NSW TAG

Promoting Strategies to Reduce Harm from Polypharmacy in Australian Hospitals: Use of Quality Use of Medicine Indicators and Tools

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NSW Therapeutic Advisory Group Inc.

Advancing quality use of medicines in NSW

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Introduction

Use of clinical indicators targeting quality use of medicines (QUM) enables identification of clinical practice gaps in the judicious selection of treatment options and the appropriate, safe and effective use of medicines. QUM is an important component of Australia's *National Medicines Policy*.[1] Use of QUM indicators support QUM improvement strategies and can be used to assess the effectiveness of such strategies or, when used periodically, can monitor hospital performance. As such, they can provide evidence for accreditation or act as key performance indicators for health service organisations (HSOs).

The QUM Indicators for Australian Hospitals were first published in 2007 and became the National QUM (NQUM) Indicators following review and the addition of other QUM indicators in 2014.[2] The formal decision algorithm found in Appendix 2 of the 2014 NQUM Indicators for Australian Hospitals has been a key feature of QUM indicator development in 2007, 2014 and in the development of the indicators discussed in this report. This algorithm enables a systematic and structured decision-making process to occur to identify clinically focussed, useful and measurable indicators that can drive clinical practice improvement. This process sets it apart from the development of many other indicator datasets. There are currently 37 published validated NQUM Indicators for Australian hospitals. Clinician feedback concludes that they are important, valid, measurable and useful for informing local improvements in QUM. The NQUM Indicators support the implementation of the National Safety and Quality Health Service (NSQHS) Standards[3], aimed at improving the quality of health care in Australia.

Medicines use in older people is a complex balance between managing disease and avoiding medication-related problems. Australia's population of those aged 65 and over continues to grow and is projected to more than double by 2057.[4] Consequently, the burden of polypharmacy (5 or more medicines) in older people is increasingly recognised.[5,6] It is estimated that during 2016 – 2017, 250,000 hospital admissions in Australia were due to medication-related problems, costing approximately $1.4 billion. An additional 400,000 presentations to emergency departments were due to medication-related problems with 50% of this harm judged preventable.[7] Use of inappropriate medicines (when the risk of harm outweighs the likelihood of benefit for the individual patient) is a major burden on older adults and the health system and represents low value health care.[5] Inappropriate polypharmacy is common in older hospitalised patients and contributes to adverse drug events such as falls and cognitive impairment, impaired quality of life, increased costs, and is currently inadequately addressed by routine care. Supervised withdrawal of inappropriate medicines (deprescribing) is safe and may improve quality of life in older people.[8,9]

Hospitalisation represents an opportunity to reduce inappropriate polypharmacy, improve patient outcomes and reduce healthcare costs. Prior to the commencement of the project outlined in this report, there were no known published validated medicine-related indicators specifically measuring the relevant processes identifying and managing inappropriate polypharmacy in hospitalised older patients.

The New South Wales (NSW) Therapeutic Advisory Group (TAG) was a partner organisation in the NSW Health funded Translational Research Grants Scheme (TRGS) project 'Reducing Inappropriate Polypharmacy in Older Inpatients', led by Professor Sarah Hilmer as the Chief Investigator. The overall aim of the project was to determine the extent and potential impact of inappropriate polypharmacy in older inpatients with and without dementia, and to develop tools to sustainably address inappropriate polypharmacy in routine care through existing systems for audit, review and policy. As part of a multifaceted intervention with several other partner organisations, NSW TAG's role was to develop relevant clinical indicators for Drug and Therapeutics Committees (DTCs) and clinicians that would enable monitoring of any interventions targeting medication-related harm in older patients and able to be integrated with standard quality assurance systems for QUM in hospitals. Such indicators were recognised as directly relevant to hospitals as they would demonstrate compliance with NSQHS Standards 1 (clinical governance), 2 (partnering with consumers), 4 (medication safety), and 5 (comprehensive care).[3] Furthermore, new actions in the updated NSQHS Standards (2nd edition) require health service organisations to have processes to perform medication

reviews, promote prioritisation of medication reviews based on clinical need and minimise the risk of medication-related problems, as well as support documentation of medication reviews and subsequent actions.

The development process of the proposed QUM Indicators for inappropriate polypharmacy sought to ensure that clinicians would accept the indicators as valid, feasible, useful and important measures of QUM practices and hence become integrated into routine use in busy clinical settings.[10] Importantly, these indicators were developed to be clinician-led, because knowledge and ownership at this level was acknowledged as most likely to generate successful practice change when required. Moreover, clinicians were recognised as having the expertise and resources to promote the use of the indicators, lead improvement strategies[10] and undertake clinician-directed audit and feedback, one of the most effective strategies for improving quality and safety of health care.[11]

Aims

To develop QUM clinical indicators for Australian hospitals that:

- evaluate processes involved in the management of inappropriate polypharmacy and monitoring of inappropriate medicines use in older hospitalised patients; and
- evaluate patients' experiences in the management of inappropriate polypharmacy, particularly the decision-making process for deprescribing and/or medication changes.

Methods

1. **Convening an interdisciplinary expert steering committee**
   An expert Polypharmacy Indicator Steering Committee (PISC) was convened via an expression of interest process and local knowledge of known experts in the area. The PISC represented a multidisciplinary group of clinicians and the skill mix was accepted as satisfactory by the PISC during the first meeting. A list of the PISC members and their credentials can be found in the acknowledgements section. Five PISC meetings were held during 2017 - 2019 and several meetings were attended with the wider TRGS project investigators.

2. **Literature review and information gathering**
   A review and analysis of the published and grey literature was undertaken by NSW TAG to identify any existing clinical indicators that addressed potential inappropriate polypharmacy in older hospitalised patients. MEDLINE and EMBASE databases, The Cochrane Library and grey literature were searched for relevant Australian and international clinical indicators. Combinations of a number of keywords and phrases were used in the search including polypharmacy, potentially inappropriate prescribing/medication, quality indicator, quality assurance, medication review/intervention/reconciliation, sedative, anticholinergic, drug burden index/DBI, falls/FRIDs. All relevant references were searched manually for additional references. Additional searches were undertaken for current Australian specific guidance relevant to the management of polypharmacy in older people from the following known sources not otherwise identified in the above searches:
   - NQUM Indicators for Australian Hospitals 2014.[12]
   - Choosing Wisely Australia website —includes lists of recommendations developed by professional medical colleges and societies of treatments, tests and procedures that healthcare providers and consumers should question.[13]
   - Standards of Practice for Clinical Pharmacy Services 2016 — published by the Society of Hospital Pharmacists of Australia (SHPA).[14]

A search for Patient Related Experience Measures (PREMs) targeting relevant patient-related processes for managing inappropriate polypharmacy did not identify any potential indicators. PREMs from the Australian Hospital Patient Experience Question Set (AHPEQS) questions and response options informed development of the new proposed PREMs for this project.[15]

3. **Expert opinion and consensus on proposed QUM indicators and PREMs**

The PISC prioritised current gaps in best practice management of inappropriate polypharmacy in older hospitalised patients. The PISC endorsed adopting the method used to develop the QUM Indicators for Australian Hospitals published in 2007 and 2014, with the aim that the new indicators become part of the NQUM Indicator set in the future.[12] The compatibility and adaptability of existing NQUM Indicators with the new proposed indicators was assessed and considered throughout the development process. The PISC assessed the potential of modifying existing indicators as well as developing new indicators to provide a set of relevant indicators for field testing. Practice information was sought from clinicians on the Society of Hospital Pharmacists (SHPA) specialty practice streams (geriatric and transitions of care) via discussion board requests for information. All feedback was considered by the PISC and incorporated into the draft versions of the indicators when appropriate.

The PREMs were drafted using the same question and answer options format as the AHPEQS questions.

4. **Development of new QUM indicator specifications and corresponding data collection tools**

Specifications for draft indicators were developed for field testing. Data collection tools were developed for the new QUM indicators. The Microsoft Excel based data collection tools were designed to obtain the indicator result as well as provide insight into possible reasons for any identified gaps. Inbuilt formulae enabled automatic collation and calculation of results. Data collection tools had been previously developed for the NQUM Indicators and the tool developer aimed to ensure consistency across the tools in their design and approach to data collection and input. The PISC approved indicator specifications and data collection tools prior to field testing.

5. **Field testing of new draft indicators and PREMS**

a. QUM Indicators

Expressions of interest for hospital participation in the field testing of the proposed indicators were distributed throughout Australia via NSW TAG networks. Organisations contacted included:

- The Council of Australian Therapeutic Advisory Groups (CATAG) for distribution amongst its members to their hospitals;
- The NSW TAG membership;
- The NSW TAG MedSMART Group; and
- Organisations already participating in other aspects of the wider TRGS project.

Field testing aimed to include hospitals using paper-based and/or Electronic Medical Records (EMRs), large and small hospitals and those from several jurisdictions within Australia to maximise generalisability. It was planned that a minimum of 5 hospitals of varying demographics would field test each indicator. Hospitals were asked to identify which indicators they wished to field test.

Field testing required participant hospitals to measure the indicator as defined in the indicator specifications document using the accompanying data collection tool and to complete a structured questionnaire (Appendix V) on various aspects of indicator use during field testing, including feasibility, validity and measurability. Hospitals retained their individual data and provided NSW TAG with their summary results and the completed questionnaire. Results and feedback were reviewed by NSW TAG and the PISC. Feedback and revisions made to the draft indicators are summarised and provided in the results section of this report.

Ethics approval was obtained from the St Vincent's Hospital (Sydney) (SVH) Human Research and Ethics Committee (HREC), HREC reference number LNR/18/SVH/259. SVH HREC approval was recognised by NSW public hospitals and some interstate hospitals. Individual site project officers were identified and site specific approvals (SSAs) were sought from each hospital's Research Governance Department.

b. PREMs

The PREMs were pilot tested separately with consumers from 2 hospitals in Sydney as part of a prospective observational study led by a General Medicine Registrar. Results of this study are published in the Internal Medicine Journal.[16]

6. Patient and public involvement

Consumers identified medication review, deprescribing in hospital and understanding changes made to their medicines as priorities in our wider project steering group and previous research. Consumers were involved in the user testing of the PREMs.

7. Finalisation of draft indicators, data collection tools and PREMs

NSW TAG and the PISC reviewed and finalised indicator specifications and PREMs based on field testing results and feedback. The data collection tools were amended and finalised by the NSW TAG and the tool developer. The polypharmacy indicators, data collection tools, PREMs and accompanying risk stratification tools were published on the NSW TAG website in November 2020.

Results

The results of the literature review, consultation and expert deliberations in development of the draft indicators and the field testing results for each draft indicator are summarised below. As the purpose of field testing was to ensure that each indicator had value for quality improvement, no interpretation of the actual data is made, albeit that in general, hospitals appear to have immature systems for identifying patients at high risk of medication-related harm and providing medication reviews.

