

# Delivery of preventive health services to Indigenous adults: response to a systems-oriented primary care quality improvement intervention

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Over the past decade, wide international interest in improving preventive health services has led to the development of preventive care guidelines in various countries, including the United States,<sup>1</sup> Canada<sup>2</sup> and Australia.<sup>3</sup> Furthermore, tailored guidelines have been introduced to accommodate the needs of specific populations such as Aboriginal and Torres Strait Islander peoples.<sup>4</sup>

Despite wide distribution of preventive care guidelines, delivery of preventive services in practice is suboptimal. A national survey undertaken in the US revealed that, among adults, 55% of recommended preventive care was provided.<sup>5</sup> A study of remote Aboriginal communities in the Northern Territory showed that, on average, 40%–50% of preventive services were delivered, in line with guidelines, to well adults aged over 16 years.<sup>6</sup> Improving this level of delivery or uptake of preventive services is a particular challenge in the Aboriginal population, which has exceptionally high and increasing rates of chronic disease.

A number of studies have demonstrated that neither dissemination of preventive care guidelines alone<sup>7</sup> nor a favourable attitude toward preventive services among health care providers<sup>8</sup> is sufficient to affect the actual delivery of preventive services. It has become increasingly apparent that improving the quality of chronic illness care and preventive care will require reorientation of health care systems. The chronic care model (CCM) described by Bodenheimer et al<sup>9</sup> provides a framework for understanding systems that could support chronic illness care and guide organisational development. Research shows that CCM-oriented interventions have been effective in improving chronic illness care,<sup>10</sup> and the model has also been recommended as a template for improving preventive care.<sup>11</sup> However, there is a lack of empirical evidence to support such recommendations.

We developed a CCM-oriented quality improvement intervention to support Aboriginal community health centre staff to improve their primary care systems for

## ABSTRACT

**Objective:** To describe changes in delivery of preventive services among adults in Aboriginal communities that occurred in association with a systems-oriented intervention.

**Design, setting and participants:** A quality improvement intervention with a 2-year follow-up was undertaken at 12 Aboriginal community health centres in the Northern Territory between January 2002 and December 2005. The study involved 360 well adults aged 16–49 years who had no known diagnosis of chronic disease.

**Intervention:** Two annual cycles of assessment, feedback workshops, action planning, and implementation of system changes. Assessment included a structured review of health service systems and an audit of clinical records.

**Main outcome measures:** Adherence to guideline-scheduled preventive services including taking basic measurements, laboratory investigations, lifestyle counselling and pneumococcal vaccination.

**Results:** Of 12 preventive services measured, delivery of four services showed improvement over the study period: counselling on diet increased from 3% to 8% ( $P = 0.018$ ); counselling on physical activity from 2% to 8% ( $P = 0.006$ ); counselling on smoking from 2% to 11% ( $P = 0.003$ ); and counselling on alcohol from 2% to 10% ( $P = 0.007$ ). There was no improvement in important measures such as monitoring of waist circumference, blood pressure and blood glucose level, and delivery of pneumococcal vaccination.

**Conclusion:** Our systems-oriented intervention was associated with some improvement in counselling activities, but no significant improvement in delivery of other preventive services. The main reason may be that implementation focused more on chronic illness management than preventive services for generally well adults.

MJA 2007; 187: 453–457

chronic illness care and preventive care. The impact of the intervention on disease management has been reported elsewhere.<sup>12</sup> Here we report on changes in the delivery of preventive services in Aboriginal primary care services to adults who had no known diagnosis of chronic disease that occurred in association with our systems-oriented intervention and consider the application of the chronic care model to preventive care.

