Could electronic information systems enhance the quality of Aboriginal health promotion? Findings of an audit of Aboriginal health programs in the Northern Territory of Australia

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Abstract

Background: In Australia, health services are seeking innovative ways to utilize data available in electronic patient information systems, such as Electronic Health Records, to report on, and improve, the quality of health care delivery and health system performance for Aboriginal Australians. These systems provide a valuable source of information on delivery of health care to individuals but are rarely designed for community-level health services, such as health promotion and disease prevention projects. Therefore, research about the use of information systems in health promotion and the potential to report on health promotion quality has received little attention in the academic literature. This study utilizes data stored in a specifically designed, commercially available, health promotion information system (QIPPS) to examine the potential for reporting and improving Aboriginal health promotion.

Methods: A structured audit tool was used to extract information from a sample of 39 health promotion projects delivered between 2013 and 2016 in Aboriginal communities of the Northern Territory. Project level data were aggregated and reported as best practice indicators of Aboriginal health promotion quality. Qualitative text describing community participation in health promotion were also captured.

Results: QIPPS provided an organized data source on a vast array of health promotion project information for secondary analysis. Using a structured data collection tool enabled project level information to be aggregated at a system-wide level and identified gaps in quality indicators. Information about some aspects of health promotion, like community participation in project planning, was described in detail such that it could be used for quality improvement purposes, however, information about other areas, particularly during project implementation and evaluation, was limited.

Conclusion: Project information stored in a specifically designed health promotion electronic information systems can be used to report on and improve Aboriginal health promotion efforts. Data availability and quality were limiting factors for reporting health promotion quality. Strategies to improve the quality and accuracy of data entry together with the use of quality improvement approaches are needed to reap the potential benefits of health promotion information systems.
Background

Australia’s health system is under increasing pressure to perform better at ‘closing the gap’ in health disparities between Aboriginal and Torres Strait Islander peoples and Australians of other descent (1) (Hereafter, we use “Aboriginal” as a collective term, acknowledging the diversity of language and culture of Aboriginal and Torres Strait Islander peoples, as the First People and custodians of Australia). This has stimulated wide-spread uptake of quality improvement programs and the introduction of key performance indicator reporting, and a rapidly expanding quest for better information about the quality of health services and programs for Aboriginal people (2). Reports on health care quality and health system performance, however, repeatedly lack information about the quality and effectiveness of Aboriginal health promotion programs and services. For example, health promotion - described as ‘activities designed to improve or protect health within social, physical, economic and political contexts’(3) - is one of 68 performance measures included in the Australian Government’s Aboriginal and Torres Strait Islander Health Performance Framework. Monitoring performance of this measure is based on the number of health promotion interventions provided by clinicians and other health professionals. Information on quality and/or health promotion effectiveness is not reported due to limits in data quality and suitable methods for measuring the nature, level and reach of programs and activities (3).

In addition to improving reporting of the contribution that Aboriginal health promotion makes to ‘closing the gap’, there are calls for Aboriginal people and communities to become active partners in their health care delivery (4, 5). Community involvement, engagement and control has long been argued as ‘what works to overcome Aboriginal disadvantage’ and an essential factor that underpins successful programs for Aboriginal Australians (6). Studies evaluating community participation in health promotion and community development projects, have consistently concluded that involvement of communities enhances delivery and uptake of health programs (7, 8), however, descriptions about the approach, strategies and processes of community engagement i.e. how the community is engaged, where, and who participated, remains limited (9, 10).

Electronic information systems have the potential to overcome some of these information challenges
and could promote the visibility of Aboriginal health promotion (11). Firstly, by facilitating collection, documentation and organization of a vast array of information about health promotion in a structured and systematic way. Secondly, as a source of data to be analyzed and communicated in real-time for quality improvement and performance indicator reporting purposes. In the clinical setting, Electronic Health Records (EHRs), a type of electronic information system commonly used in health services, provide a valuable source of information about the delivery of health care to individuals. Indeed, health services have sought innovative ways to utilize data available in these systems to report on, and improve, the quality of health care delivery and health system performance for Aboriginal Australians (12, 13). EHRs and other types of patient information management systems, however, are rarely designed or developed to track and monitor delivery of population-level health services, such as health promotion and disease prevention programs. While there is growing evidence to suggest health promotion and prevention could similarly benefit from like information technologies (11, 14), research about the use of these systems and their potential to improve quality of health promotion, generally (15), or in the context of Aboriginal communities, specifically, has received little attention in the academic literature. This is because systems for recording and monitoring health promotion efforts are often created for individual organization’s internal purposes, without any record of how it was designed, used or lessons learned, and therefore is rarely discussed or evaluated in the literature.