Results of literature review, assessment of existing practice and expert consensus in the development of the polypharmacy indicators

A number of the existing 37 NQUM Indicators, although not specific for older patients nor covering all the key medicines of interest, were considered as having potential relevance, in particular the following indicators targeting continuity of care and sedative prescribing:

- 3.1 Percentage of patients whose current medicines are documented and reconciled at admission
- 5.3 Percentage of discharge summaries that include medication therapy changes and explanations for changes
- 5.7 Percentage of patients receiving sedatives at discharge that were not taking them at admission
- 5.8 Percentage of patients whose discharge summaries contain a current, accurate and comprehensive list of medicines
- 5.9 Percentage of patients who receive a current, accurate and comprehensive medication list at the time of hospital discharge.[12]

A number of the Australian Choosing Wisely recommendations regarding polypharmacy had potential relevance. Additionally, there were specific recommendations for benzodiazepines and proton pump inhibitors (PPIs) (not age specific), non-steroidal anti-inflammatory drugs (NSAIDs) in the elderly, antipsychotics in dementia, and for patients with limited life expectancy.[13] A number of the SHPA Standards of Practice for Clinical Pharmacy Services were relevant to the management of inappropriate polypharmacy.[14,17-19] Polypharmacy indicators have been published by a few countries including Scotland and Sweden and most commonly address the use of medicines acting on the cardiovascular and central nervous systems. A number of international indicators were similar to the Australian NQUM Indicators and only those indicators specific for older patients and/or involving the key medicines of interest were included in the summaries of evidence for this project.

The following key international clinical indicators were identified:

- NHS Scotland Polypharmacy Guidance 2015.
  - Standard indicators of polypharmacy — in order to identify patients for review:
    - ≥10 British National Formulary (BNF) paragraphs (drug class name e.g. opioid analgesics, Selective Serotonin Reuptake Inhibitors) dispensed in a 6 months period with at least one high-risk drug.
    - Applicable to all people ≥50 years old.
    - Additional criteria for sub-groups most likely to benefit from deprescribing.[20]
  - High risk prescribing indicators (patients not necessarily on polypharmacy):
    - Older person (≥75 years old) prescribed an antipsychotic drug.

- Older person (≥65 years old) currently taking an Angiotensin Converting Enzyme inhibitor/Angiotensin Receptor Blocker and a diuretic, who is prescribed an NSAID (the 'triple whammy').
- Older person (≥75 years old) prescribed an NSAID without gastroprotection.
- Older person (≥65 years old) currently taking either aspirin or clopidogrel who is prescribed an NSAID without gastroprotection.
- Current anticoagulant user prescribed an NSAID without gastroprotection.
- Current anticoagulant user prescribed aspirin or clopidogrel without gastroprotection.[20]

- Scottish Patients at Risk of Readmission and Admission (SPARRA) tool:
  - ≥ 10 BNF sections (grouping of BNF paragraphs e.g. analgesics, antidepressants) dispensed in a single year.
  - Listings produced regardless of presence of high-risk drug, but include a marker indicating dispensing of at least one high-risk drug.
  - ≥75 years old; and on request 65-74 years old.[21]

- Swedish indicators for good drug therapy in the elderly (2010)[1]:
  - All recommendations about drugs to avoid applied to all those ≥75 years of age regardless of residence and other characteristics.
    - Recommendations for many individual Central Nervous System (CNS) and Cardiovascular system (CVS) drugs/drug classes.
    - Recommendations for drug use in specific conditions: orthostatic hypotension, falls, cognitive impairment.[22,23]

In addition, there were numerous indicators from a number of countries on the use of anxiolytics/hypnotics, antipsychotics, and medicines with a high anticholinergic load in the elderly, and some indicators for NSAIDs, antidepressants, antihypertensives and anticoagulants. The recommendations for deprescribing PPIs in all age groups including older patients are somewhat counteracted by a number of indicators for NSAIDs and anticoagulants recommending concurrent gastroprotection.

The lack of useful clinical indicators for the management of inappropriate polypharmacy in older people was highlighted in an interim report from the European Union Stimulating Innovation Management of Polypharmacy and Adherence in The Elderly (SIMPATHY) project: A 2017 report on a benchmarking survey and literature review of all current European guidelines on polypharmacy.[24] This report noted the absence of knowledge and meaningful metrics including quality indicators across all European countries and stakeholders. One of the medium term recommendations for future work on the SIMPATHY project was to develop indicators to demonstrate improvement in polypharmacy management and patient outcomes.[24]

Our literature search revealed that there are currently no meaningful 'gold standard' Australian or international clinical indicators that addressed known practice gaps in the effective management of inappropriate polypharmacy in older hospitalised patients. A number of the 37 NQUM Indicators for Australian Hospitals, although not specific for older patients, were of potential relevance, particularly those targeting continuity of care and sedative prescribing. There are also a number of relevant Australian Choosing Wisely recommendations. Although several international indicators were identified, many are of limited relevance due to their focus on specific diseases, specific medicines regardless of the presence of polypharmacy, or management of patients in the community.

[1] A 2017 version of the Swedish indicators was published since the literature review was conducted and has not been reviewed or included in this report.

Various tools to identify risk of harm from inappropriate polypharmacy were available for use in Australian hospitals; however, few categorised risk.[25] The GerontoNet ADR (Adverse Drug Reaction) Risk Score was considered as part of the indicator development process; however, the PISC determined that it did not meet requirements as the risk score only assessed risk of an hospital ADR and the tool did not include specific medications or medicine classes (such as high risk medicines).[26] Furthermore, the PISC acknowledged current work by other organisations with respect to the identification of patients (of all age groups) at high risk of an ADR.

The PISC considered the results of the literature review and the applicability of the international indicators to the Australian health care environment. The committee also identified a number of other QUM gaps relevant to current practice. Several indicator themes were identified to address current QUM gaps in Australian hospitals. It was resolved that there was a need to identify and measure feasible interventions during hospitalisation including the automation of identification of potential inappropriate polypharmacy, use of tools such as deprescribing guides and adequate training for staff to address inappropriate polypharmacy.

Using the formal decision algorithm used in the 2007 and 2014 QUM Indicator projects, as well as in-depth PISC deliberations, 7 draft indicators were developed and approved by the PISC to undergo field testing.[27] The draft indicators addressed the following key clinical issues and processes associated with inappropriate polypharmacy in older hospitalised patients:

- Identification of patients at high risk of medication related harm;
- Hospital-based medication review for these high risk patients; and
- Communicating the results of the hospital-based medication review as well as other important medication-related information such as deprescribing plans on discharge to other health care providers and also to patients and carers.

Three PREMs targeted at deprescribing and/or medication changes, shared decision making/patient involvement and information support were also developed. The consumer testing and piloting for the PREMs was completed separately to the indicator field testing and a report of the findings is published in the Internal Medicine Journal.[16]

The indicators and PREMs proposed for field testing are listed in **Table 1**.

Table 1 Summary of proposed process indicators and PREMs

Proposed Indicators	
Identification of older patients at high risk of medication-related harm	
8.1 (Inappropriate polypharmacy)	Percentage of older patients that are appropriately assessed for risk of inappropriate polypharmacy.
8.2 (Falls)	Percentage of older patients that are appropriately assessed for risk of medication-related falls.
8.3 (Impairment of cognitive and/or physical function)	Percentage of older patients that are appropriately assessed for risk of medication-related impairment of cognitive and/or physical function.
Intervention: a hospital-based medication review (HBMR)	
8.4 (HBMR)	Percentage of older patients at high risk of medication-related harms that receive a hospital-based medication review, and, if applicable a deprescribing plan.
Promoting medication review, optimising discharge communications and continuation of medication care at transitions of care	
8.5 (Post-Discharge Medication Review)	Percentage of older patients at high risk of medication-related harms with a recommendation for a post-discharge medication review, when hospital-based medication review is not performed.
8.6 (Discharge summaries)	Percentage of older patients whose discharge summaries contain a current, accurate and comprehensive list of medicines, including explanations for any medication therapy changes and, if applicable, details of a deprescribing plan.
8.7 (Medicine lists)	Percentage of older patients who receive a current, accurate and comprehensive medication list, including explanations for any medication changes and, if applicable, details of a deprescribing plan, at the time of hospital discharge.
Proposed Patient Reported Experience Measures (PREMs)	
A: Do you know whether any of your medicines were reduced or stopped while you were in hospital? (Yes, No, Unsure) *[if answer is No or Unsure, then no further questions; if answer is Yes, then answer Questions B and C]* **B: I was involved as much as I wanted in making decisions about reducing or stopping one or more of my medicines while I was in hospital.** (Yes, No, Unsure) *[only for those answering Yes to A]* **C: I am satisfied with the level of information provided to me about reducing or stopping one or more of my medicines while I was in hospital.** (Yes, No, Unsure) *[for those answering B regardless of answer to B]*	

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Results of the field testing

Twenty-four hospital sites of differing size (bed number range 4-1000) and acuity across Australia field tested the indicators. Sites were able to choose which indicators they wished to field test, resulting in greater number of participants for some indicators. Figure 1 summarises the number of sites who field tested the various indicators. The 24 sites included 15 from New South Wales (NSW), 2 from Victoria (VIC), 2 from Queensland (QLD) and 5 from Tasmania (TAS). Figure 2 provides a summary of the indicator results including the minimum, maximum and mean results.

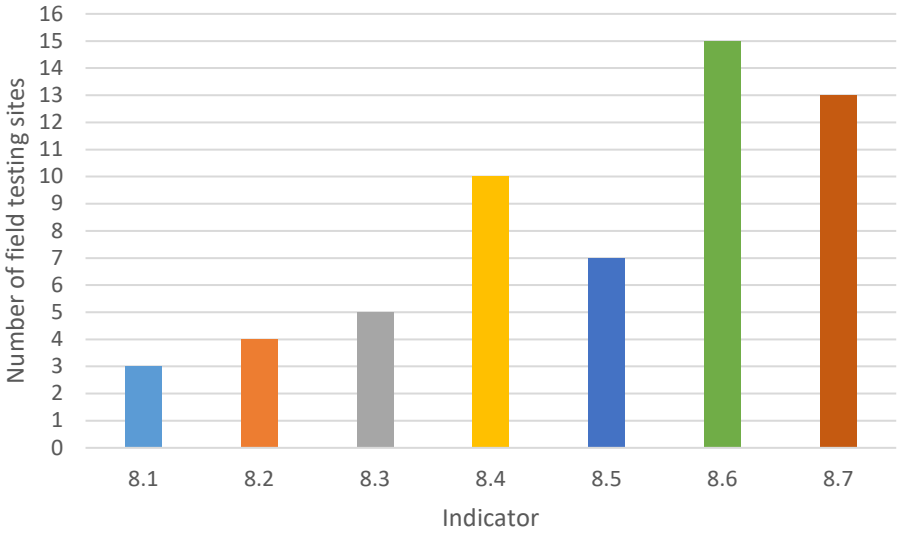

Figure 1 Number of field testing sites for each indicator (n=24)

Table 2 Summary of indicator field testing results

Polypharmacy Indicator	Number of field testing sites	Mean result	Range
8.1	3	0.0%	0%
8.2	4	1.3%	0-5%
8.3	5	3.0%	0-15%
8.4	10	5.0%	0-15.8%
8.5	7	1.0%	0-4.5%
8.6	15	17.0%	0-100%
8.7	13	16.0%	0-45.5%

The results for all indicators ranged between 0% (present for all indicators) and the highest result of 100% (Indicator 8.6). Low results were not unexpected as these indicators address known practice gaps not addressed by routine clinical practice. Nor is there routine documentation of some of these processes. Twelve of the 16 field testing sites misinterpreted the specifications of Indicator 8.2; this is discussed in further detail under Indicator 8.2 results.

The PISC discussed the results and suggested amendments for greater clarity or improvements to the indicators. The indicator specifications were revised and recirculated via email to the PISC with consensus achieved following group discussion and approval via email. Individual indicator results and feedback obtained, as well as any major amendments made to the indicators are discussed below.