## METHODS

### Study locations

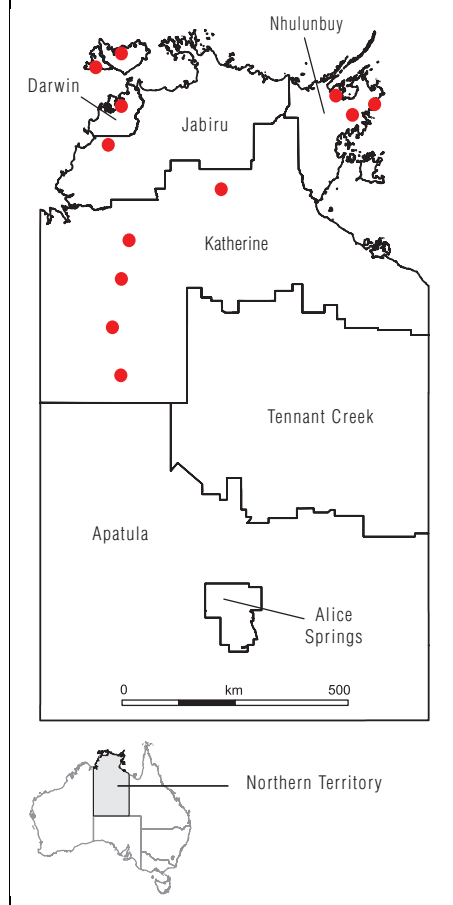
Our study was conducted in the Top End of the NT, an area occupying 522 561 km<sup>2</sup>, with an estimated resident population of 153 687 in 2003.<sup>13</sup> Aboriginal people comprise about 30% of the total population of the NT, and over 70% of them live outside

the major service centres. A majority of Aboriginal people access primary health care through community health centres, which are operated under a variety of funding and governance models.<sup>14</sup> From a total of 53 Aboriginal community health centres in the Top End, we selected 12 health centres that we considered to reflect the diversity of centres in the region in terms of governance arrangements, geographic location and community size (Box 1).

### The quality improvement intervention

The intervention study was conducted between January 2002 and December 2005 and featured two annual cycles of assessment, feedback, action planning, implementation and reassessment. The approach, rationale and principles underpinning the research are based on modern continuous

### 1 Distribution of the 12 participating community health centres in the Top End of the Northern Territory



quality improvement theory and participatory community-based research and have been reported previously.<sup>15</sup>

#### Assessment

Two instruments were used for assessment.

Firstly, an adapted version of the Assessment of Chronic Illness Care (ACIC) scale<sup>16</sup> was used to evaluate the state of health centre system development with regard to prevention and management of chronic illness. The adapted version of the scale included 34 items that were grouped into seven components (six as outlined in the CCM, plus an integration component). Based on health centre staff consensus, each item was given a score indicating the state of development, ranging from 0 (not at all) to 11 (fully developed).<sup>17,18</sup> The mean was calculated from individual item scores to create a component score, and the mean of the seven component scores formed the overall system score for the community health centre. The scale served both as a

measurement tool and an intervention tool, as the discussion of system components led to better understanding among staff of the quality of systems and consideration of how systems could be improved.

Secondly, delivery of clinical preventive services was assessed by auditing a sample of clinical records at baseline, Year 1 and Year 2. The records of community members who met all of the following criteria were eligible for inclusion: (i) aged 16–49 years; (ii) documented in medical records as Aboriginal; (iii) having no known diagnosis of diabetes, hypertension, renal disease or other major chronic disease; (iv) not known to be pregnant; and (v) resident in the community for 6 months or more during the previous 12 months. From the eligible people in each community, a random sample of 30 records was drawn using computer-generated random numbers, leading to a total sample of 360 records for the 12 participating health centres at baseline. A new sample was drawn for each audit period.

Our standardised audit form was based on previous research work in this area,<sup>6</sup> and included a list of 12 scheduled services (listed in Box 4) that local clinical guidelines recommend for delivery to adults aged 16–49 years on an annual basis (except for pneumococcal vaccine, which was scheduled for delivery every 5 years).<sup>19</sup> A service was assessed as delivered if there was a record of delivery within the specific period preceding the audit.

#### Reliability of audit data

At each participating health centre, 10% of the records audited at baseline were selected randomly and audited again 1–2 months later by the same auditor for the same calendar period. Each health centre contributed three records, so that the total reliability audit sample comprised 36 records.

