Additional File 1: Clinical audit process, sample size and audit inclusion criteria

Conduct and reporting of clinical audits **–** audits were generally done by health service staff, trained in the use of standard tools and supported by quality improvement facilitators and continuous quality improvement (CQI) program staff. Where appropriate health service staff were not available, the audits were done by trained CQI facilitators working in state/territory CQI support roles. Data were collected using standardised CQI tools, entered into a web-based information system, and analysed through an automated process, with reports made available to health services in real time for use in local quality improvement processes. Reports of aggregated data for clusters of health services, by region or state, were also available through the web-based information system to support regional or state/territory level CQI efforts.

Sampling and sample size for Preventive care, Diabetes, Maternal and Child health audits. Where the eligible population was 30 clients or less, the audit protocol recommended including all records. Where the eligible population was greater than 30, the protocol provided guidance on the random selection of records, with the number depending on the precision of estimates required by health service staff. A new sample was used for each audit period. For Preventive care and Child health, the samples were stratified by age and gender; for Diabetes care samples were stratified by gender.

Preventive care	***Diabetes***	***Child health***	***Maternal health***
Included clients must: be between 15 and up to 55 years; have no diagnosis of diabetes, hypertension, coronary heart disease, chronic heart failure, rheumatic heart disease or chronic kidney disease; not be pregnant or less than 6 weeks postpartum; and have been resident in the community for 6 months or more in the last 12 months.	Included clients must: have a clear, documented diagnosis of Type 2 Diabetes; be 15 years or older; and have been a resident in the community for 6 months or more in the last 12 months. Clients are excluded if they have Type 1 diabetes, gestational diabetes or autoimmune nephropathy.	Included children must: have been resident in the community for 6 months or more of the past 12 months (or if the child is <12 months, resident in the community for at least half of the time since birth); and have no major health anomaly such as Down Syndrome, cerebral palsy, heart defects or inherited disorders.	Included women must: have an infant between 2 and 14 months; have been resident in the community for 6 months of the infant's gestation; and have used the health service as the usual source of primary health care.

Additional File 2 – Quality of Care Index for preventive care, diabetes care, child health and maternal health care, 2005–2014

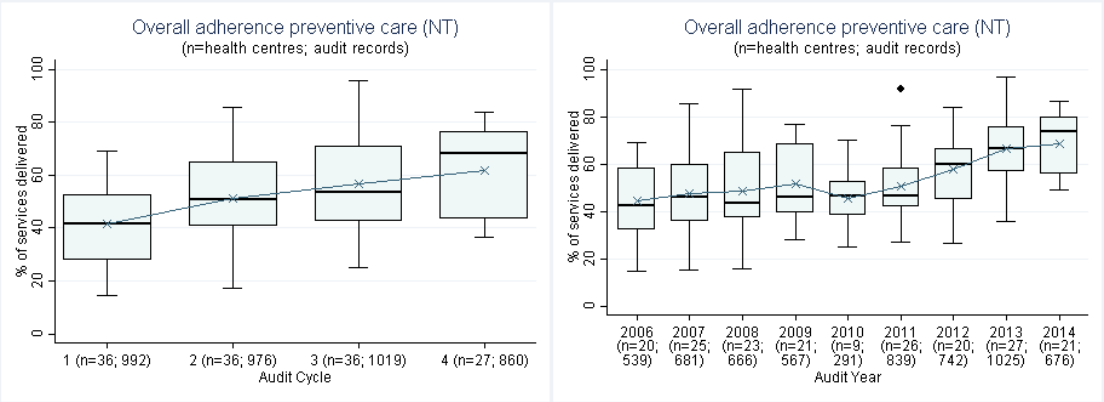
Reading the box plots

The box plots show the median, mean, 25th and 75th centile and range between health services for each jurisdiction, year and audit cycle. They also show outliers, defined as health services where the value for the indicator is more than 1.5 times the difference between the 25th and 75th centile from the median.

Preventive care (2005–2014)

QCI includes (up to 15 service items): weight, waist circumference, blood pressure, urinalysis, blood glucose levels, oral health check, nutrition & physical activity brief intervention, smoking & alcohol use recorded and brief interventions where required, sexually transmitted infection check (gonorrhea, chlamydia & syphilis) and pap smear.

