFD. Podiatrists place feet as their first priority and have a

specialised skill set for foot treatment. Increased utilisation of podiatric care has been linked to better outcomes. Strategies that have been successful in addressing Indigenous diabetes have involved community consultation, participation and ownership, the engagement of Indigenous staff, and coordinated and holistic care. In general, approaches to Indigenous health conditions should work on building trust with patients, and use a 'close to home' model.[22]

The second report, Review of diabetes among Aboriginal and Torres Strait Islander people by Burrow and Ride (2016), was found on the Australian Indigenous Health InfoNet website. The report outlined two diabetes programs of interest, which are described below.[23]

Aunty Jean's Good Health Program: This program was piloted in Illawarra Shoalhaven LHD and now operated in the Southern and Murrumbidgee LHDs of NSW. A similar program, based on Aunty Jean's model is also operating in Central Queensland. The program is based on a combined model of health promotion, education and self-management to support Aboriginal people with chronic and complex needs. The program was designed around a strong belief in the community's capacity to work together and the involvement of Aboriginal Elders. The program consists of 12 modules delivered one day per week over 12 weeks, combined with a self-managed, self-directed home program. A 2004 evaluation of the program outcomes provided strong evidence of improvements in: self-management; appropriate and effective working partnerships; culturally acceptable and appropriate information-sharing; levels of physical activity; and self-management strategies. Key factors in the success of the program included: the leadership, commitment and participation of Elders; the strength of existing relationships within the community and between the community and health professionals; the input of specialist knowledge and support; a commitment to developing culturally appropriate health promotion strategies and behaviours; and location of the program within a safe community space.[23]

Wurli Wurlinjang diabetes day program: This program was established in 2008 and operated in the community of Katherine in the Northern Territory. The program aims to provide a supportive environment and culturally appropriate, comprehensive care that fosters empowerment and promotes self-management among Aboriginal clients with T2DM. Evaluation of the program outcomes demonstrated a considerable improvement in social and emotional wellbeing; an overall improvement in the proportion of clients receiving management plans, health checks and HbA1c testing; and a small but significant improvement in clinical outcomes, including control of blood sugar, blood pressure, cholesterol levels and weight. Certain system failures, such as patient recalls, medication and education, were also highlighted and have been subsequently addressed.[23]

The third document is an operational plan for Central Coast LHD, Diabetes Care on the Central Coast 2017-21. The plan outlines two diabetes programs for Aboriginal people operating in Central Coast LHD.[24]

The Yerin Eleanor Duncan Aboriginal Health Centre: is a community controlled integrated primary health care service located at Wyong and Gosford on the NSW Central Coast. In addition to clinical services, the Centre operates a medical outreach Indigenous chronic disease program comprising a visiting endocrinologist, diabetes educator, podiatrist and dietician. The clinic operates monthly.

Nunyara Aboriginal Health Unit: provides a range of health services for Aboriginal and Torres Strait Islander people. The Chronic Care Manager and Clinical Nurse Specialist Chronic Care for Aboriginal People implement the Chronic Care program which includes but is not limited to following up patients who have been admitted to hospital and identified as having one or more chronic diseases.

The remaining grey literature search identified brief descriptions of diabetes programs for Aboriginal and Torres Strait Islander people found on websites, as outlined below.

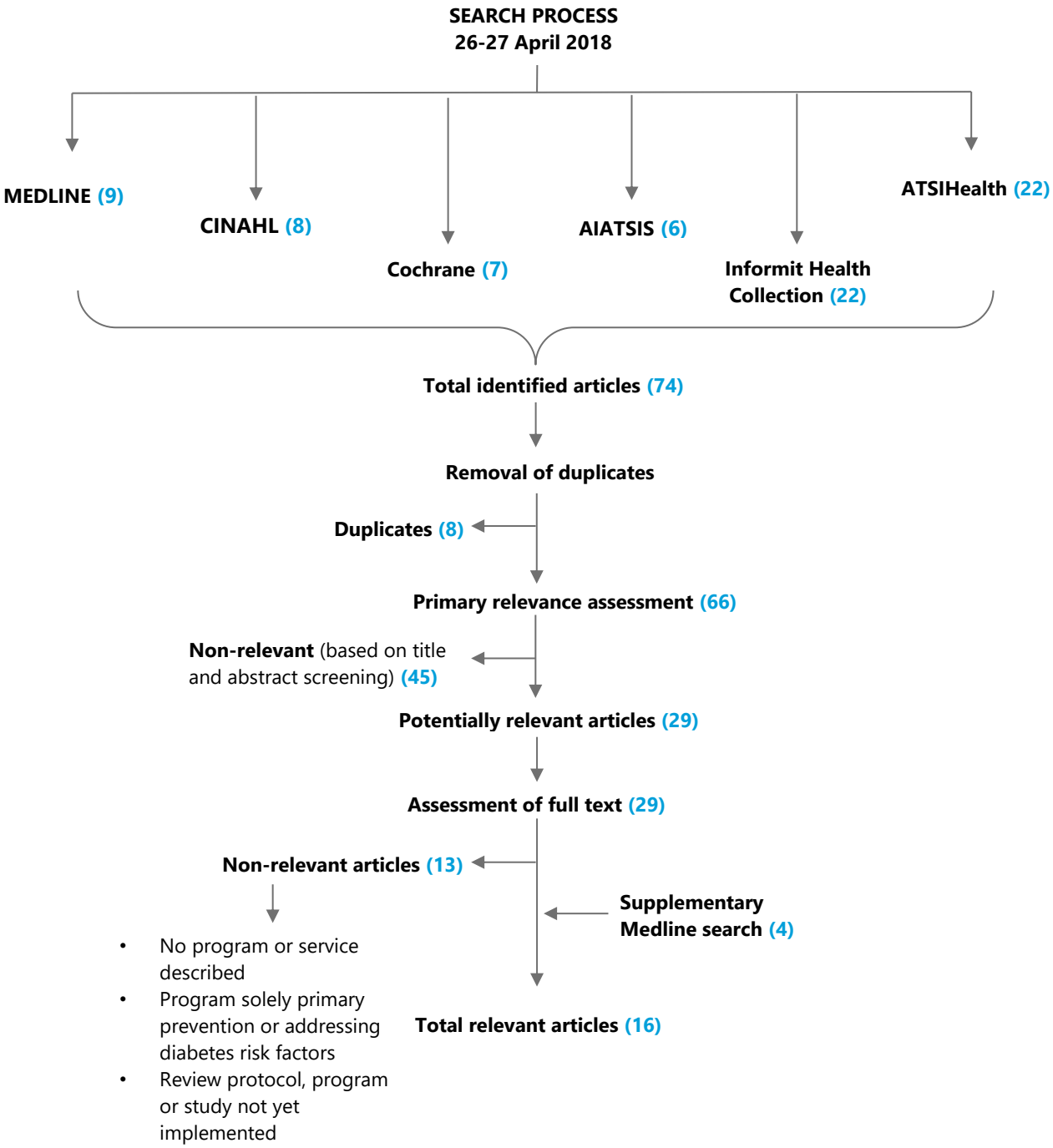
The Caritas Australia Indigenous Wellness Program, Diabetes Management and Care: The program utilises Community Cultural Carers who work within their own communities to develop health plans and

undertake activities that utilise their strengths and address the physical, spiritual and cultural wellbeing of their community. The program operates in remote Aboriginal communities in the Kimberley and is community initiated. Activities undertaken by cultural carers include providing awareness and support for people who are sick with diabetes, education about nutrition and food as well as supporting people to understand the health system. The program also undertakes community health assessments to screen for chronic diseases include diabetes and its risk factors. This website reports that the screening program identifies many new cases and acts a gateway to the Cultural Carer program. No formal evaluation was found.[25]