Amendments to specifications included adding more information regarding data sources such as use of handover tools, admission assessment tools and care plans as well as advice that auditing sites should determine useful data sources prior to data collecting. The inclusion criteria was also expanded to include patients with low literacy skills.

Several sites did not use the full functionality of the data collection tool including the pre-fill functions and the corresponding automatic calculation and some reported difficulties using the tool. The data collection tools have subsequently been reviewed and amended to include a link to the 'Data collection tool user guide' in order to facilitate correct use of the data collection tool. Education including thorough instructions to read all the details of the indicator specifications during implementation of the indicator is expected to improve usability of the data collection tools.

Although no sites utilised the combination data collection tool for Indicators 8.1, 8.2 and 8.3, the PISC determined that this was likely due to inadequate resources to test all 3 indicators as well as the known widespread gap in identifying medication-related harm whatever the medication or harm. It was decided that this data collection tool would be kept for sites to measure performance when more resources are available and also as processes are implemented over time. In addition, the combined measurement is supported by the feedback received from an aged care clinician who suggested that geriatric medicine practitioners view inappropriate prescribing as a whole entity of all 3 factors as opposed to separate factors. There was recurring feedback from participating sites who measured Indicators 8.1, 8.2 and 8.3 that most did not have local medication specific risk assessment tools (MSRATs). A number of sites requested tools be made available such as a list of Fall Risk Increasing Drugs (FRIDs) or lists of other 'culprit' drugs to assist them. The PISC decided that MSRATs would be developed by NSW TAG, which could be used 'as is' or adapted by local sites. By providing separate MSRATs, NSW TAG also aim to overcome the feedback that auditors felt compelled to undertake clinical risk assessments when in fact they should be auditing whether the clinical risk assessments were being undertaken. MSRATs were developed to accompany Indicators 8.1, 8.2 and 8.3 and are discussed further below.

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Indicator 8.1 results

Indicator 8.1, 'Percentage of older patients that are appropriately assessed for risk of inappropriate polypharmacy', was field tested by 3 sites of varying bed size and acuity. A variety and mixture of electronic systems and paper records were used to collect data for this indicator. Pharmacists, a medical records officer and some doctors were involved in collecting data for this indicator. The sites reported spending between 1 - 15 minutes retrieving data from each patient record.

The overall Indicator 8.1 compliance result was 0% for all 3 sites. Appendix A provides a summary of the collated results and Appendix B provides a summary of the qualitative feedback received for Indicator 8.1.

One site suggested that a prospective study using elements of this indicator would be useful to facilitate appropriate risk assessment and documentation. Another suggested other relevant data sources that may be more accurate and/or more easily and routinely collected such as handover tools (electronic referral tools and a pharmacy specific electronic progress note). One site responded that they would not be comfortable using this indicator to compare current performance with performance at a later date because the local process is not adequately documented and it is often a part of routine pharmaceutical review. Two sites would not be comfortable using this indicator to compare performance with other hospitals because different tools are used and because the local process is not adequately documented.

The question in the data collection tool 'What was the risk category' was amended to 'What was the documented category for inappropriate polypharmacy risk?' to reduce the misconception that the auditor is required to determine the risk category during the data collection process. To further reduce confusion for the auditor the following wording was also included: 'Is documentation present detailing the rationale for risk categorisation?'.

Feedback was received that either sites did not have a risk categorisation tool or if they did, their local tool did not specifically meet the suggested criteria and did not categorise into high, moderate or low risk. Feedback suggested that provision of a risk assessment tool for inappropriate polypharmacy would be beneficial. With approval from the PISC, a stand-alone tool, independent of the indicator specifications was developed. It is envisaged that this tool could be either used as is or adapted to local site needs. The indicator specifications includes a hyperlink to the tool called 'The Inappropriate Polypharmacy Risk Assessment Tool (IPRAT)' (Appendix O). The IPRAT can be used to stratify risk of harm from inappropriate polypharmacy and consequent recommended actions in the event health service organisations do not have a locally approved tool. This tool includes risk criteria such as whether or not the patient's admission is due to a medication-related problem, the number of prescribed medicines, the presence of high risk medicines, and medicines with no current supporting indications. A corresponding poster to prompt clinicians to consider medication-related harm from inappropriate polypharmacy was also developed (Appendix P).

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this practice gap and especially in light of the NSQHS Standards 2nd edition requiring health services to have prioritisation processes in place for patients at high risk of medication-related harm. The indicator changes were approved and finalised for publication.

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Indicator 8.2 results

Indicator 8.2, 'Percentage of older patients that are appropriately assessed for risk of medication-related falls', was field tested by 16 sites of varying bed size and acuity. The initial mean indicator compliance result was 19.9% (range 0% to 73.3%); however, it was discovered that this was an overestimate due to misinterpretation of the indicator specifications. After correction, mean indicator compliance results for the 4 sites who correctly interpreted the indicator specifications, was a mean of 1.3% (range 0% to 5%).

A variety and mixture of electronic systems and paper records were used to collect data for this indicator. Pharmacists and pharmacy students were involved in collecting data. Sites reported spending between 3 – 30 minutes retrieving data from each patient record. Appendix C provides a summary of the results and Appendix D provides a summary of the qualitative feedback received for Indicator 8.2.

Twelve sites misinterpreted the first question in the data collection tool 'Is there documentation that assessment of medication related falls risk has been made?' as a question about whether assessment using a validated Falls Risk Assessment Tool (vFRAT) had been undertaken. The PISC had identified that current vFRATs do not adequately identify the contribution of medications to falls. Additional assessment looking at the patient's list of medicines is required in addition to the vFRAT use in order to correctly and adequately identify risk of medication-related falls. To overcome this issue of misinterpretation, the first question in the data collection tool has been changed to 'What was the documented category for *MEDICATION-RELATED* falls risk?' with the words *MEDICATION-RELATED* italicised and capitalised as shown. This also aims to reduce the misconception that the auditor is required to determine the risk category themselves during the data collection process.

The data collection tool asks auditors to name the specific vFRAT in use for screening of patients. This was mistakenly answered by a few sites with the answer 'Falls Risk Assessment and Management Plan (FRAMP)', noting that use of the FRAMP is indicated following identification of a patient at high risk of falls using the vFRAT. Additional information and copies of forms or tools in use from sites were obtained to help the project team better understand the misinterpretation of the indicator as well as the different forms for assessment and management plan available. We found that:

- Three sites had a local medication-related falls risk assessment tool in use.
- Eleven sites were using the Ontario Modified Stratify (Sydney Scoring) Falls Risk Screen + corresponding FRAMP, 2 sites were using a Peninsula Health vFRAT, one site was using an integrated care plan and another site was using an overall patient admission nursing assessment and then, if applicable, a FRAMP.
    - Of these sites, 5 sites had a paper vFRAT and FRAMP; 5 sites had a hybrid combination where vFRAT is electronic and FRAMP is paper-based; 2 sites had both vFRAT and FRAMP as electronic tools.

Furthermore, several sites suggested that existing tools did not adequately identify FRIDs and many requested the provision of a FRIDs list for auditing as well as practice improvement.

The PISC approved development of stand-alone risk assessment tool for medication-related falls, which could also be adapted to local site needs. The indicator specifications now includes a hyperlink to the NSW TAG developed tool 'The Medication-related Falls Risk Assessment Tool (MFRAT)' (Appendix Q), which incorporates the result from local vFRAT assessment. MFRAT can be used to stratify the risk of medication-related falls and provides recommended actions according to risk category in the event health service organisations do not have locally-approved tools. This MFRAT tool also provides a summary list of common FRIDs for sites to use. A corresponding poster to prompt clinicians to consider medication-related falls was developed (Appendix R).

Feedback was also received about a gap in the indicator for patients who could be at low risk of falls according to results obtained using a vFRAT but who may at the same time be on multiple FRIDs thereby putting them at risk of medication-related falls. The MFRAT was revised to include these types of patients under the moderate risk of medication-related falls category for which medication review may be appropriate.

Another recurring theme of the feedback was the need for automation of the assignment of risk category, especially for sites that already have an implemented EMR system.

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this practice gap and especially in light of the NSQHS Standards 2nd edition requiring health services to have prioritisation processes in place for patients at high risk of medication-related harm. The indicator was approved and finalised for publication.

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Indicator 8.3 results

Indicator 8.3 'Percentage of older patients that are appropriately assessed for risk of medication-related impairment of cognitive and/or physical function', was field tested by five sites of varying bed size and acuity. The mean indicator result was 3% (range 0 – 15%). A variety and mixture of electronic systems and paper records were used to collect data for this indicator. Pharmacists were involved in collecting data for this indicator. Appendix E provides a summary of the results and Appendix F provides a summary of the qualitative feedback received for Indicator 8.3.

The question in the data collection tool, 'What was the risk category' was amended to 'What was the documented risk category for MEDICATION-RELATED impairment of cognitive and/or physical function risk' in order to reduce the misconception that the auditor is required to determine the risk category during the data collection process.

At the time of field testing, no sites had a live electronic Drug Burden Index (DBI) calculator in use and no sites used any other relevant tool for identifying risk of medication-related impairment of cognitive and/or physical function. Only one site reported a local list of anticholinergic and sedative medicines in use. Some sites responded 'yes' to the feedback question about experiencing difficulty in collecting data for this indicator due to the lack of a tool. Sites reported spending between 1 – 10 minutes retrieving data from each patient record. The site spending one minute retrieving data did not have a tool and/or risk stratifying process.

Sites reported there would be benefit if a risk stratification tool was provided in addition to a list of culprit medications to accompany the indicator. One site also noted that their nursing admission assessment tool only considers psychotropic medication use in relation to falls risk and that although reviews of a patient's risk of cognitive impairment relating to anticholinergic and sedative medicines are undertaken by pharmacists and documented in the medication management plan, it was not usually risk rated. Feedback highlighted the need for a more standardised process to risk stratify these types of patients.

The PISC approved the development of a stand-alone risk assessment tool, which could also be adapted to local site needs. Indicator specifications now include a hyperlink to the tool 'The Medication-Related Impairment of Cognitive and/or Physical Function Risk Assessment Tool (FUN-RAT)' (Appendix S). The FUN-RAT can be used to stratify the risk of medication-related impairment of cognitive and/or physical function and provides recommended actions according to risk category. The FUN-RAT tool also provides a summary list of 'Common Medicines Associated with Impairment of Cognitive and/or Physical Function in Older Persons'. A corresponding poster to prompt clinicians to consider medication-related impairment of cognitive and/or physical function was developed (Appendix T).

Another recurring theme of the feedback was the need for automation of the assignment of risk category, especially for sites that have an implemented EMR system.

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this practice gap and especially in light of the NSQHS Standards 2nd edition requiring health services to have prioritisation processes in place for patients at high risk of medication-related harm. The indicator was approved and finalised for publication.

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Indicator 8.4 results

Indicator 8.4 'Percentage of older patients at high risk of medication-related harms that receive a hospital-based medication review and, if applicable, a deprescribing plan', was field tested by 10 sites of varying bed size and acuity. The mean indicator result was 5% (range 0 – 15.8%). A variety and mixture of electronic systems and paper records were used to collect data for this indicator. Pharmacists were involved in collecting data. Sites reported spending between 1 – 15 minutes retrieving data from each patient record. Appendix G provides a summary of the results and Appendix H provides a summary of the qualitative feedback received for Indicator 8.4.