Northern Territory



Queensland

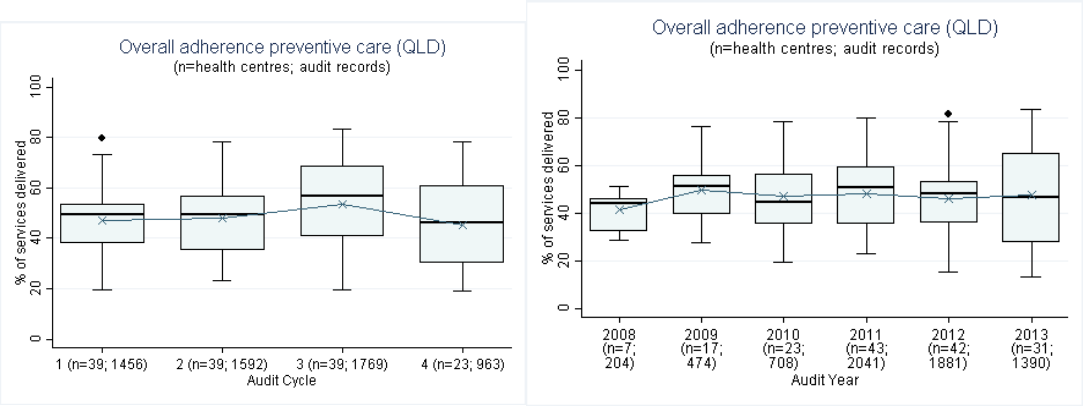
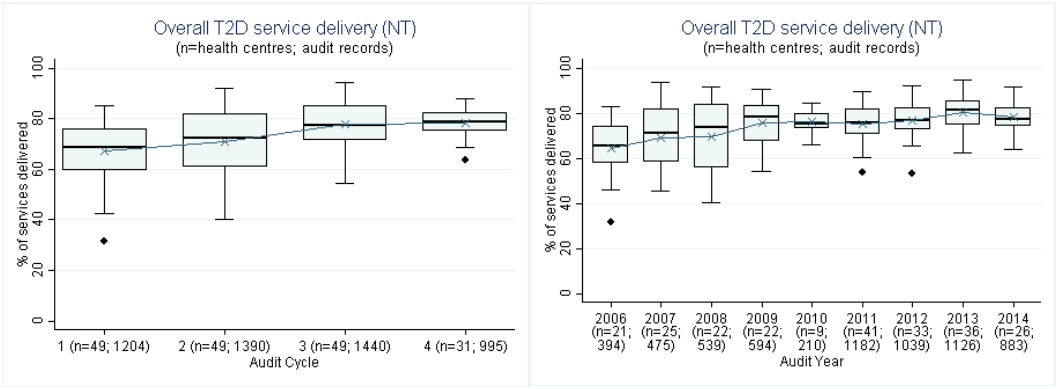


Figure 2.1: Mean percent QCI services delivered to well clients per health service, by audit cycle (health services that have at least 3 years of audit data) and by audit year (all health services), NT and QLD (n=number of health services; number of client records audited who attended in previous 24 months)

Diabetes care (2005–2014)

QCI includes (up to 22 service items): GP Management Plan, record of discussion on chronic disease management & medications, influenza & pneumococcal vaccination, blood pressure, smoking & alcohol use recorded and brief intervention where required, weight, waist circumference, nutrition & physical activity brief intervention, ACR, lipids, cholesterol, eGFR, body mass index, visual acuity, dilated eye check, feet check, HbA1c.