An interactive self-management education module for Aboriginal and Torres Strait Islander people: The National Diabetes Service Scheme and Diabetes Australia are delivering culturally appropriate diabetes information using interactive technology. The Hitnet Kiosks are located all around Australia including in remote communities (in 2016 there were 50 hubs in operation). The modules include: What is diabetes, managing diabetes, fighting diabetes, diabetes in pregnancy, personal stories, and where to get help. Information is also being adapted for personal devices (apps). This information was reported in a conference presentation to the NACCHO conference in Melbourne in 2016.[26]

Appendices

A. PRISMA flow chart



B. Data tables

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Askew et al, 2016	Mixed methods service evaluation examining feasibility, acceptability and appropriateness of the model of care from patient and staff perspectives.	Self-management Care coordination	Home based outreach case management (CM) facilitated through a primary care centre in Inala, QLD	Aboriginal patients with a confirmed chronic condition n=41 participants Patients had to live within a geographically accessible distance of the main primary care centre and be deemed by the NUM as someone who would benefit from CM.	The program was delivered in 2 phases: a comprehensive health and wellbeing needs assessment and a chart audit of diagnosis, medications, blood tests, service utilisation and preventive activities. A home visit followed where demographic information, identification of traditional country and relevant family and social supports was gathered. patients identified up to 3 health/lifestyle goals to focus on over the next 6/12. The CM then synthesised the information and presented it in a case conference attended by the GP, patient and other care providers and coordinated multidisciplinary strategies to support the patient were developed along with a care plan. Phase two involved subsequent chart audits and home assessments every 3-6/12 with a f/up case conference at 6/12.	This service operated as a research study through the QLD Centre of Excellence in Aboriginal and Torres Strait Islander Care. Participants were existing patients identified by the NUM as being eligible.	2 CMs both RNs 1 Aboriginal and 1 not Aboriginal	PATIENT: All participants were positive about the model and became increasingly involved in their own care. Delivery of care in the home was identified as important to patients as it increased their sense of safety and reduced the inconvenience and cost of travel. HEALTH: Significant improvements in T2D control as measured through HbA1c (mean difference -0.5% 95% CI -1.0 - -0.0 % p=0.05) improvements in depressions rates and blood pressure were also achieved. STAFF: appreciated the case conferences and were less worried about patients falling through the gaps. They reported the model enabled them to be more proactive in delivering care increasing their personal satisfaction. Staff identified that the model overcame some of the problems of fragmented care that were experienced by clinic only patients.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Ballestas et al, 2014	Mixed methods evaluation of the Moorditj Djena program.	Education and self-management	Aboriginal community-based outreach program facilitated through three community centres, three Medicare locals with Aboriginal primary health care teams, one Aboriginal medical service, one hospital and one satellite population health unit office in Perth, WA.	n=702 individual clients had attended the service by 30 June 2013; Most clients were Aboriginal and had at least one chronic condition such as diabetes. Clients' ages ranged from 8-87 years.	The Aboriginal community initiative provides a culturally sensitive, high-risk foot and diabetes education outreach service for Aboriginal people to identify, manage and prevent foot complications resulting from chronic disease and to learn diabetes self-management skills. Strategies employed to ensure that the program is evidence-based and culturally appropriate include evidence-based protocols and policies, community and inter-sectoral collaboration, employment of Aboriginal staff, cultural awareness training of non-Aboriginal staff, accessible clinics, quality improvement initiatives, and a holistic approach to client care. Clinic staff assist with transport, arrange medication reviews, and help with social issues. HbA1c testing is offered to all clients with diabetes.	Referrals from general practices, hospitals, community health centres, word of mouth, self-referrals and community referrals. Over half self-referred after being introduced to the program through word of mouth; the remainder were referred by primary or tertiary healthcare professionals.	The program is led by the Aboriginal health team of the South Metropolitan Population Health Unit. The team consists of a coordinator, 2 podiatrists, 1 Aboriginal diabetes educator, 1 Aboriginal health professional and one Aboriginal administration secretary.	SERVICE: The Moorditj Djena program is demonstrating the benefits of employing an accessible and culturally appropriate health service, as evidenced by the high level of attendance and the high regard for the program at the community-level. HEALTH: A clinical outcome evaluation is now underway, including a data linkage study to assess hospitalisation rates among high risk clients before and after enrolment in the Moorditj Djena program.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Blatchford et al, 2015	Retrospective clinical audit over 26 months period to classify Aboriginal T2DM patients' risk status according to UTDFRCS	Early identification Foot care	Albury-Wodonga Aboriginal AHS in NSW. This is a primary health care facility that started podiatry services in August 2011.	n=70 Aboriginal or Torres Strait Islander patients with T2DM were included in this study. Participants had a mean age of 55.43 years, with the majority being female, and a mean duration of T2DM >5 years. Patients had accessed AWAHS podiatry services after 1st January 2012.	Podiatry services were first implemented in 2011, and the UTDFRCS was taken up to identify patients' risk for future foot-related complications. The clinical information documented at the first consultation to determine patient risk status included a T2DM diagnosis, an assessment of protective sensation using a 10g monofilament, presence or absence of foot pulses on palpation, an Ankle-Brachial Pressure Index (ABPI), the presence of deformity, and current or prior history of ulceration and/or Charcot's joint. The occasions of patient visits were also collected from the appointment book in the ZedMed computer based patient administration system. The primary variables of interest were the UTDFRCS for each subject and whether those participants met the National Evidence-Based Guideline for review appointment timeframes. There was high overall adherence of this which may be attributed to the strategy of the AWAHS, which strives to ensure their services are culturally appropriate.	This podiatry service operated through the AWAHS. Participants were existing patients of the service who accessed podiatry services after 1st January 2012.	The clinical information was collected by one podiatry practitioner throughout the data collection period.	SERVICE: There was a high overall adherence rate of 94% of the study population to the National Evidence-Based Guideline for podiatric review timeframes according to their risk status. HEALTH: Regular foot examinations had not decreased the incidence of ulcerations and amputations. However, engaging in regular foot examinations helps podiatrists in categorizing patients according to their risk status, which guides interventions to reduce the likelihood of ulceration and amputation.