Within this broader context, we report a study of Australia’s first investigation of how health promotion data stored in an online information system could be used to report on, and improve, the quality of Aboriginal health promotion. Between 2008 and 2019, the Quality Improvement Program Planning System (QIPPS), a commercially available online data management system, has been the centralized system for Northern Territory Health (NT Health) staff to document their health promotion efforts. Thus, QIPPS provides a valuable, yet relatively unexplored data source about health promotion practice in Aboriginal communities. In this study, we were interested in the potential of utilizing health promotion data captured via QIPPS for the purposes of quality improvement and performance indicator reporting in Aboriginal health promotion, with an emphasis on how community
are engaged in health promotion. To do so, we undertook an exploratory analysis of QIPPS data to (1) describe the scope of Aboriginal health promotion programs in the NT; (2) assess the quality of health promotion planning, delivery and evaluation, and their documentation in QIPPS; and (3) examine the extent to which community participation is recorded such that it could be used for quality improvement and performance reporting purposes.

**Improving Aboriginal health promotion in the Northern Territory**

The NT is arguably Australia’s most challenging health service delivery environment. The NT has the highest proportion of Aboriginal Australian residents. Approximately 30% of the total NT population identify as being Aboriginal and/or Torres Strait Islander peoples compared to 3% of the total Australian population (16), making NT Health the single largest provider of health services to Aboriginal peoples in Australia. About 90% of the NT Aboriginal population live in discrete, remote communities, where the delivery of health care is logistically challenging, hence more expensive, than in urban settings (17). The gap in life expectancy between Aboriginal peoples and Australians of other descent is greater in the NT (14.4yrs for both males and females compared to 10.6 years for males and 9.5 years for females, nationally), and is increasing over time (3). Colonization, social determinants, and discrimination are important factors in these inequities (3, 6, 16), as are potentially preventable chronic diseases - the greatest contributor to the difference in health status between Aboriginal peoples and non-Aboriginal Australians (16). In the NT, the Aboriginal population experience a disproportionate burden of chronic disease linked to inactivity, malnutrition, socio-economic disadvantage and access to primary health care services (3, 18). The cost of the Aboriginal health gap in the NT has been estimated at $16.7 billion (19).

The critical role of health promotion and prevention in addressing these inequities and improving Aboriginal health outcomes is widely recognized in the NT. Health promotion is a core function in models of comprehensive primary health care (20) and an ongoing strategic priority of NT Health (17, 21). However, in reality, a range of challenges influence health promotion delivery and its success in
the NT, including the burden of acute care in Aboriginal communities, high workforce turnover, low stability and acute-oriented, temporary staffing (18, 22) together with the availability of information about, and capacity to report on, community level health promotion practice (9, 23, 24).

To overcome some of these challenges, and to improve the quality and effectiveness of health promotion, NT Health has introduced over the past 10 years a range of initiatives. These have included: (i) a Health Promotion Strategic Framework (25); (ii) introduction of the Quality Improvement Program Planning System (QIPPS); and (iii) strong and sustained participation in continuous quality improvement initiatives (26), including in health promotion specifically (27). NT Health has subscribed to QIPPS since 2008 with the original intent of (i) assisting staff to design and deliver health promotion projects, and (ii) to support staff in documenting their health promotion efforts in a systematic and structured way.

**Quality Improvement Program Planning System (QIPPS)**

QIPPS was an Australian designed online health promotion tool that provided a systematic and standardized approach to health promotion project planning and evaluation. It provided a framework for people working in the health sector to plan, evaluate, share and report on their health promotion and community development projects. The platform included a wide range of supportive information, definitions, research material, references, website links and models that assisted in designing program plans and evaluations. It was also a mechanism for knowledge management and collaborative planning with internal and external partners because it included functions enabling users to capture and search a growing body of community-based initiatives.