<u>Northern Territory</u>



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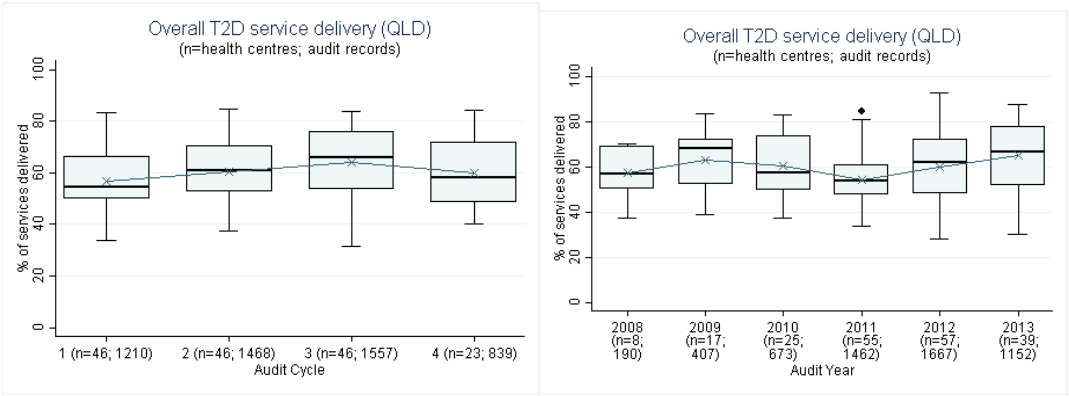
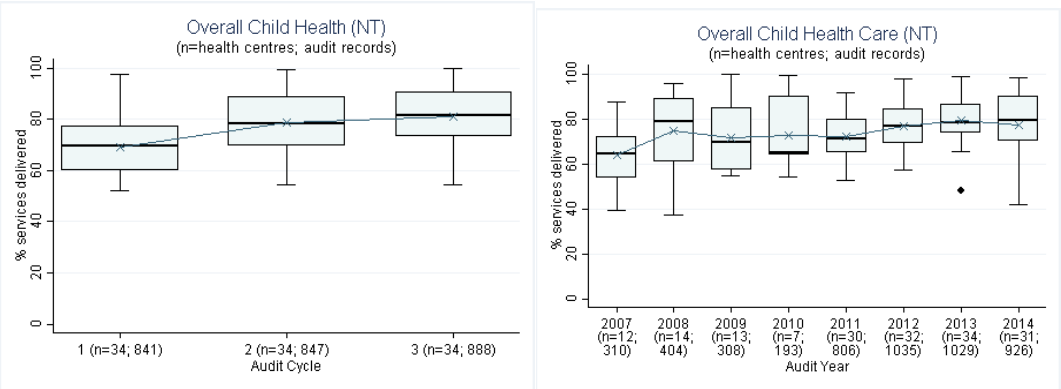


Figure 2.2: Mean percent QCI services delivered to patients with Type 2 diabetes per health service, by audit cycle (health services that have at least 3 years of audit data) and by audit year (all health services) , NT and QLD (n=number of health services; number of client records audited who attended in previous 12 months)

Child health (2007–2014)

QCI includes up to 10 service items: weight, height, ear exam, nutrition, head circumference, hip exam, sudden infant death syndrome prevention advice, breastfeeding advice, developmental check, testes check.

Northern Territory



Queensland

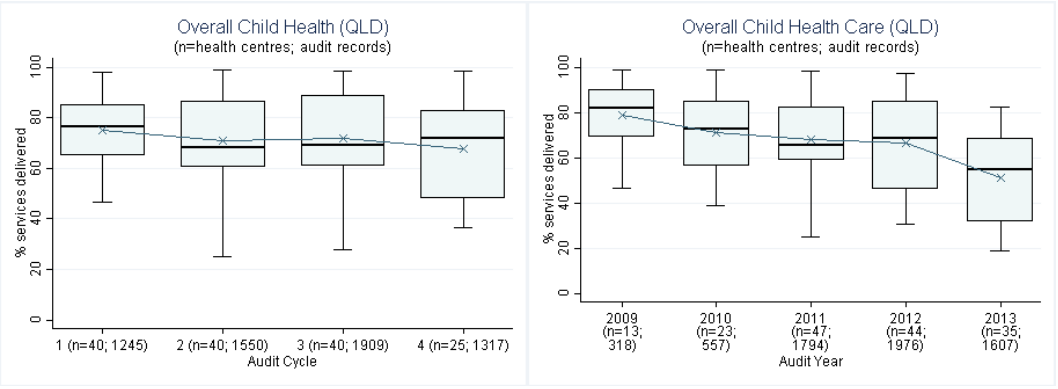
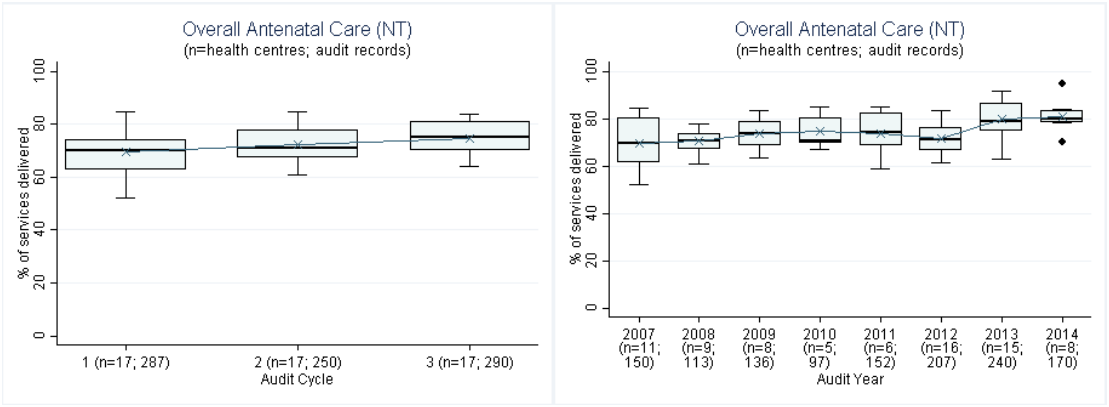