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Forbes et al, 2013	Retrospective review of diabetes care from 2009-10 conducted using a chronic disease register (Project Ferret). The results were compared with a 2004 study conducted in this to determine diabetes care processes and intermediate clinical outcomes in a remote community	Treatment	A small community in the Torres Strait Islands, with a demographic representative of the wider Torres Strait Island population.	Through Project Ferret, n=77 people with T2DM were identified in the study community, a 17-person increase from 2004. The mean age among those diagnosed was 52 years, and 52% were women. All patients were Indigenous.	Project Ferret, a chronic disease information system used frequently in the Torres Strait, was employed to identify those registered as having T2DM between 1 January 2009-10. Diagnosis was checked against the clinic file for all patients enrolled in the diabetic register. Variables checked included blood pressure, weight and BMI, HbA1c, serum creatinine levels, ACR, lipid levels, vaccination status and whether feet and eye checks had been undertaken within the last 12/12. Diabetes and other chronic disease medications were also documented. Comparison data from the 2004 audit for the same community was collected from Queensland Health. The number of diabetic care processes undertaken declined over the 5-year period of interest, hindering overall diabetic control and progress towards meeting optimal management goals.			SERVICE: From 200-09, there was a decline in the number of diabetes care processes. This includes a 5% reduction in serum creatinine measurement and a 32% reduction in foot checks. The sole care process that increased in frequency over the 5-year study period was influenza vaccination, which increased by 43%. HEALTH: During the study period, the average age of diagnosis decreased from 54 years to 52 years and the average weight increased by 5.6 kg. The average systolic and diastolic blood pressure increased, and the median ACR increased as well. Glycaemic control remained poor overall. In terms of optimal management goals for diabetes, this study found that only 34% of diabetics are meeting target blood pressure guidelines and over 67% of this population have albuminuria.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Marley et al, 2015	Cross-sectional study to compare the effectiveness of a new model of detecting diabetes (the HbA1c algorithm) vs the standard model (the glucose algorithm) in diagnosing prediabetes and diabetes.	Early identification	Data were collected from 2011-13 from 6 primary health care sites in the Kimberley region of WA	All Aboriginal and Torres Strait Islander people in the Kimberley region aged 15 years and older who did not have confirmed diabetes and who were due for diabetes testing and attending participating clinics were invited to take part. n=255 participants were enrolled and assessed by both models Their median age was 36 years and 152 participants were female.	Clinic staff recorded patient consent, determined fasting status, conducted initial POCT HbA1c and collected blood for laboratory HbA1c and glucose tests. Classification by the HbA1c algorithm used the POC HbA1C measurement, with the laboratory HbA1c test confirming the diagnosis. Classification using the glucose algorithm was based on the first laboratory venous plasma glucose (PG) measurement. Participants with an initial laboratory HbA1c value greater than 39 mmol/mol or a glucose level greater than 5.5 mmol/L were to be followed up at the clinics with further tests. Subjects were diagnosed with diabetes if they met any of the HbA1c- or glucose-based diagnostic criteria for diabetes, on the basis of the measurements obtained over the study duration. The results demonstrate that the Kimberley HbA1c algorithm may offer a more timely and accurate diagnosis of diabetes for Aboriginal people.	This study was conducted through 6 primary health care sites in the Kimberley region. Participants were existing patients of these sites who were identified as being eligible for diabetes testing (i.e. they had not been diagnosed with diabetes).	Data were collected by local health care providers employed at the six primary health care sites under study.	SERVICE: Cases were significantly more likely to be diagnosed with diabetes by the HbA1c algorithm than with the glucose algorithm. Thus, this study showed that testing for diabetes by HbA1c assessment in Aboriginal populations in remote communities was more likely to produce a definitive result than glucose testing.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Moynihan et al, 2017	Retrospective audit of the Kimberley diabetic retinopathy (DR) screening program between 2010-14 to determine the coverage and impact of the Kimberley diabetic eye health coordinator (KDEHC) on program coverage and quality.	Early identification (diabetic retinopathy DR)	Data were collected from 17 primary care services in the Kimberley region of WA.	Indigenous and non-Indigenous Australians with T2DM who screened for DR between 2010-14 to 28 were eligible. Data were collected from n=1029 patients, with n=916 being Indigenous	In the Kimberley region, screening for DR has been carried out using retinal photography since 1996. However, from 2006, the program lost the regional eye health coordinator, decreasing screening activity. This prompted the joint establishment of a Kimberley diabetic eye health coordinator (KDEHC). The KDEHC provides training for retinal camera operator staff as well as providing screening services in areas with no permanent retinal camera or camera operator staff. An audit of the Kimberley DR screening program involved data collection from all referrals during the study period for Indigenous and non-Indigenous Australians with diabetes. Information was collected on patient characteristics, screening locations, visual acuity and the presence and severity of retinopathy. The central aims of this audit were to determine the coverage provided by the screening program and the impact of the KDEHC on program coverage and quality.	This DR screening program was conducted through 17 primary health care services in the Kimberley Participants were existing patients who were deemed eligible for, and underwent screening for DR during the study period.	A KDEHC was engaged in 2012 to coordinate and support the DR screening program. The KDEHC was responsible for providing training to AHWs, nurses and other clinic staff, who performed retinal photography and visual acuity measurements	SERVICE: Over the course of the audit, the coverage provided by the program increased from 9.44% to 29.8%. In addition, the number of sites involved in screening increased from 4 to 17 over the course of the audit. Such improvements can be attributed to the engagement of the KDEHC. The rate of visual acuity (VA) recording before the engagement of the KDEHC was 50.7%, compared with 83.9% during the period when the KDEHC was active. There was also a significant association between referrals being sent after the engagement of the KDEHC and vision being included in these referrals.
Taylor et al, 2016	Qualitative focus group study to investigate barriers and facilitators to self-glucose monitoring in Indigenous	Education Self-management	Two focus groups of Indigenous patients with diabetes were conducted at Mount Isa, QLD n=9		Although self-administered glucose monitoring is important in diabetes self-management, home medication reviews identified that many patients with poorly controlled diabetes did not have enough knowledge of glucometers to use them effectively. A small focus group study explored the barriers and enablers to effective glucose self-monitoring in	Self-management, with daily checks (home visits) performed by AHWs were cited as a facilitator to		PATIENTS: Of the 7 patients who owned a glucometer, only 4 were confident their glucometers were working. The participants reported barriers to use as: getting high numbers on the readings but not understanding them; lack of encouragement from health care providers; feeling lazy, worried,