In contrast to other health promotion systems which are typically created and used within an organization (11), QIPPS was commercially available; hosted, maintained and supported by Infoxchange; a not-for-profit social enterprise with a focus on smart and creative use of technology to improve the lives of vulnerable people, driving social inclusion and creating stronger communities (see [https://www.infoxchange.org/au](https://www.infoxchange.org/au)). Organizations subscribed to QIPPS, with fees determined by number of total users. In summary, QIPPS was Australia’s only fee-for-service commercially available electronic information specially designed for health promotion. Unlike organization specific e-
technologies, many of which are resource intensive to develop and sustain, and unsuitable or unavailable for broader use, QIPPS provided a ready-made health promotion quality improvement system available for uptake and wide-scale implementation.

Methods
Study Design
This is a retrospective study examining information about health promotion projects centrally documented and stored in QIPPS. We sampled QIPPS records to identify projects that: addressed chronic diseases, including mental health, environmental health, and/or risk factors (smoking, alcohol, nutrition, physical activity), designed to benefit Aboriginal people, families and communities, and that were recorded in QIPPS as delivered between 2013 and 2016.

Data sources, collection and analysis
Our approach to data collection, analysis and reporting draws on a popular continuous quality improvement technique, known as audit and feedback. ‘Audit and feedback’ is a systematic process of gathering information about professional practice and then comparing this with explicit criteria (such as professional standards or targets) (28). The gap between assessed performance and the criteria allows health services to target efforts on areas for improvement. Audit and feedback is widely used by Aboriginal primary health care services to assess and improve health care quality (29, 30), including health promotion (9, 27).

We used a previously validated audit tool that is structured around five indicators of best practice that were identified by blending available best practice guidelines and practice-based evidence in Aboriginal health promotion (27). The tool includes closed ended and categorical questions enabling comparison over time and aggregation of data within and across health services and organizations. Data at the project level are collected, then aggregated and reported as indicators of Aboriginal health promotion quality at an organization or system-wide level. The five headline indicators are (Figure 1): Planning, Targeting, Community Participation, Partnerships, and Evaluation. Each headline indicator includes several items to give further insight into Aboriginal health promotion quality. The audit protocol provides rationale for the collection of information (or data) in a standardized way, explains the audit items, and provides examples to facilitate data collection. The health promotion
audit tool and protocol are available at https://www.menzies.edu.au/page/Resources/Health_Promotion_CQI_Tools/).

[INSERT FIGURE 1 HERE]

Four authors independently reviewed eligible projects and recorded their findings in a purpose-built Microsoft Excel spreadsheet. The spreadsheet included variables for each audit tool item using dichotomous (yes/no) and categorical variables. Simple frequency counts were calculated for dichotomous and categorical variables. In addition, we extracted text that described strategies and processes of community participation in health promotion projects. To ensure completeness of data and accuracy, three authors independently conducted audits on an initial sample of five projects. The lead author’s results acted as the ‘gold standard’ against which team members results were compared. Variations in results were discussed to determine reason for difference and strategies for enhancing data collection consistency. This included minor changes to the wording in the audit protocol and amendments to the data entry spreadsheet. Monthly meetings among co-authors were used to discuss and monitor emerging results. One co-author, not involved in the audit process, reviewed findings and interpretation.

Results
Scope of Aboriginal health promotion projects in the Northern Territory
Our sampling process resulted in a total of 39 health promotion projects. Most projects addressed nutrition (27 projects), followed by physical activity (7 projects) and mental health (including social and emotional wellbeing) (4 projects). Almost half (19/39) of the projects were considered once off (i.e. delivered only once and not expected to be done again). Five projects were continuous (i.e. delivered on a regular basis through the year e.g. monthly or weekly); and five were described as intermittent (e.g. delivered once a year, each year). Delivery frequency was unclear for ten projects. The type of health promotion strategies was dominated by health education (23 projects), followed by community action (19), health information (18) and strategies for creating supportive environments
Quality of Aboriginal health promotion

Table 1 presents a summary of the aggregated project level data for indicators of Aboriginal health promotion quality. Most projects (34/39) included descriptions of planning processes; this included a clear statement of the project aim or goal (33/34) and details on the implementation strategies (31/34). Three quarters of projects (26/34) had documentation of the indicators or criteria to evaluate the project. Only 3 projects included a budget. Five projects had no documentation of planning processes.