Sites were asked to describe their local tool(s) or rationale used to identify patients at high risk of medication-related harm and most used the rationale of patients aged over 65 years and taking more than 5 medicines. Other sites also reported use of other information/tools such as a web based clinical handover tool with information about patients with advanced illness and frequent or recent hospitalisation; a nursing assessment form; information about recent hospital admissions and one site indicated use of their own local risk assessment tool. Two sites used the same sample of patients as they had when field testing Indicator 8.2.

Four sites reported that they experienced difficulties collecting data. One of these responses was due to a specific technical difficulty in locating medical records within that site's new electronic system. Two sites indicated that defining an appropriately qualified Hospital-Based Medication Review (HBMR) pharmacist was difficult, despite a definition being provided in the indicator specifications. To provide further clarity, 'Criteria for appointment as an HBMR-approved pharmacist may vary between health service organisations' was added to the indicator specifications and a suggested framework that could be used to demonstrate appropriate expertise and/or experience was also included.

Two sites also commented that sometimes an HBMR might be included within a pharmacist's Medication Management Plan (MMP) document if it discusses medication related problems. To account for this feedback, we added a note in the limitations and interpretations section of the indicator specifications to say that 'Formal medication reconciliation processes that include obtaining a best possible medication history (BPMH), are essential in providing the optimal platform for a patient-centred and accurate HBMR. In some instances, these processes may be completed at the same time as an HBMR'. One site also reported difficulty in auditing because deprescribing practices are not formally recorded in the medical record. This meant that the auditor was required to search through multiple documents to see if any deprescribing had occurred. The PISC determined that for continuity of care, the deprescribing plans should, at a minimum, be documented in the discharge summary and medicine list. Indicator specifications, along with all other indicators that incorporate assessment of the deprescribing process, were amended accordingly.

All sites said they would use the result from this indicator to guide a review or change in practice in their hospital. A small rural site commented that HBMR referrals were not common practice at their site, that the MMP template did not include a section for deprescribing and that they would need to consider a more in-depth HBMR process and encourage referrals for HBMR.

Most sites (8 out of 10) said they would be comfortable using this indicator to compare their performance with other hospitals as long as there was consensus about the numerator being measured. Sites who responded that they were not comfortable commented on the need to relax the suggested definition of an approved health professional who can conduct an HBMR.

To improve interpretation of results and to make it clearer to auditors the requirements for HBMR compared with other medication management processes, the following questions were added to the data collection tool: 'Best Possible Medication History (BPMH) completed? (Yes/No)' and 'Medication reconciliation on admission completed? (Yes/No)'.

There is a need for medication review to be carried out in an efficient and systematic way. Therefore, for Indicators 8.4 and 8.5 NSW TAG developed a summary tool, 'Criteria to Identify Patients at High Risk of Medication-Related Harm' (Appendix U). This can be used or adapted to assist identification of sample patients for auditing. This tool extracts the high risk criteria provided in the tools developed for Indicators 8.1, 8.2 and 8.3.

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this practice gap and especially in light of NSQHS Standards 2nd edition, requiring health service organisations to have processes to perform medication reviews, enable prioritisation of medication reviews based on clinical need and minimising the risk of medication-related problems, as well as support documentation of medication reviews and subsequent actions. The indicator was approved and finalised for publication.

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Indicator 8.5 results

Indicator 8.5, 'Percentage of older patients at high risk of medication-related harms with a recommendation for a post-discharge medication review, when hospital-based medication review is not performed', was field tested by 7 sites of varying bed size and acuity. The mean indicator result was 1% (range 0 – 4.5%). A variety of electronic systems and paper records were used to collect data for this indicator. Pharmacists were involved in collecting data for this indicator. Sites reported spending between half a minute to 16 minutes retrieving data from each patient record. Appendix I provides a summary of the results and Appendix J provides a summary of the qualitative feedback received for Indicator 8.5.

All sites indicated that they understood what the indicator was measuring, however, it was later realised that if the site did not measure and/or read this indicator in conjunction with Indicator 8.4 then the definition of HBMR was not available to the auditor and sites were left to interpret what HBMR meant to them. Therefore, the results likely overestimated performance because sites did not use the comprehensive definition of HBMR as per Indicator 8.4. Furthermore, some sites were also measuring whether HBMR was performed in circumstances when there was only evidence that a patient has been seen by a pharmacist during their admission or at the point of discharge. The definition for HBMR has since been added to the specifications for Indicator 8.5.

Sites were asked to describe their local tool(s) or rationale used to identify patients at high risk of medication-related harm and most used the rationale of patients aged over 65 years and on greater than five medicines. Other sites also reported use of other information/tools such as a web based clinical handover tool with information about patients with advanced illness and frequent or recent hospitalisation; an electronic Patient Flow Management and Referral system; a nursing assessment form; information about recent hospital admissions and one site indicated use of their own local risk assessment tool. One site also used the same sample of patients identified as high risk when field testing Indicator 8.1.

Five sites reported difficulty with collecting data due to documented information not having a routine or formal location in the medical record requiring the auditor to search through multiple documents to see if any referrals had been made. The PISC determined that for appropriate continuity of care, the post-discharge medication review (PDMR) referrals should be documented in the discharge summary or letter so the indicator was amended to include this requirement. Other difficulties experienced were determined to be due to the missing definition for HBMR in the specifications (now included).

A suggestion was made to consider excluding patients transferred to another health-care facility such as another hospital or rehabilitation service as there may be very low likelihood that a clinician would recommend a PDMR in these types of patients. The PISC disagreed with this suggestion as these patients may still need a PDMR regardless of their discharge destination and it is worth documenting this need.

All 7 sites think that the suggested data sources are adequate with one suggestion to include specific local progress notes to or from the hospital service that provides PDMRs (e.g. Acute/Post Acute Care (APAC) teams or Hospital Admission Risk Program (HARP) pharmacists). This was incorporated in the indicator specifications.

Several comments and suggestions made towards facilitating regular use of this indicator in hospitals included making it easier to obtain the patient sample, improving staffing levels in order to conduct such audits, the need for more PDMR service availability and corresponding guidelines for referral pathways and a need to ensure confidence in the ongoing viability of Home Medicine Reviews (HMRs) in the community. To better understand

the different services available in hospitals for PDMR provision, the data collection tool was amended to include 'Describe the PDMR service available at your organisation if applicable (e.g. HITH, HARP, telehealth or other)'.

For a clearer and targeted response, a question about the patient sample was added to the data collection tool: 'Who was the audited high risk population? Examples of the type of patient sample could be all patients, patients identified with inappropriate polypharmacy, falls risk and /or cognitive/physical impairment or other specified criteria (please describe)'.

There is a need for medication review to be carried out in an efficient and systematic way. Therefore, NSW TAG provides a tool, '*Criteria to Identify Patients at High Risk of Medication-Related Harm'* (Appendix U) for Indicators 8.4 and 8.5. This tool extracts the high risk criteria provided in the tools developed for Indicators 8.1, 8.2 and 8.3. The tool can be used /or adapted to assist identification of sample patients for risk categorisation of medication-related harm in the event that HSOs do not have locally-approved tool(s).

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this known practice gap. The indicator was approved and finalised for publication.

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Indicator 8.6 results

Indicator 8.6, 'Percentage of older patients whose discharge summaries contain a current, accurate and comprehensive list of medicines, including explanations for any medication therapy changes and, if applicable, details of a deprescribing plan', was field tested by 15 sites of varying bed size and acuity. The mean indicator result was 17% (range 0 – 100%). A variety of electronic systems and paper records were used to collect data for this indicator. Pharmacists, a medical records officer and doctors were involved in collecting data for this indicator. Sites reported spending between 2 - 40 minutes retrieving data from each patient record. All but 3 sites had electronic discharge summaries in use. Appendix K provides a summary of the results and Appendix L provides a summary of the qualitative feedback received for Indicator 8.6.

Twelve of the 15 sites experienced difficulties in collecting data for this indicator. Several of these difficulties were due to auditor inexperience or lack of training as well as resource availability to conduct the audit. A number of issues also related to the site's lack of quality or standardised discharge summaries or letters, including one rural site who reported that the clinician writing the discharge summary is the same as the clinician receiving the summary resulting in little information being documented and no information about medicines being included. The 'Medication therapy changes' definition caused some confusion with several participants requiring clarification about the inclusion of inpatient medications such as pre-operative antibiotics and venous thromboembolism prophylaxis prescriptions. The following note was included in the specifications to provide clarification, 'Differences between admission and discharge medicines should be assumed to represent medicine therapy changes' and 'Medication therapy changes do not include medications that are only prescribed while the patient is an inpatient such as venous thromboembolism prophylaxis and perioperative antibiotics'. Some sites commented that the data collection for this audit was time consuming due to the number of different data sources to be checked. It became apparent that there may be instances when the patient does not have a list of medications on admission such as a Best Possible Medication History available in order to determine preadmission medications. The indicator was amended to account for such circumstances and specifies that 'the auditor should use the medication list documented by a clinician on admission and, if this is also not available, then the first medications prescribed on admission may be used. It is recommended that auditors record the source of admission medications in these circumstances'.

Furthermore, 2 sites did not think that the key definitions provided were adequate. There was a request to define 'cease abruptly' within the context of deprescribing, and another comment about the fact that deprescribing plans may not be documented as clearly as outlined in the indicator specifications. Deprescribing definitions have been further detailed across all relevant indicator specifications.

With regards to numerator and denominator feedback, most sites reported that they were appropriate, except for one site who suggested that the denominator could only include those that had a discharge summary with a medicines list as opposed to all patients taking one or more medicines at discharge. The PISC however disagreed with this approach because best practice would include all patients taking medicines at discharge and furthermore discharge summary accuracy and quality needs to improve along with the provision of medicines information at transitions of care.

Three sites would not be comfortable using this indicator to compare their performance at a later date due to the poor quality of existing discharge summaries and current variation in practice depending on the clinician. One site reported that the sample size obtained for field testing was too small. Some also indicated that they are in the process of transitioning to EMR systems so this comparison may be affected.

Eight sites indicated that they would not be comfortable using this indicator to compare performance with other hospitals until they have better resources to optimise local practices or implement interventions to improve the quality of the discharge summaries.

The PISC decided that it would be important to include information about quality of discharge summaries that contain medication lists. The following is now included in the specifications, 'Performance against this indicator is likely to be improved if medicines lists in discharge summaries undergo a process of medication reconciliation. Medication reconciliation is an essential component of effective clinical handover and involves matching the medicines that the patient should be prescribed with those that are actually documented and resolving any discrepancies. This process helps to prevent harm by improving continuity of care and reducing the opportunity for medication errors. Sites may wish to collect data of the number of discrepancies that cannot be reconciled by the auditor. Documenting reasons for all medication therapy changes is facilitated by a process of medication reconciliation at discharge. This, in turn, is facilitated by having an accurate medication history (e.g. Best Possible Medication History, BPMH)'.

To improve interpretation of results, the following questions were added to the data collection tool: 'Is there a documented Best Possible Medication History? Yes/No' and if this question is answered as 'No', a follow up question 'What source is used for the preadmission home medication list?' with drop-down menu options of 'Admission medication list; First medications prescribed on admission; Other'.

Participants' suggestions to facilitate regular use of this indicator in hospitals included making it easier to obtain the patient sample, improving staffing levels to conduct such audits, improving the current discharge summary templates and processes, obtaining executive support to sustain changes and assisting alignment with existing audits.

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this known practice gap. The indicator was approved and finalised for publication.