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
	patients in the community.				Indigenous patients in the local community.	effective self-glucose monitoring		shamed, and pain; not owning strips and/or lacking the finances needed to purchase strips; not remembering; not being able to collect any blood; and fear of results. Participants also cited several enablers to glucose self-monitoring: an explanation as to its importance; having more strips; daily checking during home visits done by AHWs; engaging with telehealth; and holistic diabetes care.
Schoen & Thompson 2015	Description of two diabetes foot care education movies.	Education Foot care Early identification Amputation and other complications	Foot care education movies are a practical way to support Aboriginal foot health in the Kimberley, WA, which was the highest rate of lower extremity amputation in WA	The first foot care movie, Bran nue leg, is directed towards Aboriginal people 'at-risk' of developing diabetes. The second movie, Deadly (and not in a good way), is aimed at Aboriginal people living with an amputation.	2 diabetes foot care education movies have been produced and are available as DVDs or can be viewed online. These movies were produced in collaboration with Goolarri Media Enterprises, an Aboriginal media company. Local knowledge was also utilised to ensure that the content is appropriate, respectful and evidence-based. In the first movie, Bran nue leg, Baamba, a Kimberley Aboriginal Elder and celebrity who is an amputee, shares his story while drawing on relevant health and wellbeing messages. In the second movie, Deadly (and not in a good way), Kimberley Aboriginal community members share their stores in a more serious fashion. Both movies strive to improve viewers' health literacy with respect to 'at-risk' feet and promote earlier engagement with health services for foot problems by Aboriginal people.	Both movies aim to encourage Aboriginal people to use health services earlier for foot problems to aid in early identification	The authors of this paper advise practitioners everywhere of the availability of these educational films.	No evaluation available

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Segal et al, 2016	Cost-consequence analysis performed in parallel with a cluster RCT of an intervention delivered between 2012-13	Care coordination treatment	12 primary health care services in rural and remote north QLD communities with Indigenous populations.	Indigenous people with poorly controlled T2DM and at least one other chronic condition. n=87 participants in 6 Indigenous health worker-supported (IHW-S) communities and n=106 people in 6 usual care (UC) communities met the study inclusion criteria.	The Getting Better at Chronic Care Project (GBACC) was a cluster RCT piloted to improve the care of those with poorly controlled diabetes residing in 12 rural and remote Indigenous communities in North QLD. In the 6 intervention communities, participants received intensive chronic condition management for 18/12 delivered by Indigenous health workers (IHWs), in conjunction with standard primary care. The IHWs received additional training in diabetes management from the clinical team. The Indigenous health worker-supported (IHW-S) model was family-centred and focused on community outreach. Communities in the control arm received usual care (UC) from a centre-based primary care team, but with less involved IHW support. Findings from a process evaluation revealed that there was significant implementation failure during the 18-month intervention phase, which could be attributed, in part, to the restructuring of Queensland Health.	The GBACC project was conducted through 12 primary health care services in rural and remote north QLD Indigenous communities. Participants were existing patients of these sites with poorly controlled T2DM and at least one other chronic condition.	IHWs who are close to Indigenous communities linguistically and culturally were involved in providing intensive chronic care management for the intervention. Intervention and control communities were both recipients of standard primary care, which was delivered by a centre-based primary care team (nurses, GPs, IHWs providing less intensive support etc).	SERVICE: There was a small reduction in annual hospitalisation costs for most care components in the IHW-S group, but the difference only approached significance for T2DM as the primary diagnosis. Nevertheless, additional expenditure of just over $6700 per participant per year with the IHW-S intervention achieved no significant improvement in mean HbA1c levels, rate of disease progression, or quality of life, thereby rendering the service outcomes disappointing. HEALTH: The primary clinical outcome was the difference in change in HbA1c levels in the IHW-S and UC groups 18/12 post-intervention. Secondary study outcomes included change in quality of life, disease progression, and rates of hospitalisation. The mean reduction in HbA1c levels in the IHW-S group was non-significantly greater than that for the UC group. Secondary study outcomes included a minor fall in quality of life in both groups, non-significant differences in the rate of disease progression, and an increase in the rate of hospitalisations in both groups.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Sinclair et al, 2016	Qualitative study of n=26 Aboriginal people living in 3 remote communities to understand responses to the Western Desert Kidney Health Project (WDKHP).	Education Early identification	The WDKHP has been implemented in 10 Aboriginal communities in the Goldfields region of WA. Interviews were undertaken in 3 communities	n=26 adult Aboriginal people with a broad age range (11 male, 15 female), evenly representing the 3 communities, were interviewed.	The WDKHP aims to reduce the prevalence and burden of diabetes through early identification and public education of the importance of prevention. A truck was equipped to deliver a screening program. The program was held in each community annually for 3 years, lasting about 2/52. It strived to screen all community members for diabetes and kidney disease. A second truck that provided various community arts programs which sought to disseminate positive, culturally appropriate health messages was also used. Artists engaged community members to convey the message that kidney disease can be addressed and prevented. One arts intervention required community members to use traditional sand-drawing techniques to generate community-led stories with locally relevant health messages about kidney health. Each arts residency ended with participants sharing their creative work with their respective communities. After the program, a community development officer worked together with the community to generate solutions to structural issues (e.g. community advocacy and the preparation of grant applications for community infrastructure).	Recipients of this preventative intervention were existing members of three Aboriginal communities.	The clinical team was led by AHWs, including one worker with close family ties and cultural authority within the communities. With respect to the community arts programs, artists engaged community members to convey the importance of kidney disease prevention.	PATIENT: Almost all the interviewees agreed that the WDKHP was effective in addressing the needs of the community. Community Leaders publicly endorsed the project, many participants committed to changing their lifestyle and all participants endorsed the preventive message for others. Community members valued the integration of skilled AHWs in this intervention. It is important to note that participants also cited the unique role that the arts-health residencies played in perpetuating the health promotion messages of the WDKHP. SERVICE: There were high rates of participation in both the clinical screening and arts-health components of the project.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Spaeth et al, 2014	Before-After comparison of the clinical and operational efficiency of POCT vs laboratory testing over an equivalent time period of 15/12 was undertaken	Treatment Self-management	n=30 remote health centres in the NT.	A total of n=907 Indigenous diabetes patients had 1594 HbA1c tests performed by POCT at the participating remote NT health centres during the audit period.	30 remote health centres in the NT currently participate in the Quality Assurance in Aboriginal and Torres Strait Islander Medical Services (QAAMS) Program, which provides POCT for HbA1c in remote health centres for diabetes management since 2008. HbA1c POCT is performed on-site in the remote health centres. Operators conducting the tests undergo necessary training and certification through QAAMS. To compare the effectiveness of POCT versus laboratory testing, an audit of the number of HbA1c results performed by POCT on Indigenous diabetes patients from 2008-11 was undertaken by examining the NT's Primary Care Clinical Information System (PCIS). Patients who had >3 HbA1c results performed by POCT during the study period were assessed to determine their change in glycaemic control. A sub-cohort of these patients who also exhibited a decrease in HbA1c levels of more than 1.5% were subjected to a more detailed clinical audit. These audits allowed for the determination of the statistical significance of the change in glycaemic control and the number of tests performed per patient before the introduction of POCT (when HbA1c testing was conducted by the nearest local laboratory), and after POCT's implementation.	POCT for HbA1c is an initiative of the QAAMS Program, which operates through 30 remote health centres in the NT. Study participants were existing diabetes patients of these health centres.	Operators performing the tests include remote area nurses and Aboriginal Health Practitioners who undergo training and competency certification through the QAAMS Program.	SERVICE: n=181/907 of the Indigenous diabetes patients had three or more HbA1c POCT performed during this period. The mean turnaround time from sample collection to receipt of the result was 2.3 days when the laboratory was performing HbA1c testing compared to turnaround time of only 6 minutes after POCT was introduced. Similarly, when the laboratory performed the HbA1c, the mean time to consult with the doctor was 24 days in the remote setting, as compared with an immediate consultation with the doctor during the same visit post-POCT. HEALTH: n=181 patients who underwent >3 HbA1c POCTs during the study period experienced a mean reduction in HbA1c from 9.2% to 8.8%. Forty of these patients showed a greater than 1.5% reduction in HbA1c from their first to their most recent POCT.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
Stoneman et al, 2014	Mixed methods: retrospective audit of primary care records providing descriptive evaluation of care of patients with T2DM and features of effective CQI. Qualitative interviews were also conducted with health service staff and focus groups with patients post audit.	Treatment Self-management Foot care	4 ACCHS in the Kimberley WA	Audit of n=348 medical records of Aboriginal patients aged ≥ 15 years with T2DM diagnosis. Interviews were conducted with health service staff (n=19) and 3 focus groups (n=16) patients	Diabetes care measures expected to be checked at least every 6/12 were blood pressure, waist circumference, weight, HbA1c, brief foot checks and assessment of diet and physical activity. Measures expected to be recorded annually included retinal screening, full foot checks, smoking status assessment, and general practice management place. Recall systems were reported to be in place in 2 ACCHs to contact patients for a diabetes review if they had not attended in more than 3/12. The other 2 ACCHS had no formal recall systems however some GPs performed intermittent searches to identify patients who were due for recall. Where patient transport and AHWs were available, recall systems tended to be more effective. At ACCHS 4 the lack of a recall system was identified as the main factor contributing to poor service delivery. 2 of the ACCHS has chronic disease clinics where diabetes reviews took place resulting in reduced waiting times for patients. ACCHS 3 and ACCHS 4 had allocated GP time for chronic disease management however a lack of coordination decreased its effectiveness, and acute presentations were often prioritised. ACCHS 3 had a retinal screening program run by an AHW. Allied health professionals including diabetes educators, dieticians, podiatrists, optometrists visited each of		Services delivered by GPs, RNs and AHS with visiting allied health practitioners attending at varying intervals. AHWs were an enabler of diabetes care. AHWs most involved in diabetes care in ACCHS 1, in the other clinics they took observations but were not involved in consultations with patients Access to visiting allied health services (including diabetes educators, dieticians, podiatrists, optometrists).	PATIENT: Diabetes clinics perceived as favourable by patients. AHWs were identified as an important facilitator of diabetes care breaking down communication and cultural barriers between Aboriginal patients and non-Aboriginal staff. At ACCHS 1 patients reported the AHW made them feel comfortable in the clinic and appreciated their involvement. SERVICE: 3 of the ACCHs had high service delivery rates for most diabetes care processes including HbA1c, BP and cholesterol. ACCHS 4 did not perform well with significantly lower rates of service provision for these care processes. Recorded service delivery rates for retinal screening, brief foot checks, assessment of diet and physical activity, assessment of smoking status and general practice management plans were low across all 4 clinics. Diabetes clinics resulted in reduced waiting times for patients. STAFF: perceived clinics as favourable. Staff commented that greater awareness of the clinics and their importance resulted in better attendance. In ACCHS 3 and ACCHS 4 high nursing staff turnover and lack of clarify around roles were noted to be barriers. GP suggested that to improve efficiency of diabetes care,