[INSERT TABLE 1 HERE]

In 35 of the 39 projects, there was a clear record of the ‘target group’, or, those who would benefit from the project. Most projects were designed for the “general community”, followed by “children”. There was a record of involvement of other organizations or agencies in 26 of the 39 projects, of which, 15 were with agencies or organizations beyond the health sector. Details about evaluation results were reported in approximately one third of projects (15/39); majority of the evaluation documentation was limited to a recording of participant numbers (12/15). The level of detail describing other evaluation findings were mixed, such as reporting changes in participant satisfaction (4/15), knowledge and understanding (6/15), skills and behaviours (3/15) or broader impacts on policy/environments (3/15).

Recording of community participation in QIPPS projects

Documentation of community participation in planning, implementation and evaluation was reported in 20 of the 39 projects (see Table 1), and predominately described at the project planning phases (identifying need (16/20) and determining strategies (11/20)). Documentary evidence of community involvement during project implementation (7/20) or evaluation (4/20) was limited. In almost half of the projects, information describing community participation was not available or in insufficient detail, despite the QIPPS prompt to record “How will the target group and community stakeholders be encouraged to actively participate and engage with the project?”

Table 2 includes examples of the unstructured text derived from project documentation; illustrating
how strategies and processes of community participation are described in real world practice. The main strategy by which community participation happened was via consultation processes. Common consultation methods included community meetings, focus groups, surveys and interviews as common consultation mechanisms. Some QIPPS records included more detailed descriptions of how community participated than in others.

[INSERT TABLE 2 HERE]

Discussion

This exploratory analysis demonstrates the potential of utilizing health promotion data captured via an electronic information system for the purposes of quality improvement and performance indicator reporting in Aboriginal health promotion. QIPPS provided an organized data source on a vast array of information pertaining to health promotion practice in NT Aboriginal communities. The use of a structured data collection tool enabled project level information to be systematically collected, analyzed and displayed as aggregated data at a system-wide level. The findings provided insight into the scope of health promotion projects and identified gaps in quality indicators which could be used to target system level changes and improve Aboriginal health promotion efforts.

Our findings highlighted the most common type of health promotion projects were nutrition related, and largely dominated by health education strategies. Few health promotion projects were ongoing, the majority were delivered as once-off projects. Encouragingly, for around half of the projects in our study, information about community participation was described such that it could be used for quality improvement and performance reporting purposes. Having a range of quality indicators enabled a nuanced exploration of the different ways community participate as an ‘active partner’ throughout each project phase: planning, implementation and evaluation. Our findings illustrated that information about community participation were predominately descriptions of consultation processes during the planning phase. Consistent with previous health promotion studies (7, 9, 10) records of how community were engaged and who in the community participated during phases of implementation and evaluation were not documented or were in insufficient detail. Given the centrality of community participation, control and ownership to Aboriginal program success, demonstrable improvements in
community participation, as well as increasing evidence of health promotion effectiveness in Aboriginal communities, could be achieved by ensuring information systems are designed to support the collection, analysis and reporting of community involvement. Our previous research demonstrated that using indicators of Aboriginal health promotion quality within a continuous quality improvement framework enhances health system capacity for recording health promotion, and subsequently the availability and quality of data (9). With further support for uptake and implementation of quality improvement in health promotion, demonstrable and sustained improvements in Aboriginal health promotion are feasible (9, 32).