Figure 2.3: Mean percent QCI services delivered to children per health service, by audit cycle (health services that have at least 3 years of audit data) and by audit year (all health services) , NT and QLD (n=number of health services; number of child records audited who attended in previous 12 months)

Maternal health (2007–2014)

The antenatal QCI includes 26 best practice service items present in the maternal health audit tool: ≥7 antenatal visits, estimated gestational age ≤13 weeks at first antenatal visit, blood pressure (1st, 2nd & 3rd trimester), urinalysis (1st & 2nd trimester), BMI (1st trimester), fundal height (2nd & 3rd trimester), fetal movements (3rd trimester), blood glucose (2nd trimester), documentation of blood group, antibody status, rubella, Hepatitis B status, mid-stream urine, full blood examination, Syphilis serology, HIV, PCR test, smoking and alcohol use status recorded (1st & 3rd trimester), social risk and emotional wellbeing assessments, planning for care and birthing, nutrition, breastfeeding, domestic and social environment, and cultural considerations.

Northern Territory



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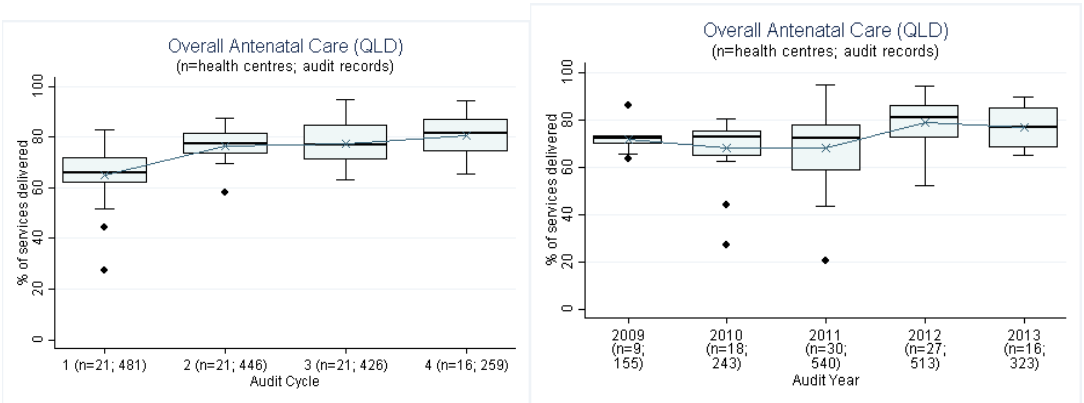

Figure 2.4: Mean percent QCI services delivered to pregnant women per health service, by audit cycle (health services that have at least 3 years of audit data) and by audit year (all health services) , NT and QLD (n=number of health services; number of client records audited)

Additional File 3 – Detailed description of policy context by state and territory