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
					the clinics at variable time intervals. WELL COORDINATED CARE INVOLVED: allocated roles for chronic disease management, a well-functioning recall system, the involvement of AHWs in diabetes care delivery, and well-coordinated integration with allied health professionals			patient recalls followed by initial review by an AHW or RN for certain activities and self-management support would was needed prior to GP review. Access to allied health services seen as important in delivering diabetes care although not always reported as functioning well.
Chung et al, 2014	Retrospective clinical audit of adult patients with T2DM comparing diabetes clinic attenders with non-attenders	Education Foot care	Audit conducted in Winnunga AHS in Canberra	n=65 adult patients with T2DM average age 56	Monthly diabetic clinic is held at the ACCHS acting as a 'one stop shop' for diabetes care. In addition to be a source of peer support, it facilitates cooking demonstrations, patient education on lifestyle changes and diabetes management. Patients can also access podiatry, dietetics and a diabetes educator services without appointments. an endocrinologist visits every 3/12.			SERVICE: Blood pressure was the most frequently monitored outcomes, with around 2/3 of clinic attenders have their blood pressure checked in the last 3/12. a similar proportion of patients had their lipids checked. Only 40% of patients had their HbA1c checked in the past 6/12. only around 1/3 had their eyes and feet checked in the past 12/12. vaccination rates were also low. Patients who attended the diabetes clinic were more likely to have met the targets for routine checks and have their pneumococcal vaccination recorded. HEALTH: The mean HbA1c levels was 8.2% 39% of patients with a recorded HbA1c level had good glycaemic control (HbA1c <7%) and 19% of patients had an HbA1c of 7-8%. There was no statistically significant difference between attenders and no- attenders clinical outcomes although metformin use

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								was higher among those who attended the clinic (90% compared with 58%). patients who attended the clinic were also more likely to be using other diabetic medications.
Harvey et al, 2014	Longitudinal analysis of patient records from 2 Aboriginal communities in SA. Repeated measures data were collected for individual patients using a range of clinical indicators for diabetes (type 1 and 2) Random effects modelling techniques were used to model clinical indicators at the individual and group level.	Education Self-management Foot care	2 Aboriginal communities in Adelaide and Port Lincoln SA	n=36 clients aged between 35-81. 10 years of data used for each patient.	The participating communities had a range of chronic illness management strategies in places. 1 community reported well established processes for preparing and monitoring formal chronic condition management care plans along with other self-management initiatives based on a modified Stanford University self-management model. other initiatives underway in these communities included the introduction of formal care planning processes and community education and support programs to encourage people with chronic conditions to make lifestyle and dietary changes. All patients were involved in some form of structured chronic condition management systems (CCMS). This ranged from effective self-management with clinical support at one extreme, to simple diagnosis and medication support at the other end. the results of the modelling indicate the structured systems of chronic condition care may be associated with improved health status of patients.			HEALTH: Where care planning had been in place longer than in other sites overall improvements were noted in BMI, cholesterol (high and low density lipids) and HbA1c. This indicates that for Aboriginal patients with complex chronic conditions, participation in and adherence to structured care planning and self-management strategies can contribute to overall health status improvement.

