Designing an Informatics Infrastructure for a National Aged Care Medication Roundtable

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Abstract. In the residential aged care sector medication management has been identified as a major area of concern contributing to poor outcomes and quality of life for residents. Monitoring medication management in residential aged care in Australia has been highly reliant on small, internal audits. The introduction of electronic medication administration systems provides new opportunities to establish improved methods for ongoing, timely and efficient monitoring of a range of medication indicators, made more meaningful by linking medication data with resident characteristics and outcomes. Benchmarking contemporary medication indicators provides a further opportunity for improvement and is most effective when indicator data are adjusted to take account of confounding factors, such as residents' characteristics and health conditions. Roundtables provide a structure for

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sharing and discussing indicator data in a trusted and supportive environment and encourage the identification of strategies which may be effective in improving medication management. This paper describes a new project to establish, implement and evaluate a National Aged Care Medication Roundtable.

1. Introduction

The increasing use of electronic clinical information systems in the aged care sector presents new opportunities to monitor care quality, as well as initiate interventions to improve care delivery and outcomes. While many residential aged care services have implemented electronic clinical information systems, there has been considerable under-utilization of the data captured and data are often siloed from other clinical systems.

Poor medication management in residential aged care has been consistently identified as a major problem and accounts for over a third of complaints made to the Australian Aged Care Quality and Safety Commission [1]. Medication use in residential aged care is extensive, with over 80% of residents taking five or more medications each day and 40% taking ten or more [2]. Concerns around polypharmacy and associated adverse events, as well as inappropriate use of some medications such as antipsychotics and antibiotics have also been highlighted as problematic in the sector [3]. Our research has demonstrated, for example, large variation in the use of antibiotics in residential aged care [4]. Evidence of successful interventions to reduce inappropriate use of antibiotics in this sector is limited [5].

National medication indicators for polypharmacy and antipsychotic use were introduced in 2021 and provide some of the first contemporary national data on medication use in the sector. While these mandatory indicators provide new information, there are also significant limitations. No adjustments are made to the indicators for residential aged care facilities based on differences in the characteristics of their resident populations which may influence medication use. This limits the value of the indicators in making meaningful comparisons between facilities and over time.

There has been continued uptake of electronic medication administration systems by residential aged care facilities (also known as nursing homes). These systems capture real-time medication data and can be linked to other important details about residents such as their health conditions. As such, the data in these systems provide opportunities both to automate the process of generating medication indicators, reducing the need for manual audits, and to apply the information gained to inform improvements in medication management. However, leveraging these opportunities requires data analytics expertise, as well as a framework by which data can be benchmarked, interpreted and discussed, to take into account factors such as local contexts and determine appropriate actions.

In the acute care sector, benchmarking of outcome data across organizations has been used as a mechanism to drive improvements in care and to spread successful interventions. The Health Roundtable, for example, has been in operation for over 25 years in the acute care sector in Australia and has over 140 members [6].

Here we discuss the initiation of a major new project to design, implement and evaluate a National Aged Care Medication Roundtable under-pinned by an innovative

informatics infrastructure exploiting contemporary medication administration datasets from the residential aged care sector.

2.   Methods

The project is a collaboration between multiple aged care provider organizations, policy makers and consumers and is funded by a NHMRC grant that commenced in 2022.

The National Aged Care Medication Roundtable draws on a learning health systems model. Learning health systems are designed to bring together evidence generation and application to everyday decision-making and service provision. Within a safe and trusted environment, members of the Roundtable review data and evidence reports and bring to this process their front-line knowledge, experience and expertise. Through this process, indicators of medication management will be presented to the Roundtable based on analyses of contemporary medication administration data generated by the member aged care providers. These medication indicator data will be benchmarked and discussed by members.
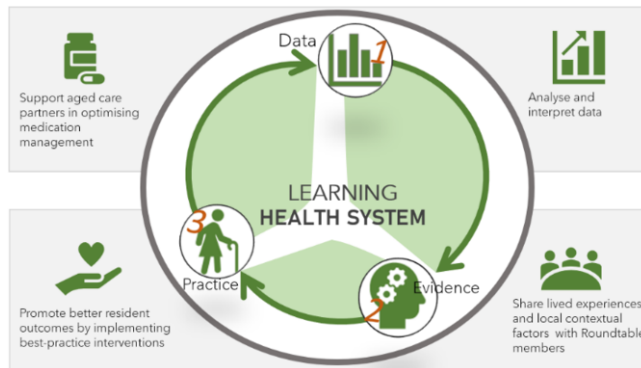
Figure 1. Provides an overview of the learning health systems model.

The project will apply mixed-methods and involves three parts, i) establishment of a Roundtable, ii) implementation of the Roundtable and iii) evaluation of the outcomes of the Roundtable.