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Indicator 8.7 results

Indicator 8.7, 'Percentage of older patients who receive a current, accurate and comprehensive medication list, including explanations for any medication changes and, if applicable, details of a deprescribing plan, at the time of hospital discharge', was field tested by 13 sites of varying bed size and acuity. The mean indicator result was 16% (range 0 – 45.5%). A variety of electronic systems and paper records were used to collect data for this indicator. Pharmacists and doctors were involved in collecting data for this indicator. Sites reported spending between 1 - 30 minutes retrieving data from each patient record. Appendix M provides a summary of the results and Appendix N provides a summary of the qualitative feedback received for Indicator 8.7.

Five of 13 sites experienced difficulties in collecting data for this indicator. Some difficulties were as a result of resourcing to complete the audit as well as some technical difficulties to access medical records in a timely manner to complete the field testing. The main difficulty reported from several sites was about the lack of documentation and record keeping that a medication list was generated and/or issued to a patient. This issue has been noted in the indicator specifications as, 'There may be variation in local practices regarding medication lists e.g. the location of documented evidence regarding distribution of medication lists or whether copies of patient medication lists are kept for record keeping purposes. It is recommended that sites determine useful local data sources prior to data collection and consider collecting data about the location of this documentation to inform quality improvement as well as any repeat auditing'.

A question was also raised about the ability to use a copy of the list of medications within the discharge summary as the medication list for the patient as it was noted that it is a practice that occasionally occurs when patients do not want to wait for a pharmacy-developed patient specific medication list. Furthermore, feedback was provided by one site that patients being discharged to residential care facilities or other hospitals are less likely to be prioritised for a patient medication list unless they are 'self-caring' patients on discharge. The PISC decided that this practice couldn't be relied upon given the current lack of quality of discharge summaries, that it is best practice that medication information be made available to all patients and that patient medication lists require a different level of detail and use of plain language. However, the indicator still allows room to record information about why a patient may not have received a medication list. It was also noted in discussions that in some Australian jurisdictions, all patients who are dispensed any medicines on discharge from the pharmacy department automatically receive a medication list. The following note was added to the Indicator 8.7 specifications to acknowledge the limited resources available, 'When it is not possible to provide discharge patient medicine lists to all discharged patients, patients should be prioritised according to their risk. Health service organisations should implement policies to determine which patients are provided with discharge medication lists, for example, patients over 65 years of age, taking multiple medicines, with changes to their medicines during the admission, suspected of non-adherence or taking high-risk medicines or identified by an appropriate health professional as requiring one on discharge. When using this indicator, organisations may wish to select specific patient groups to audit in accordance with their local policy. Reasons why a patient medicine list is not supplied may be collected for further information'. One site also suggested that we further define medication list in the specifications as a 'pharmacy' generated list to not confuse them with the discharge summary medication list. The PISC decided not to restrict the definition to a pharmacy department generated list, as this practice of generating patient medication lists is likely to change in the near future to enable doctors and nurses to generate patient medicine lists within Electronic Medication Management (EMM) systems.

A gap identified by several sites is that pharmacy dispensing software and/or medication list generating software does not automatically record any allergies and intolerances (including if no known allergies) and does not automatically provide reasons behind changes to medications. This issue is well known to pharmacy departments

and several sites mitigate this by manually entering in the missing information with some sites currently awaiting a potential future automated electronic solution within EMM systems.

With regards to the numerator and denominator feedback, most sites reported that they were appropriate, except for one site who suggested making the denominator a bit more restrictive to those patients taking 5 or more medicines instead of older patients taking any medicines at discharge. The PISC however disagreed with this approach because best practice would include all patients taking medicines at discharge and furthermore, greater provision of patient friendly medication lists to all patients prescribed any medicines is required.

Five sites provided feedback that they would not be comfortable using this indicator to compare performance with other hospitals until they have better local resources to optimise practices or implement interventions to improve or standardise the criteria for provision of medication lists to patient and also because the dispensing software does not automatically generate allergies resulting in poor overall indicator results. Sites commented that it was also difficult to have good results due to the variation between the acute and subacute settings and also last-minute handwritten additions to lists provided to patients after they have been generated/printed. Some sites also felt that their results did not adequately reflect the instances where patients appropriately did not receive a medication list. The indicator however, accounts for this by directing auditors to record this information as free text.

Participant suggestions to facilitate regular use of this indicator in hospitals included improving staffing levels and other auditing resources, obtaining executive support, providing advice on when to conduct the audits and assisting alignment with existing audits and disseminating awareness within a multidisciplinary team.

Linking to the already developed deprescribing tools within the indicator was clarified in the specifications. The following was added: 'Details of (or reference to) the deprescribing plan should also be provided in the medicine list. This may include provision of a separate patient specific deprescribing plan in conjunction with the medicine list (e.g. consumer information leaflets available via: http://www.nswtag.org.au/deprescribing-tools/'). Including the wording '(or reference to) the deprescribing plan' accounts for the practice that occurs currently whereby patients are, for example, issued with a medication list that refers to a separately provided detailed plan such as a prednisolone weaning plan.

Performance against this indicator is likely to be improved if patient discharge medicine lists undergo a process of medication reconciliation. Documenting reasons for all medication therapy changes is facilitated by a process of medication reconciliation at discharge. This, in turn, is dependent on having an accurate medication history and list of current medicines at admission. Therefore, optional questions were added to the data collection tool: 'Is there a documented Best Possible Medication History?' with Yes/No answer options and a sub question, 'If answered No, what source is used for the preadmission home medication list?' with drop-down menu answers of: 'Medication list documented on admission; First medication(s) prescribed on admission; and Other'.

The PISC decided that the indicator should be retained due to its utility in sites that wish to identify or monitor this known practice gap. The indicator was approved and finalised for publication.

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Discussion

Older adults are a growing vulnerable population and optimising treatment for them is a complex challenge. NSW TAG has developed 7 QUM Indicators targeting medication-related harm in older hospitalised patients and 3 PREMs with support from the NSW Health Translational Research Grants Scheme (TRGS). This indicator project work was a component of a larger project, led by Professor Sarah Hilmer, seeking to optimise medication management in older patients. This indicator work also integrates tools developed by other TRGS project components including:

- A HETI module about polypharmacy in older inpatients: https://www.heti.nsw.gov.au/education-and-training/courses-and-programs/polypharmacy-in-older-inpatients-; and
- Deprescribing tools: https://www.nswtag.org.au/deprescribing-tools/.

The 7 QUM Indicators for Inappropriate Polypharmacy should be considered for routine measurement by health service organisations caring for older patients to support quality improvement activities, particularly in light of new requirements in the second edition of the NSQHS Standards. Field testing of these indicators has demonstrated that currently many HSOs have immature systems and processes to address the known practice gaps in the management of polypharmacy in older patients. There is potential for these indicators to be useful in other care settings such as Residential Aged Care Facilities (RACFs).

For the first time, NSW TAG has developed targeted PREMs to accompany the QUM Polypharmacy Indicators and incorporate the increased focus on shared decision making that should occur with medicine use. Future work to be considered includes the development of Patient Reported Outcome Measures (PROMs).

Indicator development and measurement

Alignment and support for NSQHS Standards

The development of indicators to address challenging medication management issues in older hospitalised patients was an iterative and multidisciplinary process with invaluable feedback obtained from the field testing sites. The strengths of the NSW TAG indicators and accompanying tools are that the required variables are routinely collected inpatient data and easy to extract. Measurement using these indicators and tools assist HSOs to target their interventions and focussing on higher risk patients for interventions i.e. those patients who are most likely to derive the greatest benefit from these interventions. Indicators are useful tools to provide evidence towards meeting the NSQHS Standards, 2nd edition, which all acute care hospitals will be accredited against from 2020.

The NSQHS Standards 2nd edition, Clinical Governance Standard action 1.15 requires that a HSO identify groups of patients using its services who are at higher risk of harm (poor medication-related outcomes) and incorporates information on these higher-risk groups in the planning and delivery of care. It is suggested that HSOs implement strategies to proactively manage these risks by incorporating patient risk assessment processes in the organisation's quality improvement system if there are specific risks associated with particular types of patients.[3] Older patients with inappropriate polypharmacy are prominent within these higher risk groups. The NSQHS Standards 2nd edition also has provisions for sites to specifically address the needs of Aboriginal and Torres Strait Islander people to support the provision of culturally appropriate care across the health system.[3] Our indicator specifications define older patients as all patients aged 65 years and over. In addition, others may be appropriate for inclusion in high risk patient groups e.g. 50 years and older for Aboriginal and Torres Strait Islander people, residents of aged care facilities or patients with low literacy skills. These other groups have been included in all the indicator definitions. Moreover, sites are able to adapt the indicators and tools to local real world conditions and supplement or refine them as needed.

Action 1.13 of the clinical governance standard of the NSQHS Standards 2nd edition, requires HSOs to have processes to seek regular feedback from patients, carers and families about their experiences and outcomes of care.[3] Consumers were involved in the pilot testing of the developed PREMs to ensure quality and relevance of the PREMs

for widespread use. Until now, there has been a paucity of PREMs that measure medication-related issues and inform processes related to medication continuity of care in older hospitalised patients. The separate pilot testing study found the PREMs to be a feasible tool to examine older patient's experiences regarding medication changes in hospital and that targeted interventions are required to improve awareness of medication changes, shared decision making and provision of information to older patients.[16]

Identifying and categorising risk of medication-related harm for intervention: Polypharmacy Indicators 8.1, 8.2 and 8.3

Pharmaceutical care of older people is a complex and increasingly demanding specialty that involves caring for patients at the greatest risk of medicine-related harm.[28] Indicators 8.1, 8.2 and 8.3 examine the routine identification of hospitalised patients at high risk of medication-related harm, i.e. harm from inappropriate polypharmacy, medication-related falls and medication-related impairment of cognitive and/or physical function respectively. Quantifying definitions and categorising risk assists clinicians in screening older patients with polypharmacy at highest risk of harm enables timely evaluation, intervention and optimisation of their care.[25,29] British research has also identified that patients are at greatest need of pharmacist input during the early stages of their inpatient stay in terms of identification or resolution of clinically relevant medication-related problems (MRPs), however ongoing pharmacy review throughout the patient stay was still required.[30]

HSOs are expected to have processes in place for identifying patients at high risk of medication-related harm for intervention.[3] However, few field testing hospitals had local and/or appropriate tools for risk identification. For this reason, to assist HSOs, the project team developed pragmatic risk stratification tools to accompany the Polypharmacy Indicators 8.1, 8.2 and 8.3 using well recognised risk factors of specific medication-related harm.