Northern Territory

In early 2009, a Continuous Quality Improvement (CQI) Strategy was endorsed by the Northern Territory (NT) Aboriginal Health Forum – comprising the Commonwealth Department of Health and Ageing (now Department of Health); the NT Department of Health; and the Aboriginal Medical Service Alliance of the Northern Territory (or AMSANT, the peak community-controlled health service body in the NT) – with the goal of building a consistent approach to CQI across the NT Indigenous primary health care (PHC) sector. The NT CQI Strategy was part of a broader Indigenous PHC reform agenda that incorporated the Expanded Health Service Delivery Initiative (EHSDI),[1] which included a substantial increase in funding and an expansion of remote PHC services, a program of regionalization, and the development of key performance indicators (KPIs). The Strategy built on a history of leadership and innovation in Indigenous PHC, including in relation to community control of PHC services, the development and implementation of a Chronic Disease Strategy, guideline development, electronic information systems, and chronic disease management, as well as on the Audit and Best Practice in Chronic Disease (ABCD) CQI work which originated in the NT in 2002.[1,2]

The CQI Strategy included: i) establishment of a Steering Committee (made up of representatives from each of the three organizations' in the Aboriginal Health Forum); ii) engagement of two CQI Coordinators to provide leadership, advice and training; iii) funding to support CQI Facilitators in each Health Service Delivery Area of the NT; and iv) support for regular CQI Collaborative meetings. By the end of 2012 there were 16 facilitator positions across the NT, and more than 200 health professionals, including 25 Aboriginal Health Workers, had been trained in the use of CQI tools and processes.[3] The CQI Strategy was allocated around $2.79m per year, with the intention that CQI should be a core PHC activity.[1]

The independent evaluation of the NT CQI Strategy [1] found that it 'had been successful in establishing the practice of quality improvement across the NT Aboriginal PHC system… to build the beginnings of a system-wide culture of quality improvement'. The Strategy was found to have resulted in an increase in 'overall CQI capability and capacity', 'enthusiasm and fervor among health workers for quality improvement', 'wide engagement of health service managers and clinicians in CQI activities' and had contributed to 'staff becoming adept at using ePIRS (electronic Patient Information Record Systems) and the data in these systems being improved'. The evaluation highlighted the ABCD CQI tools as providing a 'solid technical basis for CQI' and 'technical rigor behind the approach', and developing routine clinical information systems to generate and regularly report on agreed Indigenous health KPIs to NT Government-operated services. Under the guidance of the CQI Steering Committee, the NT provided national leadership in developing specialized infrastructure support and workforce capacity for wide-scale implementation of CQI.[3]

Queensland

In 2005–2006, the Queensland Government undertook a review both of the readiness of services to commence CQI and of the evidence as to its effectiveness in improving health care delivery. This provided a foundation for subsequent investment.

Following the lead of the NT, in 2007–2008 Queensland Health appointed a CQI Coordinator and regional facilitators to support the implementation of CQI processes in Indigenous PHC

services as part of ABCD. A restructure in 2008 provided a key leverage point, and change through reform, as the funding for CQI was expanded from north Queensland specific to state-wide. A North Queensland CQI Steering committee was established in 2008 with key stakeholders, including Royal Flying Doctor Service, Apunipima Cape York Health Council and Queensland Health. There was a further investment in CQI in 2010, including a contract with One21seventy to provide CQI support to Indigenous health services.

In 2011, Queensland Health established a state-wide Primary Health Care CQI Steering Committee and a team with responsibility for CQI in Indigenous health services.[3] The team included two coordinators and 12 locally based facilitators, whose task was to develop and implement a coordinated CQI approach using One21seventy tools and processes with a focus on supporting Queensland Health services, although this support and access to One21seventy was available to Aboriginal Community Controlled Health Services (ACCHSs) as well. CQI was included in the Queensland Chronic Disease Guidelines, and the section on CQI was strengthened in 2008. This CQI initiative was part of the Queensland Chronic Disease Strategy and was supported by the Making Tracks Policy and Accountability Framework for improving health outcomes for Indigenous people (funded through Australian Government 'Closing the Gap' funding.[4]

By late 2012, the CQI team established by the Queensland Health initiative was supporting 75 services across the state to conduct CQI, with engagement of other service organizations in addition to those managed by Queensland Health. This work aligned with the development of evidence-based clinical guidelines, and orientation and training packages.[3] The infrastructure and policy support for CQI provided by Queensland Health was adversely affected by changes in the policy environment, with budget cuts and health reforms following the implementation of regionalization through the *Queensland Health and Hospitals Network Act 2011* and the change of government in Queensland in 2012. Contracts for CQI support and tools through One21seventy were discontinued and there was a loss of dedicated CQI support positions throughout the state.