The Roundtable design process is iterative and collaborative and involves gaining agreement from participants about:

- The principles of how the Roundtable will operate

- Standards and timetable for the extraction of datasets

- Medication indicators and processes for adjusting indicators

- Roundtable report formats, determining and testing the ways in which results will be presented using graphical formats which target different user audiences

During Roundtable meetings, indicator outliers are a focus of discussion and further investigation conducted to understand contributing factors, including the identification of successful interventional strategies in some organizations which may be appropriate for wider adoption. Roundtable discussions will be facilitated by presentations from subject experts and members will decide upon priority areas for interventions.

2.1. Formatting of Benchmark Reports

The power of data lies in its ability to be easily understood and interpreted and then the information gained to be applied to inform decision-making. Thus, a key element of the Roundtable is tailoring the presentation of data for multiple audiences. For example, the type and level of detail required at an organizational level will be very different to the information which will be of value to a facility manager or an individual resident.

As part of the Roundtable development process a series of different data graphics are being reviewed and tested by user groups. For example, Figure 2 provides two views of the same dataset. Panel A shows a funnel plot, which displays each facility's indicator results within an expected uncertainty envelope around a target value. Panel B shows a caterpillar plot of each facility's indicator with its confidence interval and the target value as a horizontal line. Both graphics show individual facilities and allow identification of outliers and benchmarking of performance against a target value, but the different ways of presenting uncertainty may affect how people respond to the data. Testing both user preferences as well as accuracy of the interpretation of information will be important in determining which data representations are most effective.
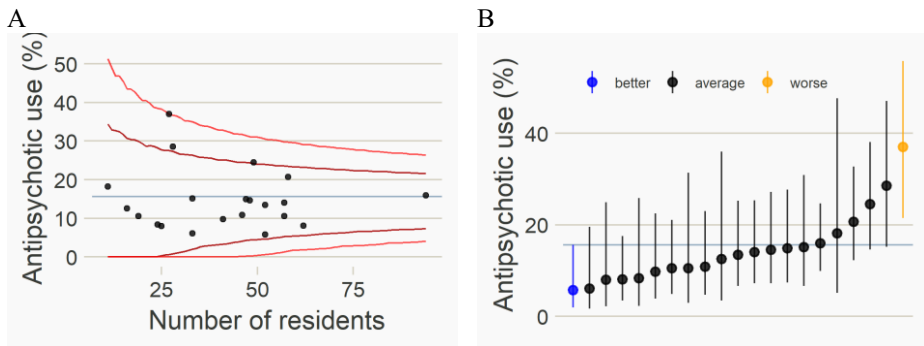
Figure 2. Funnel plot and caterpillar plot representing the same data.

2.2. Nudge Interventions

Digital nudge interventions will be designed to target areas of common concern. Nudge interventions aim to change the way information is presented or framed in order to influence decision-making. Nudge interventions are typically low-cost interventions which are not reliant upon education programs. These might include, for example, requiring a prescriber to document a reason for continuing an antipsychotic for a period beyond that recommended by guidelines – in essence, nudging the system user to review the use of the medication. The effects of such interventions will be evaluated using appropriate study designs and facilitated by the Roundtable informatics infrastructure.

The project received ethics approval from Macquarie University HRE Committee.

3. Results

The National Aged Care Medication Roundtable commenced in 2022 with membership including three aged care provider members who deliver care to approximately 5000

aged care residents, and representatives from the Aust. Commission on Safety & Quality in Health Care and Consumers Health Forum. The Roundtable is supported by a team based at Macquarie University, with input from experts from six other Universities.

During the first year of development, the Roundtable has established a set of agreed operating principles, including Terms of Reference. Two Roundtable meetings have been held and have reviewed different approaches to data presentation. Core elements of the benchmarking indicator reports have been agreed and will include: indicator description; descriptive statistics, case mix of residents; comparison of the adjusted and unadjusted indicators against benchmarks (incl. the national average where available); trend lines; and other data to assist in interpretation of indicator data e.g., staffing ratio.

Outside the formal meetings, processes for standardization of medication data extraction have been established and algorithms for the calculation of indicators (incl. adjustments for potential confounders) completed. In 2023, quarterly benchmarking Roundtable meetings will commence, including the design of agreed areas of intervention focus. The membership with be expanded to incorporate representatives across all staffing levels from the aged care providers, residents, and families/careers.

4.   Discussion

The National Aged Care Medication Roundtable will support a data driven approach to understanding the quality of medication management in the aged care sector and a cyclical process for identifying, trialing and testing interventions to improve safe and effective use of medicines.

5.   Conclusions

The highly collaborative framework involves aged care providers, consumer representatives and policy makers sharing and interpreting data. Importantly, the benchmarking process accounts for local contextual factors and will facilitate the spread of effective strategies, the outcomes of which can be measured.

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