Intra-rater reliability for audit items, measured by  $\kappa$  statistics,<sup>20</sup> ranged from 0.79 to 0.93.

#### Feedback workshops and action planning

As part of each quality improvement cycle, feedback workshops were held with staff and management of each health centre to discuss system assessment and clinical audit findings, compare performance with de-identified findings from other participating centres, and explore root causes of poor performance. Health centre staff were encouraged to reflect on system innovations, to identify practical solutions, and to set action plans for system changes.

#### Implementation

Health centre staff were responsible for implementing their action plans and were asked to document activities and initiatives relating to that implementation. The research team provided ongoing support for implementation to health centres, mainly through email and telephone communications, and, when necessary, by site visits.

#### Statistical analysis

Means, proportions and medians were used to summarise data as appropriate. Logistic regression models were used to assess changes in delivery of individual preventive services, with adjustment for age, sex and health-centre clustering. Delivery of a given preventive service was treated as a dichotomous dependent variable — for example, “blood pressure was measured in the previous 12 months (yes/no)”. Two independent time variables,  $X_1$  ( $X_1 = 0$  denoting baseline and  $X_1 = 1$  denoting Year 1) and  $X_2$  ( $X_2 = 0$  denoting baseline and  $X_2 = 1$  denoting Year 2), were introduced into the logistic regression models; their regression coefficients ( $P$  values) indicated the average magnitude (statistical significance) of changes in preventive

### 2 Characteristics of participating adults at baseline, Year 1 and Year 2 audits\*

Characteristic	Baseline	Year 1	Year 2
Median age (years)	29.9	29.7	29.6
Men	50%	51%	49%
Attended health centre in previous 12 months	77%	77%	68%
Reasons for last attendance during previous 12 months			
Acute care	75%	78%	74%
Well person's check	12%	8%	13%
Sexual health	8%	12%	11%
Immunisation	5%	2%	2%

\* Number of adults reviewed in each audit was 360.

care 1 year and 2 years after the intervention. All analyses were conducted using Stata software, version 9.2 (StataCorp, College Station, Tex, USA).

The study was approved by the Human Research Ethics Committee of the NT Department of Health and Community Services and Menzies School of Health Research, and by its Indigenous health research sub-committee.

## RESULTS

### Characteristics of study participants at each audit period

Study participants at baseline, Year 1 and Year 2 audits had similar age and sex compositions (Box 2). There were similar attendance rates at health centres within the previous 12 months at baseline and Year 1 audits, but a fall in attendance at the Year 2 audit. Of adults attending health centres within the 12 months before the baseline audit, the primary reason for the most recent visit was acute care (75%), followed by well person's check (12%), sexual health (8%) and immunisation (5%). This pattern of attendance remained largely unchanged over the study period.

### Changes in health centre system development over time

The status of health centre system development (as reflected in the ACIC scale) is visually illustrated in the form of a spider plot (Box 3). Participating health centres experienced marked improvements across each system component over the study period.

During the course of the study, implementation of actions to change systems varied between participating health centres. Those most relevant to improving preventive care were related to "external linkages" (including outreach and health promotion type initiatives) and "organisational influence" (including use of management processes to demonstrate interest in preventive care and securing new resources) components of the CCM. However, other initiatives covered the scope of CCM components: for example, development of local language concepts (self-management support); training by vis-

iting specialists (decision support); revision of team roles and use of interpreters (delivery system design); and review of information system function and development of reminder systems (clinical information systems). The range of actions and strategies relevant to improving preventive services was relatively limited in comparison to those relevant to diabetes management.<sup>12</sup>

### Changes in delivery of preventive services over time

Changes in delivery of individual preventive services from baseline to Year 2 are shown in Box 4. Of the 12 services measured, four services (counselling on diet, physical activity, smoking and alcohol), which had very low levels of delivery at baseline, achieved statistically significant improvements at the Year 2 audit. Other services showed little improvement. The delivery of one service, pneumococcal vaccination, actually declined significantly, from 35% at baseline to 25% at Year 2.