A number of organisations and studies have sought to assist identification of high risk of medication-related harm during hospitalisation.[31-34] Numerous risk factors have been identified for various outcomes e.g., medication errors and/or adverse drug reactions during hospitalisation and/or medication-related harm post-discharge. Synthesis of these multiple factors remains a significant challenge in a busy clinical environment. EMRs should be able to provide such a role e.g. calculate a risk score for a specific outcome but the use of EMR in this area remains immature in most Australian hospitals. An example of a prioritisation tool developed by the Middlemore hospital in New Zealand is the Assessment of Risk Tool (ART), a virtual real-time electronic tool that can stratify patients into those at high, medium or low risk for medication errors and adverse drug events.[31] This system uses 25 risk flags, each with an associated weighted score, and then calculates a total score which corresponds to a particular risk group. The authors report that the scoring tool allowed pharmacists to perform medicines reconciliation and clinical review in a more timely and targeted manner.[31] The flags with the most significant predictive value to identify risk of unintentional medication discrepancies were 'more than 8 admission medications' and 'readmission within 30 days'.[31]

Similarly, a hospital in the United Kingdom designed a pharmaceutical assessment screening tool (PAST) to assign all inpatients a patient acuity level (PAL) in order to help teams of clinical pharmacists prioritise the frequency of, and the seniority of, pharmacists performing patient reviews; assess clinical pharmacists' adherence to the tool; and identify when pharmacists do not adhere to the tool. The tool uses medication- related criteria including: high risk medicines (HRMs), medicines requiring therapeutic drug monitoring, high cost medicines or with conditions or drug therapy regimens outside the competency of a junior pharmacist. Of note, the tool was only used correctly in approximately half of the patients studied and the study concluded that larger scale studies using validated tools in a more diverse patient population are needed across multiple hospital sites to test the generalisability of findings and before such tools can be reliably used to prioritise pharmaceutical care.[32] This study also highlights the role a risk calculation system can have on identifying the seniority or type of clinical review should be undertaken. Indicators do not provide recommendations on the seniority of pharmacist care that should be provided to the patient based on their category of risk. It is possible that sites may wish to locally apply this intervention.

Further research into the use of risk categories and consequent intervention strategies is warranted for Indicators 8.1, 8.2 and 8.3. Organisations may differ in workforce capacity and/or aversion to risk, resulting in a need to develop flexible thresholds, tailored to organisational need or fluctuating staffing levels. While categorisation has challenges given it assumes that all patients falling within a certain category have the same risk, there is currently a high degree of variation in prioritisation of patients for medication-related harm and review and categorisation provides a more systematic process to implement improvement strategies.

Indicator 8.1

To the best of our knowledge, at project inception, there were no tools (electronic or paper) in use or available in Australia that stratify the risk category for inappropriate polypharmacy. Hence the project identified a need to develop a tool that would use readily available, routinely collected relevant data in the medical record, the NSW TAG IPRAT. It was also recognised that the tool should avoid the need for complex calculations or categorisation to ensure ease of use and promote uptake. The exact documentation is described to ensure standardisation and reproducibility. Ultimately, NSW TAG recommends integration with electronic health record systems in order to perform automated risk assessments in 'real-time'. Feedback from the field testing sites strongly supported the development of automated risk screening processes.

The IPRAT incorporates well recognised risk factors for inappropriate polypharmacy: medication related hospital readmissions; high risk medicines (HRMs); polypharmacy.[35] Hospital readmissions receive significant national and international attention and reducing avoidable hospital readmissions is facilitated by financial incentives for HSOs.[36] Given hospital readmissions are already a performance measure and explicit identification a 'medication-related' readmission may not be recognised or documented (as imperfect coding and/or poor quality documentation of the reasons for admission can hinder obtaining medication-related readmission information efficiently and accurately), HSOs may find broadening the indicator criteria to the more general readmission. However, this will come at the cost of an increased high risk population and therefore supporting resources.

High Risk Medicines (HRMs) are included as criteria in inappropriate polypharmacy risk assessment based on their known ability to cause significant patient harm or death if they are misused or used inappropriately.[37] Provisions for the use of a locally approved list is included because it is known that HRMs may vary between hospitals and between other health care settings depending on the types of medicines used and patients treated. In the acute sector in Australia, the 'APINCH' classification is widely used to assist clinicians identify HRMs[38] (noting the caveat that the 'APINCH' classification is not an exhaustive list).

Indicator 8.2

Falls in hospital are common but often preventable adverse event and falls prevention in acute care hospitals remains unresolved. Despite widespread use of validated Falls Risk Assessment Tools (vFRATs) in hospitals, there is little appreciation of their gap in assessing medication-related falls risk. This lack of appreciation complicated the field testing of Indicator 8.2. Indicator 8.2 and its accompanying tools now address this gap. The MRAT provides an easy-to-use tool in conjunction with various widely used vFRATs and the accompanying list of Falls Risk Increasing Drugs (FRIDs) assists all clinicians to identify common FRIDs. Importantly, it was identified during the field testing that some of the terminology used widely with respect to falls prevention practices and tools causes substantial confusion.

The field testing results demonstrated a lack of documentation and, in some cases, non-existence of processes to identify patients at risk of medication-related falls. The field testing highlighted the need to improve knowledge and skills in the area of managing high falls risk patients with the provision of better and clearer screening, assessment and management tools, with particular attention paid to the considerations of FRIDs and actions to be taken as a result of FRIDs identification.

In NSW, the Health Education and Training Institute (HETI) provides training and education to support staff across the NSW health system[39] in the form of eLearning modules about falls risk screening, assessment and management plans for adults as well as simulation modules about medication and falls prevention.[40] It is important that these educational offerings reiterate the significance of FRIDs and how to appropriately identify and manage patient's at high risk of medication-related falls. Importantly, Indicator 8.2 may be an important conduit for not only measuring gaps and developing improvement strategies but also promoting the sharing of falls prevention knowledge, expertise and resources for those working in the hospital, community and residential aged care sectors by leveraging several state based and national organisations and networks.[41]

As with other developed RATs, it is recommended that these falls risk tools including the medication-related falls risk tools are automated using data from the EMR as soon as possible.

Indicator 8.3

Older people are routinely exposed to medicines with anticholinergic and sedative activity. Anticholinergic and sedative burden has been demonstrated to be a predictor of cognitive and functional impairments in older people.[42,43] There are several tools available to predict anticholinergic-associated adverse events in older people.[44] Indicator 8.3 allows various options for anticholinergic and sedative activity calculation including an option for risk assessment using the calculated Drug Burden Index (DBI) score. The DBI is a pharmacological risk assessment tool to assist clinicians identify medicines with anticholinergic and sedative effects and their cumulative impairment burden in older people.[45] Implementation of the DBI calculator in NSW public hospitals is currently in progress and it is envisaged that wider implementation will follow where EMR systems permit. Indicator 8.3 will be a valuable instrument to measure performance and reduce associated harm when the electronic DBI calculator is more widely available in EMR systems and as deprescribing practices become more commonplace.

Promoting medication review to address medication-related harm: Indicators 8.4 and 8.5

A key recommendation in a position statement from the International Group for Reducing Inappropriate Medication Use and Polypharmacy is "Review the medications of all older adults with an eye to deprescribing, particularly those who are vulnerable to the adverse effects of medication", highlighting the need for individual and system approaches to reducing inappropriate medication use and polypharmacy.[46] Every opportunity should be taken to review a patient's entire medication regimen and potentially deprescribe or switch medications.[29] It is important to appreciate that even if an older person has been on a medication for many years, changes in pharmacokinetics and pharmacodynamics associated with ageing and multimorbidity may occur and it is essential to periodically review all medications to ensure safety and efficacy is monitored.[29] An acute hospital stay is an opportunity to review patients' medicines and reduce inappropriate medication use. Increasing polypharmacy, especially in those with functional impairment highlights the need for the values and preferences of this patient group to be considered in decision making around medicines management.[6] Barriers to comprehensive medication review in hospital include limited clinician knowledge and skills, difficulty obtaining and communicating information, and prioritising review during what often is a short admission.[47] A recently published medication review guide supports health professionals undertaking medication reviews with people living with frailty. It highlights issues for frail older people within the framework of a standard comprehensive medication review.[48]

The NSQHS Standards 2nd edition requires HSOs to have processes to perform medication reviews, enable prioritisation of medication reviews based on clinical need, and support documentation of medication reviews and subsequent actions.[3] It is recognised that HSOs will be unable to meet the NSQHS Standards nor undertake measurement of Indicator 8.4 and 8.5 if there is no standardised or accepted method of medication-related risk

assessment. There is a need for medication review to be carried out in an efficient and systematic way. In the event that HSOs do not have locally-approved tool(s) for risk categorisation of medication-related harm and those that require intervention in the event that HSOs do not have locally-approved tool(s) for risk categorisation of medication-related harm, the project developed a tool, 'Criteria to Identify Patients at High Risk of Medication-Related Harm', (Appendix U) that can be used and/or adapted to assist identification of patients for auditing. This tool extracts the high risk criteria provided in the tools developed for Indicators 8.1, 8.2 and 8.3.

Indicator 8.4 addresses the effectiveness of processes that ensure older patients at high risk of medication-related harms receive timely and appropriate intervention to mitigate potential and actual medication-related harm during hospitalisation and post-discharge.

Indicator 8.5 addresses the effectiveness of processes intended to ensure older patients who are identified as having a high risk of medication-related harm and who do not receive a hospital-based medication review have potential (and possible actual) medication-related harm addressed following hospital discharge. This indicator aims to help sites develop or refine a process to address these issues and bridge the gap between the inpatient and outpatient settings while increasing successful patient contact points during the transitions of care process from the hospital to the ambulatory setting such as home or residential aged care facilities. While a hospital-based medication review is considered best practice in older hospitalised patients, this may not always be possible due to staffing and/or time constraints. In the event that a hospital-based medication review cannot be undertaken in high-risk patients, it is recommended that a comprehensive post-discharge medication review (PDMR) be conducted in identified high risk patients.[49] In some circumstances, both hospital-based and post-discharge medication reviews may be appropriate. Pharmacists' directed interventions during transitions of care such as with PDMRs have been shown to reduce hospital readmission rates.[50,51] Referring patients for home medicine reviews (HMRs) or Residential Medication Management Reviews (RMMRs) can assist with implementing deprescribing plans and reduce inappropriate prescribing in older people.[9] The NSW TAG-developed tools are targeted at inpatients. Other tools such as prescribing indicators specific to the elderly may also assist identification of those who would benefit from medication review in other settings.[52, 53]

Medication review cannot be a stand-alone process. The National Institute for Health and Care Excellence (NICE) guideline on medicines optimisation highlights the importance of medicines reconciliation and robust medicines-related communication systems when people are discharged from hospital or move from one care setting to another.[54] Relevant information about medicines should be shared with patients, and their family members or carers, where appropriate, and between health and social care practitioners when a person moves between care settings, to support high-quality care. The NICE guideline also includes recommendations on medication review (particularly for older people, people with chronic or long-term conditions and people taking multiple medicines) and highlights the importance of involving people in making decisions about their medicines.

Although care coordination is an essential part of healthcare provision, Australia does not have a standardised PDMR referral system and many HSOs lack resources for hospital-initiated PDMRs, with only some hospitals offering a service. These services demonstrate medication safety benefits.[55] The increasing availability of telehealth during the COVID-19 pandemic may expand the reach of PDMR. Several organisations are advocating for better resources and structured services and it is evident that the landscape is changing as this report is being written. In response to the Interim Report of the Royal Commission into Aged Care Safety and Quality, a number of changes have been implemented in relation to the HMR and RMMR Programs.[56] One of the changes for example is that patients can now be referred for a HMR or RMMR by other medical practitioners such as specialist physicians when a GP may not be available to make the referral.[56,57] These changes are supported by a framework for hospital-initiated medication reviews developed by the Society of Hospital Pharmacists of Australia (SHPA) Transitions of Care and Primary Care Leadership Committee.[58] Whilst the scope and detail of the changes are still being realised, this is a promising step in the right direction and the development of and publication of indicator 8.5 is a timely addition to help measure and address the current gap at transitions of care.

To demonstrate that medication-related risk assessment and subsequent medicines management is being conducted optimally and in a step-wise approach for older patients, it is recommended that Indicators 8.1, 8.2, 8.3, 8.4 and 8.5 are measured by a HSO at the same time.