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
King et al, 2013	Descriptive qualitative study examining issues that compromise the clinical practice of rural and remote AHWs and RNs who undertake an accredited diabetes educator course.	Education	n=2 ACCHS and n=7 mainstream health services in Far Western NSW	Participants were experienced diabetes educators (RNs and AHWs), managers and students currently enrolled in the course (n=17)	AHWs and RNs in Far western NSW completed the diabetes course to enable them to deliver care to Indigenous Australians. The first time that a regional health services had supported diabetes specialist AHWs and RNs working in partnership to help improve the diabetes health status of Indigenous Australians.			Participants of this study reported several issues that compromised their practice, including confusing funding practices by NSW Health, the duplication of health services, the lack of recognition for the diabetes qualification, the lack of universal data system and working with communities that were mobile. Strategies to improve practice included a need for continuous and dedicated funding, strategic diabetes planning by managers, improved communication between managers and educators and Aboriginal involvement with the delivery of services.
Payne et al, 2013	Before-After study of knowledge, health status and depression were assessed using self-administered surveys and a validated depression instrument. A participatory action research	Education Self-management	Community-based support group operating at the township of Ingham, QLD	A group of Nywaigi female Elders were assisted in creating a community-based support group for younger Nywaigi women with diabetes.	The women participated in the design and conduct of the support group, which involved information sessions on self-management, and the development of personal skills for health ownership. An 'Awareness and Self-Management Program' plan was developed and submitted to the community for their consideration. The programme was later expanded to include sessions aimed at providing grief and loss support. Non-Indigenous Allied Health Clinicians facilitated these programmes. The final programme consisted of 8 weekly sessions covering an introduction to concepts of change, health ownership, disease self-management strategies, and		Programs were facilitated by non-Indigenous Allied Health Clinicians and Nywaigi female Elders.	PATIENT: after the intervention, the women's awareness of depression, its symptoms increased and participants were confident to discuss issues openly and connect with each other, and with their culture. In terms of self-management, most reported the translation of knowledge into sustained behaviour change for practical self-management was a difficult process. All participants agreed that utilising the Indigenous holistic approach for working in the group has been instrumental in the overall increase of their knowledge and understanding. SERVICE: Post-

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
	methodology was used.				a focus group style-debriefing component. The aim of the program was to provide both informative content and share strategies required to address barriers to effective self-management practices. The teaching plans were flexible, which allowed participants to interact during the sessions and provide feedback that could be implemented in subsequent sessions.			intervention evidence has demonstrated an increase in regular checks with their health care provider, as well as more frequent contact with the Diabetes Educator on a monthly basis. HEALTH: Although it was not the main aim of the programme, one participant had been able to improve her self-management to the extent of significantly reducing her blood glucose level.
McDermott et al, 2015	Cluster RCT where intervention of chronic care coordination from a community based IHW supported by a clinical outreach team was compared to usual care. The usual care group were wait listed to receive the intervention in 18/12.	Education Self-management Care coordination Foot care	n=12 small remote communities in Far North QLD where the majority of the population was Aboriginal or Torres Strait Islander	n=213 Aboriginal or Torres Strait Islander adults with poorly controlled diabetes (HbA1c >8.5%) and at least one other comorbidity	Each intervention community recruited an IHW resident in the community. Health workers were trained in clinical aspects of diabetes and other chronic condition care including how to support patients in self-management skills, advice on medications, routine foot care, nutrition, smoking cessation, follow up referrals to other providers and scheduled test. Health worker roles included helping patients to make and keep appointments, understand their medications and nutrition and the effects of smoking, and work with the patient to support self-management. Home visits and out of clinic care were features of the trial, however these were conducted according to patient preferences.	Patients were recruited into the study after being identified from their health service records.	IHW led community care supported by a clinical outreach team. Indigenous health workers were recruited from communities and given specialised training in providing care for chronic conditions.	SERVICE: at follow up, 45% of the intervention group patients had a GP management plan for diabetes compared to 35.5% in the control (OR 1.23 95% CI 0.72-2.22). The intervention group were also more likely to have seen a dietician and dentist and slightly more likely to have seen a diabetes educator, be taking insulin and been vaccinated for influenza. The control group showed greater self reported adherence to prescribed medications and were slightly more likely to have had an eye examination and be self-monitoring for glucose. HEALTH: There was a significant decrease in HbA1c of 1% from baseline in the intervention group from 10.8% to 9.8% compared to the control (p 0.018). More patients in the

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								intervention group achieved at least a 0.5% interval reduction in HbA1c.
Reeve et al, 2015	Cross sectional retrospective evaluation of the results of a health service partnership between an ACCHS, a hospital and a community health service	Care coordination	Health service partnership in the Fitzroy Valley in the remote Kimberley in WA. The partnership involved an ACCHS, a hospital, and a community health service reoriented to a primary health care approach. The hospital, main community clinic and ACCHS are all co-located in the town of Fitzroy Crossing	Services are provided to both Aboriginal and non - Aboriginal residents (about 80% of the population are Aboriginal).	Daily primary care services and occasional specialist services are provided through the community health clinics in larger outlying communities and less frequent services to smaller satellite communities. The partnership aimed to reorient existing health services from an acute reactive approach to a more comprehensive PHC approach. Prior to the partnership, care was largely episodic and reactive to patient initiated presentations. the partnership agreement enabled the 3 services to have a single governance structure for allocating funding, share a single medical record and delineating areas of responsibility. Responsibility for health promotion, environmental health and cultural safety belonged to the ACCHS; acute inpatient care, primary care clinic and specialist care to state district hospital; and public health, screening and primary care community clinics and programs to the state operated Population Health Unit. Funding was accessed to facilitate implementation of the shared electronic health record and additional primary health care positions to provide chronic disease management and care planning. A special exemption was made to allow Medicare billing for			SERVICE: There was an increase in primary care activity over the 6-year period, alongside an overall increase in service activity. Hospitalisations remained relatively constant. The trend in non-urgent ED presentations which had been increasing, also reversed. increased access to PHC led to an increase in health checks in accordance with guidelines and a subsequent increase in the proportion of patients identified with chronic disease or risk factors. the ACCHS provided regular feedback from the Aboriginal community enabling services to provide more culturally appropriate and respectful services, including increased employment of Aboriginal staff and cultural training for all staff. identifying patients with chronic diseases or risk factors and placing them on care plans was prioritised resulting in 73% of patients with diabetes having care plans. HEALTH: Despite increasing numbers of patients receiving diabetes care, improvements in glycated haemoglobin levels (>7%) or in blood pressure levels reaching target values were not significant. There was a