## DISCUSSION

The improvements in health centre systems that occurred during our quality improvement intervention were associated with little or no improvement in delivery of preventive

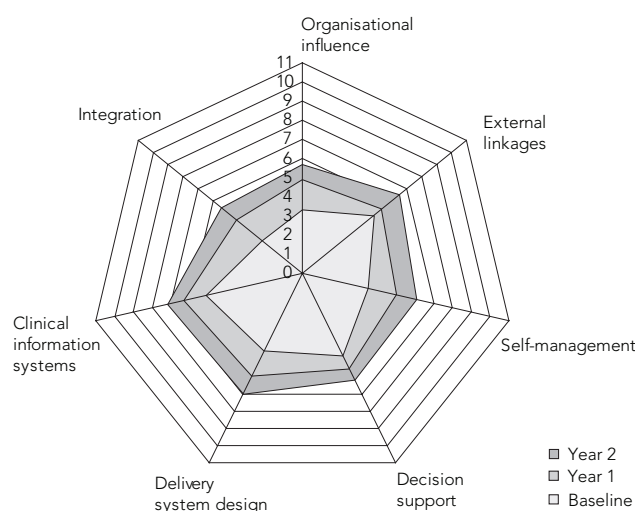
services to well adults. This is in contrast to improvements that occurred in delivery of care to people with diabetes over the same period.<sup>12</sup> The delivery of preventive services relating to counselling on lifestyle changes, which had a low level of delivery at baseline, showed the greatest percentage improvements. Important measures such as monitoring waist circumference, blood pressure and blood glucose level, and delivery of pneumococcal vaccination, showed no improvement.

In contrast to our experience, a Canadian study of a focused intervention for adults attending health check-ups showed a significantly higher level of delivery of preventive services in the intervention group (72%) compared with the control group (49%).<sup>21</sup> Such focused interventions are likely to miss many opportunities, as only those adults attending for health check-ups are targeted. Indeed, our data

showed that only about 10% of adults attended community health centres primarily for a well person check. Hence there is a need for broad system interventions. A continuous quality improvement intervention on delivery of preventive services in primary care settings in the US<sup>22</sup> showed similarly disappointing findings to ours. The authors ascribed the failure of the intervention to two major factors: (i) relatively high rates of preventive service delivery at baseline, which left a relatively small margin for further improvement; and (ii) inadequate implementation of the intervention to change systems. By contrast, in our study, delivery of preventive services at baseline was low, leaving ample room for improvement.

The principal reason for failure to improve delivery of preventive services in our study appears to lie in the focus and implementation of change in health centres. Health service providers in our study tended to emphasise strategies and actions related to chronic illness management,<sup>12</sup> rather than preventive services for generally well adults. Information presented to health centre staff as part of the intervention clearly drew attention to low levels of delivery of preventive services. However, the response in terms of identified strategies for improving

### 3 Changes in staff ratings of health centre systems: spider plot



In this plot, each axis represents one component of health centre systems, and a point marked on each axis indicates the level of development, with the overall system development being reflected by the size of the area encompassed by these points. Scores were categorised as 0–2 (limited support), 3–5 (basic support), 6–8 (good support) or 9–11 (fully developed support). ♦