Other significant CQI work in Queensland included a partnership between the state's peak Indigenous health body, Queensland Aboriginal and Islander Health Council, and a state-based general practice organization that used collaborative-style methods, supported by implementation of an electronic clinical information system. A report for 2009-2010 showed high performance on a number of indicators, with wide variation between services on others.[5] In 2011 it was reported that 13 of the 21 Aboriginal Community Controlled Health Services were participating.[3]

Other Indigenous health organizations' have used CQI methods for clinical governance purposes at a regional level in recent years, for example Apunipima Cape York Health Council and Institute of Urban Indigenous Health.

New South Wales

In New South Wales (NSW), participation in ABCD commenced in 2005, driven primarily by the initiative and resources of a regional ACCHS, Maari Ma Health Aboriginal Corporation, which used the CQI process to support and evaluate implementation of its Chronic Disease Strategy. This organization has gone on to integrate a systems-oriented CQI approach into the ongoing management of its service.[6]

While NSW Health showed some interest in supporting engagement with ABCD more widely, there was no specific policy or funding support provided to services for their participation. However, several NSW-based ACCHSs and other PHC organizations' (such as Divisions of General Practice) used the ABCD tools through engaging with One21seventy. NSW Health funded the state's peak Indigenous health body, the Aboriginal Health and Medical Research Council (AHMRC), to support its member services with CQI activities through building infrastructure, skills and data collection systems, and to share models of good practice in CQI in the Indigenous PHC context. In 2015 the AHMRC produced web-based resources and a DVD describing success stories in 10 NSW ACCHSs, reflecting the use of a variety of tools, processes and approaches to CQI. Other than for those services participating in the ABCD program, or for a relatively small number of selected indicators available through national KPIs reporting, there appears to be no publicly available reports on clinical performance for Indigenous PHC services in NSW.

Western Australia

In Western Australia (WA), the state government provided some funding for a project officer to work with the ABCD program between 2005 and 2009, but there was no clear policy or infrastructure to encourage engagement by PHC services. Continued engagement with the ABCD Program over 2010-2014 was supported by a project officer funded through the Lowitja Institute. Participation was heavily reliant on the initiative of individual services and the support of a small research team based with one of ABCD's academic partner organizations' and on the national ABCD project network. While some services were encouraged to use ABCD tools and processes through their participation in the national Healthy for Life program, there were inadequate resources to support the use of CQI tools and processes among services distributed across the vast distances of WA.

Concurrent with the early implementation of ABCD in WA, the Aboriginal Health Council of WA (AHCWA) in 2006 implemented the Australian Primary Care Collaboratives program (referred to then as the National Primary Care Collaborative or NPCC) in seven selected sites. An evaluation of this initiative in mid-2007 reported that 'the central notions of quality improvement had been introduced' and that 'systems were in place to varying degrees', which created 'the potential to improve the way in which chronic health needs are addressed'.

However, the evaluation also noted that 'it was clear that there was a need for the NPCC Program to be more responsive to the needs and desires of specific ACCHSs'. While participating services were reported to be satisfied with the NPCC program, they were 'less enthusiastic about the program continuing', or its roll-out to other ACCHSs.[7]

Between 2012 and 2015, AHCWA engaged in a research partnership that had an initial focus on conducting a systematic review of the effectiveness of CQI programs in PHC settings in Indigenous and ethnic minority populations, and identifying common elements among programs with improved outcomes.[8]. There appear to be no publicly available reports on subsequent work arising from the AHCWA-Australian National University research partnership.