As for information systems more generally (12, 13, 33, 34), a significant constraint in realizing the potential of QIPPS is data quality. Information about some elements of health promotion, particularly related to project planning, were more readily available, and reliably collected, such as stating project goals and objectives, identifying the target group and health issues to be addressed. Meanwhile, information about aspects of project implementation and evaluation, such as strategies for community participation, evaluation methods and reporting findings, were missing or inconsistently reported and therefore, less reliably collected for secondary analysis. Records about health promotion practice predominately constitute prose-like narratives, or free text, invariably resulting in variability in documented information. From a quality improvement standpoint, data standardization is critical for creating indicators and tracking and reporting performance over time. However, in practice, important insights about the quality of Aboriginal health promotion, such as community participation processes and strategies, will likely remain invisible if information is recorded in pre-specified formats or by applying strict documentation practices. Herein lies one of many challenges in designing an information system that supports collection, analysis and reporting of data for quality improvement, alongside health professionals’ planning and evaluation needs (11, 14).

The extent of generalizability of our study findings should take into account: (i) data were based on recorded health promotion practice, which may underestimate breadth and depth of actual health promotion efforts; (ii) given the long-standing use of QIPPS in NT Health, the quality of data reported is likely to be better than for other Aboriginal health services and state/territory government health
departments more generally in Australia. Furthermore, NT Health provided support and training for QIPPS users—Aboriginal and non-Aboriginal dedicated health promotion practitioners and non-dedicated health promotion staff including nutritionists and public health staff in hearing, oral and environmental health - thus, staff have a better understanding of the information system which is likely to influence quality of information entered in QIPPS; and (iii) several biases can arise auditing records of health service delivery, including experience and skills of the auditor/s; and the type of data extracted, influencing the reproducibility of quality indicator/s. A strength of the study was the iterative and team-based approach of Aboriginal and non-Aboriginal researchers, policy staff and health promotion practitioners working together. Since completing this study, QIPPS was decommissioned by Infoxchange and is no longer available on the market. NT Health is currently transitioning from using QIPPS to an existing internal health record management system, with customized templates for documenting the planning and evaluation of health promotion.

Conclusions
This first Australian study of an online commercial information system for health promotion demonstrates the potential for utilizing project level information for the purposes of quality improvement and performance indicator reporting in Aboriginal health promotion. More should be done to encourage accurate recording of information about health promotion practice, particularly findings of evaluations and how community are engaged throughout project phases. This would allow the more successful strategies to be identified and replicated to enhance health promotion success, and ultimately improve the health and life expectancy of Aboriginal people. Testing and improving the validity and reliability of indicators of Aboriginal health promotion quality is an important area for future research, and more specific attention to the development and use of information systems in health promotion should contribute to a more comprehensive understanding of the quality of health services and programs for Aboriginal Australians.

Abbreviations
CBW - Community-based workers
EHR - Electronic Health Record
NT – Northern Territory

QIPPS – Quality Improvement Program Planning System

SWSBSC - Strong Women, Strong Babies, Strong Culture;

TAFBALK - Talking About Feeding Babies and Little Kids

Declarations

Ethics approval and consent to participate

All research procedures related to this study were deemed as ‘Nil/Negligible Risk’ by the Research Governance Committee, University of Technology Sydney, and not requiring review from a Human Research Ethics Committee (UTS HREC ETH17-1792).

Consent for Publication

Not applicable

Availability of data and material

The dataset analyzed during the current study are not publicly available because the information system has been decommissioned and the product is no longer available on the market. Data are however available from the corresponding author upon reasonable request and with permission of NT Health.

Competing Interests

The authors declare that we have no competing interests

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Authors' contributions

NP conceptualized the study and led the data collection, analysis, interpretation, writing drafts and finalizing the manuscript. PB and KC contributed to study design and provided advice during data
analysis and manuscript writing. PB, KR & JC contributed to data collection, analysis and interpretation. All authors reviewed drafts, read and approved the final manuscript and have agreed to be personally accountable for their own contributions, and in ensuring accuracy and integrity of any part of the work presented in this manuscript.