**4 Changes in delivery of preventive services over the study period**

Service item*	Baseline <sup>†</sup>	Year 1 <sup>†</sup>	Year 2 <sup>†</sup>	Difference between baseline and Year 1 (95% CI) <sup>‡</sup>	Difference between baseline and Year 2 (95% CI) <sup>‡</sup>
<b>Basic measurements</b>					
Weight	33%	30%	38%	-3% (-13%, 11%)	6% (-6%, 19%)
Height	19%	21%	21%	2% (-7%, 16%)	1% (-7%, 14%)
Body mass index	16%	8%	16%	-8% (-12%, 0.3%)	0 (-9%, 15%)
Waist circumference	15%	13%	14%	-2% (-8%, 7%)	-1% (-7%, 10%)
Blood pressure	46%	49%	48%	3% (-6%, 13%)	1% (-9%, 11%)
<b>Laboratory investigations</b>					
Blood glucose level (finger prick or venous blood)	31%	26%	27%	-5% (-11%, 2%)	-4% (-15%, 9%)
Urine (dipstick)	31%	26%	31%	-5% (-12%, 5%)	0 (-11%, 12%)
<b>Counselling/advice</b>					
Diet	3%	6%	8%	<b>3% (1%, 7%)</b>	<b>6% (1%, 17%)</b>
Physical activity	2%	6%	8%	<b>5% (1%, 11%)</b>	<b>7% (1%, 21%)</b>
Smoking	2%	6%	11%	3% (-0.4%, 13%)	<b>8% (2%, 23%)</b>
Alcohol	2%	6%	10%	5% (-0.2%, 20%)	<b>10% (1%, 32%)</b>
<b>Vaccination</b>					
Pneumococcal vaccination (every 5 years)	35%	29%	25%	-6% (-15%, 6%)	<b>-10% (-17%, -2%)</b>

\* All services were scheduled every 12 months unless denoted otherwise. † Figures represent proportion of patients receiving the service. Number of adults reviewed in each audit was 360. ‡ Changes significant at 0.05 level are shown in bold, based on logistic regression models with adjustment for age, sex and health-centre clustering. ◆

preventive care and actual delivery of care was poor compared with strategies for chronic disease management. The improvements in chronic disease management were achieved despite significant ongoing constraints on financial, staffing and other resources, and the same should be achievable for preventive care.

In the broader context, there has been an increasingly positive policy environment in Australia for promoting delivery of preventive services. This includes the introduction of specific Medicare Benefits Scheme (MBS) items in 1999 to reimburse general practitioners for providing preventive services for all Australians aged over 75 years and for Indigenous people over the age of 55 years.<sup>23</sup> This initiative was expanded in 2004 to include Indigenous people aged 15–54 years.<sup>24</sup> However, a recently published evaluation showed that the uptake of preventive service MBS items among Indigenous populations has been slow.<sup>25</sup> In our study, half of participating centres reported some use of the MBS items,<sup>16</sup> but it was not possible to determine the specific effect of this in our study. Moreover, while the MBS rebates provide incentives for individual (and private) GPs to deliver preventive services, they may have less effect in motivating practitioners working in remote Indigenous community

health centres, who are usually in salaried positions. Moreover, rebates are not currently claimable by remote area nurses or Aboriginal health workers. This example is just one illustration of the need for system development at health centre level to help implement higher level policy initiatives at the coalface.

Health care providers need innovative ways to improve health outcomes across a range of priority areas, including chronic disease management and delivery of preventive care to adults. In our study, use of the concept of the CCM (and its associated ACIC scale) to assess system development did not distinguish between support for preventive services and support for chronic disease management. To encourage specific attention to systems that would support preventive care in addition to disease management, we have developed a System Assessment Tool (available on request from the authors) that focuses on clinical management of people known to have chronic illness as well as clinical preventive services for generally well adults. Experience gained from wider application of the tool should lead to further improvements in the understanding of how primary care systems can be strengthened to support delivery of preventive services.

**ACKNOWLEDGEMENTS**

We gratefully acknowledge the support of staff and management of the participating community health centres. Our project was funded by the Australian Health Ministers' Advisory Council and the Cooperative Research Centre for Aboriginal Health. Damin Si's work is supported by a National Health and Medical Research Council (NHMRC) Population Health Capacity Building Grant. Ross Bailie's work is supported by an NHMRC Senior Research Fellowship. Joan Cunningham's work is supported by an NHMRC Career Development Award.

**COMPETING INTERESTS**

None identified.

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(Received 8 Jun 2007, accepted 21 Aug 2007) □