Optimising discharge communications and continuation of medication care at transitions of care: Indicators 8.6 and 8.7

Indicators 8.6 and 8.7 focus on communicating the results of the hospital-based medication review (HBMR) as well as other important medication related information such as deprescribing plans on discharge to other health care providers and to patients and carers. Ensuring medication therapy changes are documented and communicated accurately and adequately is essential to safe transitions of care.[59,60] A systematic review of qualitative studies exploring medication-related experiences of polypharmacy among patients with multimorbidity found that patients need health care professionals to provide information when regimens are changed and that communication to ensure continuity of care is essential.[61] Furthermore, significant changes in treatment regimens have been identified as a risk factor predisposing to medication-related problems in the elderly and act as a trigger for Commonwealth of Australia-funded HMRs.

Indicator 8.6 addresses the effectiveness of processes that promote continuity of care in medication management in older patients, with the aim to minimise adverse medicine events when care is transferred. This indicator was developed by adapting NQUM Indicator 5.*8 Percentage of patients whose discharge summaries contain a current, accurate and comprehensive list of medicines*. NQUM Indicator 5.8 remains relevant because omission of medicines information and medication errors in discharge summaries in Australia are common and may affect continuity of care, contribute to adverse events and potentially avoidable re-admissions.[62-65] Indicator 8.6 may also be useful for sites to measure improvements after the introduction of electronic discharge summaries or after implementing practice models such as pharmacists completing medication management plans in the electronic medical discharge summary[66] or pharmacists documentation of medication changes in a medication management summary.[67]

Indicator 8.7 addresses the effectiveness of processes intended to ensure that patients and their carers receive adequate medicines information for safe and effective medication management after hospital discharge, and to promote continuity of care in medication management, with the aim to minimise adverse medicine events when care is transferred. This indicator was developed by adapting NQUM Indicator 5.9 *Percentage of patients who receive a current, accurate and comprehensive medication list at the time of hospital discharge*. Measurement of this indicator is important for identifying gaps in supporting consumer enablement and raising awareness of polypharmacy and deprescribing. Furthermore, as EMRs become more widespread across Australia, so will the ability to generate and view medication lists more easily from these systems by all health care professionals and not just pharmacists. This indicator may be useful for sites to measure improvements after implementing EMR-generated medicine lists.

The main differences between Indicators 8.6 and 8.7 and NQUM Indicators 5.8 and 5.9 are the targeting of the older patient population and the inclusion of deprescribing plans, a critical intervention to reduce medication-related harm.

Responses from the field testing feedback questionnaire

A need for indicators addressing medication-related harm in older hospitalised patients was clear given 42 hospitals across Australia expressed interest in participating in the field-testing project with 24 hospitals ultimately participating. Data collection tools and guidance information for data collection, including reference to a guide for sampling methodology, accompany the indicator specifications. Detailed qualitative feedback about the indicators was received from participating sites in the multisite study. Each indicator and data collection tool were tested in a minimum of 3 sites. Indicator 8.1 was field tested by the least number of sites (n=3) and Indicator 8.6 was field

tested by the most number if sites (n=15). Paediatric and neonatal populations were not represented due to the focus on older hospitalised patients. The new indicators were tested across 3 jurisdictions with the aim of optimising generalisability to other Australian hospitals. Unfortunately, the process of gaining ethics approval for field testing of the indicators was found to be resource intensive and time consuming. This restricted the number of sites that were able to participate and resulted in the loss of several sites who either expressed interest in participating or some sites started the ethics process but were unable to be approved in time to conduct the field testing. In addition, competing resources as a barrier to participation when these sites were implementing EMR and/or EMM systems or had recently implemented them.

For some of the tested indicators there were significant variations in the reported results. These could be accounted for by variations in the practice processes and local systems in use with differences in organisations structure, patient population, staffing arrangement and resource availability apparent. Field testing exposed nuances and challenges in measuring some of the required processes. In some cases, different interpretations of the indicator instructions were revealed, which was addressed during finalisation of the indicator documents.

Consultation and field testing have demonstrated the usefulness and applicability of the new indicators to the current Australian healthcare environment. During field testing many users commented that the indicators would provide useful data for accreditation purposes and would be valuable to promote and monitor the effects of practice change. However, a frequent theme in the questionnaire feedback was the lack of resources available to measure the indicators. The accompanying tools developed during the project should be used by appropriately trained health professionals as a resource to optimise medication management. Importantly, the tools do not replace clinical judgement in the clinical management of patients.

A strength of this study is that multiple sites from different jurisdictions within Australia participated. This study also attracted interest from and participation from sites/hospitals that have not previously been involved in NSW TAG indicator field testing or other similar QI projects. This fosters important collaborative relationships which will assist the sustainability of the indicators.

Specification and tool improvement: Feedback from participating sites was invaluable as it revealed issues to be rectified within both the specifications of each indicator as well as in the data collection tools. Positive experiences were reported by participating sites around QI methodology training experience for early career clinicians and the facilitated collaboration within and between departments and disciplines. Furthermore, some sites have already formulated improvement strategies based on gaps in practice identified during field testing and started to have conversations with stakeholders to drive change. One site suggests that they have been able to feedback some inadequacies in their systems to the individual sites already. It was also pleasing to receive reports that clinicians were engaged and displayed enthusiasm in polypharmacy management.

Automated real time risk identification systems and defined processes: A recurring priority for clinicians is the ability to collect data about the recommendations and actions resulting from risk identification, especially in light of scarce health resources. This priority could be a potential reason for some of the poor indicator field testing results (particularly Indicators 8.1 – 8.5) as the processes undertaken prior to identification of risk of harm are poorly documented and some sites reported a lack of a standardised process or no process at all to document this information. Ideally, a digital tool generating real time risk assessment information for clinicians would enable proactive interventions such as medication review and deprescribing. An effective digital tool would negate the need for Indicators 8.1, 8.2 and 8.3. However, until this time, these indicators and their accompanying tools serve as critical components of any activities related to medication harm in older hospitalised patients. For Indicators 8.4 and 8.5, it was apparent that there is a need for standardised definitions of HBMR that clinicians can work towards achieving, as there appears to be variation in practice and documentation.

Confusion regarding processes, responsibilities and knowledge: Indicator 8.2 addresses the effectiveness of processes for identifying risk of and preventing medication-related falls in older hospitalised patients. Field testing

feedback revealed that there is confusion in the terminology between the falls risk screening process and the management plan process after a patient at high risk of falls has been identified, this resulted in collection of incomplete data or not identifying the appropriate documentation. However, in most cases it was a lack of this documentation in the medical record. Another factor, which may have influenced the inconsistent completion of these screening and management forms, is the introduction of EMR systems, where some sites had a hybrid model with some of the assessment completed electronically while other components remained on paper resulting in missed documentation. The feedback received for Indicator 8.2 concurs with many concerns raised in a 2012 report, 'Preventing Falls and Harm from Falls in Older People: Best Practice Guidelines for Australian Hospitals':

- "Nurses raised concerns about the expectation of falls prevention action following assessment completion and how this was challenging in an environment of limited resources."[68] p22
- "Use of short, simple and accurate tools along with increased education and use of reminders were identified as key drivers for practice change."[68] p22
- "Nurses reported that they felt education surrounding the use of tools was important but rarely/never occurred. With respect to education, nurses indicated that they prefer face-to-face, short sessions that include a combination of process (how and when to complete), reasoning behind tool use, risk factors and problem-based learning such as case studies. "We're often given a sheet of paper and told this has to be done, but to get people more engaged with doing it you have to explain to them why and how it would benefit you as a caregiver."[68] p20
- "These findings highlight deficits in the delivery of guideline care relating to use of risk assessment and screening tools. The practice gap is unlikely to be due to a lack of knowledge about risk assessment and screening best practice. Survey results showed 82% of nurses agreed that it was their responsibility to update their patient's falls risk status if a fall and/or change in condition occurred."[68] p20
- "Nurses reported communicating a patient's risk status verbally at handover and also were supportive of this information being displayed on 'journey boards' within the ward."[68] p20
- "Despite having a policy reflective of best practice guideline care, practice relating to the use of risk assessment and screening tools is poor."[68] p24
- "There did not seem to be a standardised process for recording when a medication review was undertaken for the purpose of falls prevention as opposed to other purposes such as pain management."[68] p40
- "It was highlighted that to improve the use of medication reviews a structured process needed to be implemented to trigger the review."[68] p39

The importance of documentation: Data collection for all the indicators relies on good documentation. If there is no documentation of the information, it is considered not to have occurred but this does not mean that an action has not occurred. Some reasons why documentation may have not occurred is that there is a lack of documentation systems in place, there is no consistent place to document medicines or related information and there is inadequate training of those responsible for documenting, for example, junior medical officers and the completion of discharge summaries. As a default, information may be written in the medical progress notes where it may be difficult to locate. This was highlighted in the feedback and real-time auditing was considered desirable. The implementation of electronic systems has in some respects made it harder to audit some information given information can be documented in many different locations within the EMR. Some processes have also changed such as the usual screening of a discharge prescription process whereby printed draft discharge summaries listing intended discharge medicines and signed by a doctor form the discharge prescription for hospital supply of medicines. Some screening tools such as the vFRAT have been developed for electronic completion in the EMR but the corresponding management plan remains on a paper form. Not only does it make it difficult to audit but it also makes it cumbersome in practice to access and action recommendations. The patients BPMH, the patient's medication management plan and/or HBMR may be documented in several locations making it cumbersome to switch between the different views electronically in order to assess, make recommendations and to action any recommendations. A similar issue is the lack of a standardised location for

documenting deprescribing plans. Furthermore, some sites are still using a hybrid system of paper and electronic documentation, which means that auditors must switch between both types of documents making auditing onerous. Filing systems of hard copies of discharge prescriptions compound this hybrid system issue, as it is difficult to generate a report or easily find the records for the desired patient population being audited. A proposed solution is that a standardised template is developed for consistent documentation of HBMRs within the EMR and that they are readily accessible during the episode of care by all health professionals. It would be ideal if multiple clinicians could also contribute to this template during an episode of care, however this raises various challenges beyond the scope of this report. Organisations responsible for managing EMRs and EMMs in hospitals should also consider how they can improve the view of medication administration records and related medication information such as the BPMH, medication reconciliation documents or medication management plans. These types of information in the paper-based environment were very easy to view simultaneously and compare information to make clinical care decisions; however, with the advent of EMR and EMM, simultaneous visibility is reduced and usual cognitive workflows for clinicians have been affected.

Inadequate resources such as discharge templates: Studies have shown that unintended discrepancies in the medication information provided on discharge are common with one study showing only 1 in 5 changes made to the medication regimen during hospital admission were explained in the discharge summary.[7] Omitting one or more medicines from a patient's discharge summary exposes patients to nearly 2.5 times the usual risk of readmission to hospital.[69] Indicator 8.6 feedback from field testers revealed particular concerns by rural sites, with one site reporting that their discharge summary template in use "is woefully inadequate, it needs an update", and that the "rural medical practitioners see the discharge summary as a letter to themselves so do not usually invest much effort in filling it out". Suggestions were made by participants to provide more intensive support to doctors to improve this area of documentation and communication. All 15 sites who field tested the indicator would use the result from this indicator to guide a review or change in practice at their hospital. Some positive comments include suggestions that this indicator is potentially more useful than the currently published Indicator 5.8 as it considers the high risk group of patients that need intervention the most. Two sites reported the desire to repeat this once they have implemented their EMM system to address any remaining gaps or implement practice improvements. These insights demonstrate participants' commitment to continuous performance measurement and utility of the indicators.