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Tables

Table 1. Summary of audit findings against indicators of Indigenous health promotion quality
| Audit tool items related to five best practice criteria | Number of projects with documentation of item* (Total number of projects=39) |
|-------------------------------------------------------|-------------------------------------------------------------------------|
| **1. Planning** that included:                        | **34**                                                                  |
| - aim                                                 | 33                                                                      |
| - Strategies                                          | 31                                                                      |
| - People responsible for tasks                        | 7                                                                      |
| - Timeframes                                          | 11                                                                      |
| - Indicators or evaluation measures                   | 26                                                                      |
| - budget                                              | 3                                                                      |
| **2. Targeting** that included:                       | **35**                                                                  |
| *target group*                                        | **35**                                                                  |
| General population                                    | 16                                                                      |
| Children (infants, preschool, primary school)         | 17                                                                      |
| Adolescents & young adults                            | 8                                                                      |
| Adults                                                | 14                                                                      |
| Elderly                                               | 5                                                                      |
| Parents & families                                    | 11                                                                      |
| *Gender*                                              | **33**                                                                  |
| Males                                                 | 0                                                                      |
| Females                                               | 4                                                                      |
| Both males and females                                | 26                                                                     |
| *Setting*                                             | **33**                                                                  |
| Health centre                                         | 3                                                                      |
| Community                                             | 28                                                                     |
| Both health centre and community                      | 2                                                                      |
| *Health issue / topic*                                | **37**                                                                  |
| Smoking                                               | 2                                                                      |
| Nutrition or diet                                     | 27                                                                     |
| Alcohol                                               | 2                                                                      |
| Physical activity or exercise                         | 7                                                                      |
| Mental health / social and emotional wellbeing        | 4                                                                      |
| **3. Community participation**                        | **20**                                                                  |
| *Identifying needs*                                   | 16                                                                      |
| Determining strategies                                | 11                                                                      |
| Implementing strategies                               | 7                                                                      |
| Evaluating                                            | 4                                                                      |
| **4. Partnerships**                                   | **26**                                                                  |
| *outside agencies and organisations*                  | 26                                                                      |
| *organisations beyond the health sector*              | 15                                                                      |
| **5. Evaluation**                                     | **15**                                                                  |
| *Number of participants*                              | 12                                                                      |
| Participant satisfaction                              | 4                                                                      |
| Changes in knowledge and understanding                | 6                                                                      |
| Changes in skills and behaviours                      | 3                                                                      |
| Changes in policy and/or environments                 | 3                                                                      |

*some projects included documentation of more than one audit item, therefore the total number exceeds the number of projects included in the study
Table 2 Descriptions of community participation strategies and processes recorded in QIPPS projects

| Identifying/Determining Need | Determining Strategies | Implementing SI |
|------------------------------|-------------------------|-----------------|
| After conducting a community consultation with 13 community women, they all expressed a desire to participate in group education around exercise and healthy eating | Clinic staff including Community Based Workers can assist with community engagement and evaluation processes, undertake training in the healthy food sale. | One community elder really liked the resource and they wanted to take Primary Health to a different group, community to show education with the concerned for won smoke. |
| Community members in [community] expressed an interest in nutrition education and healthy cooking activities | A similar group was conducted in community which the women stated they all enjoyed, during the community consultation process. | Activities and discussion were done in language. |
| Particular community leaders have indicated that soft drink is something that they would like to help the community find a strategy to reduce consumption | Adapted workshop content and logistics based on CBW feedback in planning stages and previous TAFBALK evaluations | Strong Women Workers, Health Development who are active in health promotion activities and will be crucial throughout planning and implementation. |
| Clear communication from Primary Health Network to community stakeholders via official letter of invitation | Include SWSBSC CBWs in planning TAFBALK workshop content to share community knowledge needs, comment on existing knowledge base of CBWs and ensure workshop remains culturally relevant and appropriate | The shelf labels were placed at the store shelves. This was done by a group of 8 school children. |
| Collaborate with the Takeaway Store in identifying the need | A new interview strategy, where key community members and traditional owners would be targeted. This was done by the local project staff member developing a list of individuals to approach. | Participation in the preparation, setting community by enc SBT and pick child. |
| Consult with community leaders about proposed project.-consultation with community leaders using semi-structured questions - conduct meeting/focus groups | Sample label designs were discussed with community, | Healthy Tucker/Long life shelf labels on healthy foods at the store, went to store with students and supported them. |

CBW = community-based workers; SWSBSC = Strong Women, Strong Babies, Strong Culture;

TAFBALK = Talking About Feeding Babies and Little Kids

Figures
Figure 1
Diagram