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					all primary care patient visits, which was a significant driver of increased PHC activity, providing additional resources and incentives to commence adult Indigenous health checks and care plans. Another key event occurring in parallel was the community led implementation of alcohol restrictions, which resulted in a decreased acute care workload, and appeared to increase patient presentations for non-acute care.			decrease in the numbers of deaths over the period and a decreasing trend in the proportion of hospital admissions requiring emergency evacuation. There was an increase in screening for alcohol and tobacco and the number of patients who reported modifying or ceasing these behaviours also increased
Shephard et al, 2016	Mixed methods review of the cultural safety of the QAAMS program. A focus group was conducted with the Indigenous leaders team and an electronic survey was conducted with the POCT operators	Education Early identification Self-management	POCT for diabetes management is currently available in over 180 Aboriginal and Torres Strait Islander communities as part of the QAAMS program, more than 75% of which are located in rural and remote Australia	Indigenous leaders team (n=4) participated in a focus group where they were asked about the cultural safety of QAAMS. An electronic survey of n=104 POCT assessed perspectives on cultural safety and effectiveness.	The QAAMS provides a culturally safe, convenient and accessible 'one stop' pathology services for Indigenous clients with diabetes, and empowers AHWs to have a direct role in the care of their patients with diabetes. The POCT is conducted close to the patient and results are available at the time of consultation. The test measures HbA1c, a marker for long term glycaemic control and urine albimum, a marker of early renal disease. The Indigenous leaders team works alongside the QAAMS management team to ensure the program is culturally safe, provide support for training at workshops and assists with developing culturally safe resources for use in the QAAMS.		The Indigenous leaders team is responsible for ensuring the programs' cultural safety, providing training and resources for patients. POCT operators work in communities delivering testing and education. The operators were AHWs, nurses, diabetes educators or other allied health professionals.	STAFF: the Indigenous leaders team reported the importance of a culturally safe program and the role they played in connecting QAAMS and the community and participants. Indigenous leaders reported that for patients, being tested in their own community by an AHW was important. The training program is nationally recognised and is important to up skill AHWs to obtain qualifications and contribute towards diabetes management in the community. The leaders noted that AHWs in QAAMS developed a sense of autonomy and pride. for POCT operators, more than 80% believed the QAAMS was well regarded by health professionals and more than 90% believed it raised awareness of diabetes in the community, and was effective in improving clinical outcomes. POCT was noted to be an

Author, year	Study design	Program target area	Setting	Population	Description of program and elements	Referral pathways	Staffing	RESULTS
								important opportunity for engagement and education, with results provided on the spot. it was perceived as convenient and motivated clients to improve their health.
Gibson et al, 2015	Systematic literature review of n=13 studies. Joanna Briggs Institute critical appraisal tools were used to assess the study quality. PRISMA guidelines were used for reporting.	Foot care Treatment Education Care coordination Amputation and other complications of diabetes	Primary care initiatives were implemented in Australia, Canada, New Zealand and the United States.	Indigenous adult populations of Australia, Canada, New Zealand and the United States with T2DM	13 studies were reviewed. The "Australian Coordinated Care Trials" (CCT) increased primary care funds and facilitated funds transfer to local Indigenous health management boards for the purchase and delivery of services. "Improved Care Co-ordination Australia" is a QI intervention including staff orientation and a conference to enhance understanding of the QI process. "Indian Health Service United States" (IHS) aimed to assist American Indian and Alaskan Native tribes establish and expand local PHC programs and diabetes teams. "Integrated Diabetes Education Recognition Program" (IDERP) ranked IHS programs according to the comprehensiveness of PHC services provided. The "Special Diabetes Program for Indians" comprises multi-disciplinary diabetes teams to support implementation of evidence based guidelines IHS health care organisations. The "High Risk Foot Program" devised a diabetic foot risk categorisation system and maintained a register of high-risk patients with diabetes for all IHS facilities. "Care Plus – NZ" is a QI	Participants were Indigenous adults with T2DM who were existing or past patients of diabetes management programs in PHC settings.	Multi-disciplinary diabetes management teams working in PHC settings.	HEALTH: A statistically significant improvement in HbA1c levels was reported by 5 of the 12 studies to report HbA1c, and 7 studies reported no significant change pre – post cohort or compared with control or less-intensive management groups. "Patient recall system to support evidence based guidelines for diabetes – Australia" reported a decrease in the proportion of persons hospitalised and episodes of diabetes-related hospitalisations among the group receiving the intervention. The "High Risk Foot Program" appeared successful, giving rise to a 59% reduction in the incidence of lower limb amputation between 1996 and 1998 compared to 1999 and 2000.

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					initiative which provided funding to PHCs to develop a wellness plan for patients with diabetes. “Get Checked – NZ” met patient costs of an annual diabetes review by reimbursing GPs or practice nurses for completed evidence-based diabetes care plans. “Integrated diabetes specialist clinic – Australia” incorporated a weekly specialist diabetes clinic with the local PHC service. Follow-up care was also provided by the local PHC team in between the weekly visits. “Patient recall system to support evidence based guidelines for diabetes – Australia” introduced a paper-based diabetes recall system in 8 PHC centres in the Torres Strait. “Diabetes Risk Evaluation and Macroalbuminuria 3 – Canada” sought to evaluate the effect of a community-based home visiting program on blood pressure control. “Diabetes Outreach Van Enhancement program – Canada” introduced a regional-based specialist diabetes outreach team who delivered diabetes services Northern Alberta rural health services. “Screening for Limb, I-Eye, Cardiovascular and Kidney (SLICK) complications – Canada” delivered a mobile outreach service provided by specialist staff who screened for micro and macro-vascular complications of diabetes in First Nations people in Alberta.			

C. Jurisdictional search list

Australian Diabetes Organisations	
Diabetes NSW & ACT	https://diabetesnsw.com.au/
Australian Diabetes Society	https://diabetessociety.com.au/
Baker IDI and Diabetes Institute	https://www.baker.edu.au/
Diabetes Queensland	https://www.diabetesqld.org.au/
Diabetes Victoria	https://www.diabetesvic.org.au/?rdr=y
Diabetes South Australia	http://www.diabetessa.com.au/
Healthy living NT	http://www.healthylivingnt.org.au/
Diabetes WA	https://diabeteswa.com.au/
Australian and NSW Government	
NSW Ministry of Health	http://www.health.nsw.gov.au/Pages/default.aspx
NSW Clinical Excellence Commission	http://www.cec.health.nsw.gov.au/
NSW LHDs	
Central Coast	http://www.cclhd.health.nsw.gov.au/
Far West	http://www.fwlhd.health.nsw.gov.au/
Hunter New England	http://www.hnehealth.nsw.gov.au/
Illawarra Shoalhaven	http://www.islhd.health.nsw.gov.au/
Mid North Coast	http://mnclhd.health.nsw.gov.au/
Murrumbidgee	http://www.mlhd.health.nsw.gov.au/
Nepean Blue Mountains	https://www.nbmlhd.health.nsw.gov.au/
Northern NSW	http://nnswlhd.health.nsw.gov.au/
Northern Sydney	http://www.nslhd.health.nsw.gov.au/
South Eastern Sydney	http://www.seslhd.health.nsw.gov.au/
South Western Sydney	https://www.swslhd.health.nsw.gov.au/
Southern NSW	http://www.snswlhd.health.nsw.gov.au/
Sydney	http://www.slhd.nsw.gov.au/
Western NSW	http://www.health.nsw.gov.au/lhd/Pages/wnswlhd.aspx
Western Sydney	http://www.wslhd.health.nsw.gov.au/
Aboriginal Research Organisations	
SAHMRI	https://www.sahmriresearch.org/our-research/themes/aboriginal-health/theme-overview
Aboriginal Healthinfo net	https://healthinfonet.ecu.edu.au/
George Institute	https://www.georgeinstitute.org.au/
Lowitja	https://www.lowitja.org.au/