A review of WA Health Programs in 2014 argued for the implementation of a state-wide system for CQI with 'transparent measurements, accountable comparisons and resultant action plans', with specific reference to the evidence base developed by the ABCD Program and the benefits of adopting the One21seventy system.[9] In 2014–15, AHCWA acknowledged the generally

low capacity for CQI in the state, and reported the organization had begun actively promoting CQI to all member services.[10]

Five member services were reported to be engaged in CQI activities with a focus on health checks, smoking, otitis media and sexually transmitted infections. There is evidence that at least some local WA Indigenous PHC services had made substantial strides in the management of conditions such as Type 2 diabetes over the previous decade, [11] and in the development of local CQI systems more recently.[12]

South Australia

Engagement of PHC services with the ABCD program in South Australia (SA) commenced in 2006, with a few services using the ABCD tools on their own initiative. The SA State Government provided policy and funding support to the ABCD National Research Partnership between 2010-2014, with additional funding provided by the Lowitja Institute for a research officer to work closely with the Aboriginal Health Council of South Australia (AHCSA) as both a researcher and coordinator for participating ACCHSs. By 2012, in addition to 10 ACCHSs, there were five state government-run health services using ABCD CQI tools and processes on a pilot basis, supported in various ways by their Local Health Networks.[13]

Policy support in SA was relatively limited and the implementation and ongoing CQI support to PHC services relied heavily on the small team based at AHCSA, and the ABCD project network. Research on PHC professionals' perspectives on barriers and enablers to CQI in the SA context identified health workforce capability - including the availability of CQI coordinator support – and senior management and leadership support for CQI as being vital to effective implementation. Organizational systems and individual behavior change, with regional collaborations and the use of systems approaches, were identified as key requirements for successful and sustained implementation of CQI.[13]

References:

1. Allen and Clark. Evaluation of the Northern Territory Continuous Quality Improvement Investment Strategy, 2013, Department of Health, Canberra.

2. Bailie RS, Si D, Robinson GW, Togni SJ, d Abbs PH. A multifaceted health-service intervention in remote Aboriginal communities: 3-year follow-up of the impact on diabetes care. Medical Journal of Australia. 2004 Aug 16;181:195-200.

3. Wise M, Angus S, Harris E, Parker S. Appraisal of Continuous Quality Improvement Initiatives in Aboriginal and Torres Strait Islander Primary Health Care. 2013, Lowitja Institute, Melbourne.

4. Queensland Health: Making Tracks towards closing the gap in health outcomes for Indigenous Queenslanders by 2033 – policy and accountability framework, Brisbane 2010.

5. Panaretto KS, Gardner KL, Button S, Carson A, Schibasaki R, Wason G, et al. Prevention and management of chronic disease in Aboriginal and Islander Community Controlled Health Services in Queensland: a quality improvement study assessing change in selected clinical performance indicators over time in a cohort of services. BMJ Open. 2013 Jan 1;3(4):e002083.

6. Maari Ma Health Aboriginal Corporation. Annual Report 2015/2015, Maari Ma Health Corporation, 2016.

7. Smith P. Thirdforce Consultancy Services. Evaluation Report of the Aboriginal Health Council of Western Australia's Implementation of the National Primary Health Care Collaboratives Program, September 2007.

8. Australian Primary Health Care Research Institute. [Internet] Systematic review of continuous quality improvement in Indigenous primary health care organisations. [cited 9th Dec 2016]. Available from: http://aphcri.anu.edu.au/aphcrianu/projects/systematic-review-continuous-quality-improvement-indigenous-primary-health-care

9. Holman CDJ, Joyce SJ. A Promising Future: WA Aboriginal Health Programs. Review of performance with recommendations for consolidation and advance. December 2014, Department of Health Western Australia, Perth.

10. Aboriginal Health Council of Western Australia, Annual Report 2014 – 2015, AHCWA, Highgate.

11. Marley JV, Nelson C, O'Donnell V, Atkinson D. Quality indicators of diabetes care: an example of remote-area Aboriginal primary health care over 10 years. Medical Journal of Australia. 2012 Oct 1;197(7):404.

12. Stoneman A, Atkinson D, Davey M, Marley JV. Quality improvement in practice: improving diabetes care and patient outcomes in Aboriginal Community Controlled Health Services. BMC health services research. 2014 Oct 7;14(1):1.

13. Newham J, Schierhout G, Bailie R, Ward PR. 'There's only one enabler; come up, help us': staff perspectives of barriers and enablers to continuous quality improvement in Aboriginal primary health-care settings in South Australia. Australian Journal of Primary Health. 2015 Feb 27.