Menzies	https://www.menzies.edu.au/page/Research/Indigenous_Health/
Poche Indigenous Health Network	http://pochehealth.edu.au/
Aboriginal Health Organisations (ACCHS, AMS, AHS)	
AH&MRC	http://ahmrc.org.au/
NACCHO	http://www.naccho.org.au/
AMS Redfern	http://amsredfern.org.au/
Orange AMS	http://oams.net.au/
Dubbo AMS	http://www.dubboams.com.au/
Walgett AMS	http://walgettams.com.au/
Moree AMS	http://piusx.com.au/
Western Sydney AMS	http://www.amsws.org.au/
Maari Ma (Broken Hill AMS)	http://www.maarima.com.au/
Albury AMS	http://www.awahs.com.au
Awabakal Newcastle	http://www.awabakal.org
Bourke AHS	http://www.bahs.com.au
Brewarrina AHS	http://www.bahsl.com.au
Bulgarr Ngaru (North Coast)	http://www.bnmac.com.au
Bullinar AHS (Ballina)	http://www.bullinahahs.org.au
Coomealla (Far West)	http://www.chacams.org
Coonamble	http://www.cahs.net.au
Durri AMS (Kempsey)	http://durri.org.au/
Galambila AHS (Coffs Harbour)	http://galambila.org
Griffith AMS	http://www.griffithams.org.au/
Illawarra AMS	http://www.illawarraams.com.au
Katungal (Far South Coast)	http://www.katungul.com.au
Ngaimpe (Central Coast)	http://www.theglencentre.org.au
Oolong (Illawarra)	http://www.oolonghouse.org.au
South Coast AMS	http://www.southcoastams.org.au
Tharawal	http://www.tacams.com.au
Ungooroo	http://www.ungooroo.com.au
Weigilli (Illawarra)	http://www.weigelli.com.au
Wellington ACHS (Far West)	http://www.wachs.net.au/
Yerin (Hunter)	http://www.yerin.org.au/

D. Diabetes programs in Aboriginal Community Controlled Health Services

ACCHO or AMS	Summary of Programs identified on websites
Walgett AMS	• Chronic Disease Manager: This position ensures Chronic Disease management is focused on diabetes, chronic heart disease and asthma. The Coordinator is actively involved in health care plans, health assessments, child and adult health checks, case conferencing and assisting Doctors and AHWs with enhanced primary care. This role also works within the community and surrounding areas, assisting with Men's and Women's health programs, and promoting general health and wellbeing. • Diabetes educators regularly visit the service and work closely with the Aboriginal health workers
Maari Ma Broken Hill AMS	• Marabinya: Aboriginal people with a diagnosed chronic disease (including diabetes) can be referred to Marrabinya by their GP for assistance with specialist appointments, transport, accommodation, and medical aids. Marabinya operates as a brokerage service not a parallel clinical service. Marrabinya staff (Local Chronic Care Link workers) liaise between the client's primary care provider (e.g. general practice or AMS), the client and the service they need and provide information back to the client's primary care provider. Marrabinya staff facilitate the client receiving the care that is deemed necessary by their GP according to their referral and GP management plan.
Bourke AHS	• The Ray Kelly too deadly for diabetes program: The program aims to promote healthy eating, exercise and weight loss to the community as well as reduce the HbA1C in those with diabetes. Each program lasts for 10 weeks and during that time the participants receive meal plans, an exercise program, education and motivation.
Galambila Coffs Harbour AHS	• Aboriginal health practitioners offer diabetes education to patients • Internal diabetes/diabetes care clinics
Griffith AMS	• Aboriginal Chronic Care Program: provides care coordination to patients with a diagnosed chronic condition including diabetes.
South Coast AMS	• Chronic Care Support Program: provides access to specialist and allied health services for Aboriginal and Torres Strait Islander needing complex chronic disease management
Wellington AHS	• Eye health coordinators: monitor people with diabetes annually for diabetic retinal review. • Healthy for life program: aims to improve chronic disease care by prevention, early detection and management of chronic disease • Chronic disease camp • Integrated care program: provides support and care coordination to patients with diabetes

Yerin Central Coast AHS	• Integrated Team Care (chronic disease): is responsible for the treatment and management of Aboriginal and Torres Strait Islander people with chronic conditions, helping to provide better access to the health services. The program consists of Aboriginal Care Coordinators and an Aboriginal Outreach Worker. Care Coordinators provide a holistic approach to managing ITC clients care need, by identifying barriers to accessing health care.

E. Diabetes programs operating in Local Health Districts

Local Health District	Summary of Programs identified on websites
Central Coast	• Yerin Eleanor Duncan Aboriginal Health Centre: is a community controlled integrated primary health care service located at Wyong and Gosford on the NSW Central Coast. In addition to clinical services, the Centre operates a medical outreach Indigenous chronic disease program comprising a visiting endocrinologist, diabetes educator, podiatrist and dietician. The clinic operates monthly. • Nunyara Aboriginal Health Unit: provides a range of health services for Aboriginal and Torres Strait Islander people. The Chronic Care Manager and CNS Chronic Care for Aboriginal People implement the Chronic Care program which includes following up patient with a chronic disease who have been admitted to hospital.
Hunter New England	• Chronic Disease Healthy Lifestyle Program: A program providing low impact rehabilitation services to low risk Aboriginal people who have suffered cardiac arrest, respiratory disease, renal failure or diabetes. • Werris Creek Community Health Service Aboriginal diabetes clinic.
Illawarra Shoalhaven	• Aunty Jean's chronic care program: multi-layered approach to build confidence, through health coaching and education, for participants living with chronic disease. The program provides a multidisciplinary team of specialist service providers and health professionals who are committed to improving Aboriginal health. There are three programs, based at Nowra, Ulladulla and the Illawarra, that run weekly.
Mid North Coast	• Chronic Care for Aboriginal People: provides 48-hour follow up when patients are discharged from hospital, access to culturally competent care, an Aboriginal chronic care worker and the Aboriginal community nursing service, and community chronic disease rehabilitation
Murrumbidgee	• Aunty Jean's Program: as above the program aims to support Aboriginal people with/or at risk of chronic illness. The program combines health assessments, information and education, exercise sessions and healthy eating. They also have a foot care program educates participants on how to care for their feet if they have diabetes. It also allows the AHWs to screen the feet of their participants and refer to a GP and or a podiatrist if necessary.

Local Health District	Summary of Programs identified on websites
Nepean Blue Mountains	• Mootang Tarimi Outreach Assessment Program: a free renal assessment and chronic care service available to the Aboriginal community residing within both the Nepean Blue Mountains and Western Sydney LHDs. This service conducts screening on more than 500 Aboriginal people annually, including diabetes screening. The team of two includes an AHW and RN who provide screening, referrals, cultural support as well as health information on nutrition, physical activity, alcohol and quit smoking programs.
Northern NSW	• Chronic Care for Aboriginal People
South Eastern Sydney	• La Perouse Aboriginal Community Health Centre Aboriginal diabetes group. Provides education, treatment and understanding of sugar levels.
Western NSW	• Chronic care for Aboriginal people: 48-hour follow up aims to improve health outcomes for Aboriginal people by providing follow up within 48 hours of discharge from an acute care facility. The program aims to identify and address concerns or outstanding issues that may lead to readmission, ensure patients have access to medications and know how to use them, asking patients if they have a care plan and follow up appointments

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