Barriers and enablers to measuring the indicators

The barriers and enablers experienced and reported by sites as well as observed by the NSW TAG project team are similar to those previously identified in the 2014 review of the NQUM indicators and are summarised below.[2] Broadly, participant suggestions to facilitate regular use of the indicators in hospitals included improving staffing levels and other auditing resources, obtaining executive support, providing advice on when to conduct the audits and assisting alignment with existing audits and disseminating awareness within a multidisciplinary team.

Some barriers include:

- Delays and variability in timing of site specific approvals to conduct multisite projects.
- Lack of dedicated resources for clinically meaningful data collection/collation/reporting, including repeat auditing and sustaining longer term auditing (this was the most commonly perceived barrier to indicator uptake) and lack of leadership support in provision of these resources.
- Inefficient workflows.
- Cumbersome paper records as well as hybrid paper and electronic records.
- Lack of expertise/experience/confidence in undertaking clinical practice improvement activities.
- Local context specific issues.
- Administrative burden; missing required data in routine medical records or usual record keeping processes

- Service shortfalls or inconsistencies in service models within and between states in Australia (one of the concerns raised was whether indicator measurement would be fair across hospitals in any benchmarking activities).
- Lack of translatable guidelines or relevant tools to use (changing healthcare practices to align with evidence informed guidelines is a complex process that takes time).

Some enablers include:

- Integration with routine systems, processes, practices and with digital solutions when possible.[10,28]
  - For example one site suggested potential for alignment with a pre-existing auditing schedules such as the NSW Quality Improvement Data System (QIDS) and Quality Audit Reporting System (QARS) activities.
- Clinical leadership, effective multidisciplinary collaboration and positive relationships with hospital risk management teams.
- Availability and/or access to the right mix of relevant expertise (clinical, therapeutics/QUM, methodological, e.g. "implementation science").
- Regular and meaningful communication (multi-mode, multi-channel, multidisciplinary).
- Dedicated resources and specialised expertise to support.
- Clinically meaningful data collection, collation and reporting.
- Timely data feedback to clinicians (and ideally sustained longer term).
- Design and delivery of effective interventions using collaborative group implementation.
- In-depth knowledge of local context to inform appropriate tailoring of strategies to local needs.

Key recommendations by NSW TAG include the need by HSOs to:

- Work with clinicians to develop processes for documenting the findings of screening and assessment processes. This may include formalising existing processes, and developing or adapting specific paper or electronic tools as recommended in the NSQHS Comprehensive Care Standard.[3] Clinicians require processes and tools that are optimised for sensitivity and ease of application at the bedside to facilitate timely treatment or interventions and avoid missing patients at high risk of harm.
- Provide practice guidance for deprescribing non-essential medications along with systems-based infrastructure to enable integrated and effective assessments during opportune moments in the health care continuum.
- Provide and resource multimodal approaches that include education, risk stratification, population health management interventions, research and resource allocation to help transform organisational culture in health care facilities toward High Reliability Organisations (HRO) models of care, aiming at zero harm to patients.[70] An investment in cultural change within healthcare systems must occur in order to deliver best care and outcomes for patients.
- Ensure adequate resourcing for local quality improvement projects. Surveys by NSW TAG published in 2017[71] and 2020[72] continue to identify poor resourcing for quality improvement projects particularly those involving local evaluations of QUM.
- Encourage all quality improvement practitioners in all hospital settings to look through the whole suite of indicators to identify other indicators that they may measure at the same time to maximise use of resources and justify any subsequent system wide changes required. A low burden of measurement is important to facilitate widespread implementation as well as maximise efficient use of limited resources.
- Sustain measurements over time and across different settings to characterise changes in practice, interpret the impact of quality improvement interventions, benchmark outcomes across facilities and geographical regions where appropriate (and thus identify opportunities for improvement), and guide resource and research investments.
- Promote championing of these indicators by national and jurisdictional organisations as well as local practitioners who acknowledge the indicators' importance to assist with overcoming some of the identified barriers to the use of the indicators. The indicators and PREMs have the potential to have a major effect on local practices and improve shared decision-making.

Sampling guidance

As previously identified in the review of the QUM Indicators in 2014, it became apparent during the field testing in 2019 that there remained a lack of knowledge regarding the methodology for conducting local quality improvement (QI) in many hospital practitioners. Participation in local QI is an essential component of the NSQHS Standards. While there is no single recommended methodology for QI, the lack of knowledge regarding methodology, particularly how to determine sample size and audit frequency, was recognised as a significant barrier to indicator utilisation and subsequent intervention. Given that there also exists potential for the indicators to be used for accountability or benchmarking activities, it is also important that auditors understand the limitations and advantages of the various methodologies.

Participating sites who enquired about sampling were provided verbal advice by the NSW TAG Project team and were also referred to the "National Quality Use of Medicines Indicators for Australian Hospitals: User guide" when reading each indicator's specifications to ensure that informed decisions regarding sample size, sample selection and data collection methodology would be made that would meet the objectives of the field testing project.[27] The "Data collection for local use" section in the indicator specifications refers to this sampling guidance as well as providing information regarding inclusion and exclusion criteria and recommended data sources. The local advisory group guiding the audits should guide decisions regarding sampling for local audits. Importantly the sample size should convince the relevant audience that the audit results are a true representation of the local practice.

Data collection tools

Data collection tools have been developed for all polypharmacy QUM indicators and were field tested. Data collection tools for the PREMs were not developed but may be developed in the future. An accompanying User Guide for use of the data collection tools is available. Some data collection tools have been amalgamated to form one data collection tool to enable collection of data simultaneously, i.e. one tool for Indicators 8.1, 8.2 and 8.3. The provision of standardised data collection tools facilitates ease of use, uptake of the QUM Indicators, promotes quality improvement activities and assists with provision of evidence towards meeting the NSQHS Standards. Furthermore, tools such as these are essential for multisite projects or benchmarking activities as they assist with standardisation of measurement. The data collection tools also facilitate the development of online real-time reporting, monitoring and feedback of QUM Indicators within facilities, which will further facilitate indicator uptake.

General observations from the development and field testing of the QUM indicators

Ethics approval

A major challenge in the field testing of the QUM indicators was the variability of requirements for ethics approval of low and negligible risk projects across the Australian jurisdictions. Despite the project being approved by a Human Research and Ethics Committee (HREC) accredited as a Lead HREC by the NSW Ministry of Health and a certified institution under the NHMRC National Harmonisation of Multi-centre Ethical Review Initiative and having extra insurance to cover multi-state projects, numerous separate ethics applications had to be made by the Project Team. This particularly applied to interstate hospitals. We assisted NSW sites with their Site Specific Applications (SSAs) by obtaining relevant information for completion of governance forms, collecting curriculum vitae and drafting emails and letters. We also assisted other jurisdictional sites navigate their research governance processes to the best of our ability in an attempt to maximise the National Mutual Acceptance agreement where possible, however in the end, this was not recognised.

Despite the assurance that the data was not identifiable once entered into the data collection tool and that NSW TAG would only be receiving summary data and feedback about the field testing process, NSW TAG was instructed to apply under the Public Health Act of Queensland prior to seeking ethics approval, which added several weeks to the approval process. One Victorian site required a research collaboration agreement as well as a material transfer agreement. One hospital district charged the local site for an ethical review. There was inconsistency in approaches regarding sign-off by medical records departments. This requirement was not apparent when initial submission was made; however, sites were later told this was a requirement and resulted in delayed SSA approval at these sites.

There was also varying requirements by governance officers with the format of submissions e.g. some required hardcopy submissions, some required electronic submissions, some required both types of submissions and some required cover letters. Some required a courtesy call that a submission was about to be made. There was varying visibility by researchers and governance officers of documents on the AU RED platform and therefore there was a requirement by some governance officers for subsequent email submission of some documents. We note that the AU RED platform is now decommissioned.

There were some NSW hospitals where the site specific approval was so delayed that sites were unable to participate in the project. Ultimately only 24 sites gained SSA approvals within an appropriate time frame and resource availability that enabled study participation. Pertinent statistics indicating the timeframe for SSA approval following SSA submissions as at January 2019 for 24 sites were a median of 30 days and a range of 4 - 133 days.

Whilst it is acknowledged that ethics and governance of research projects are of great importance and fundamental to the conduct of any research, the barriers to undertake this project meant that time and money was wasted, and health care practitioners were unable to gain experience in indicator measurement. It is recommended that national and jurisdictional organisations consistently facilitate the national harmonisation of ethical review for low and negligible risk projects.

Use of data sources for indicator measurement

Field testing revealed that hospitals use a variety of data sources to collect information required for indicator measurement. Despite consistency of indicator specifications and data collection tools across the field testing sites, there was a variety of methods used by the sites to collect data. The lack of documentation, lack of dedicated locations for documentation and the introduction of EMR systems at several hospitals compounded the burden of data sources to be checked. This was especially apparent in the retrieval of medicines information at discharge when several hospitals used pharmacy sources to identify their sample. However, it should be noted that there may be a number of patients who are discharged without receiving medicines from the hospital pharmacy at discharge or they may only receive some and not all of their required medicines. Hence, there is a potential to bias indicator results.

Increased duration of and complexity in data collection occurred for any indicator that relied on data being extracted from multiple data sources. Field testing generally highlighted that hospitals with electronic data records were able to undertake indicator measurement most efficiently. Nevertheless, barriers to measurement arose in these hospitals. Firstly, the information sources, such as pharmacy dispensing software, did not have the ability to capture all the information required to meet the Standards, such as allergies and adverse drug reactions. Some hospitals have adopted ‘workarounds’ to include this information such as handwriting information on the medication list. However, a copy of this handwritten information is not kept. There is a significant potential for increased efficiency and improved medication safety with better integration of the electronic systems and dispensing software. Importantly, these initiatives will facilitate QUM indicator measurement. This observation highlights the importance of clear and agreed documented methodology for data collection, particularly for intra- and inter-hospital comparison. It underscores the importance of the formation of a local advisory group to oversee indicator measurement to ensure that the potential gaps of measurement are identified and that the aims of the indicator measurement are met.

As indicators were generally easier to measure and more acceptable if data could be extracted readily from electronic resources, it is important that indicator measurement and data extraction is considered when developing and enhancing EMR systems.

The QUM indicators examine processes, they do not measure outcomes such as death, hospital admission, adverse events, health care professional visits or quality of life. Nevertheless, the QUM gaps that they measure have been linked to poor outcomes for patients. Future development of EMR systems and data linkage may, in the long term, allow the development of QUM indicators as outcome measures including patient reported outcome measures.

What does indicator measurement mean?

It is important that auditors, QI advisory committees, hospital managers and the executive recognise that 100% compliance rate with a QUM indicator may not be desirable or feasible given resources and known poor performance. Clinicians' and other stakeholders' involvement in indicator measurement and feedback and the need for agreed performance targets (which may vary between hospitals) is key to the success of indicator measurement and subsequent QI. A pragmatic view of compliance rate is also required for several new QUM indicators with a view to drive change in hospital settings where systems and resources are still immature or lacking. This is particularly so with the Indicators 8.1, 8.2 and 8.3.

Measurement of a QUM Indicator means little without accompanying and sustained actions. The 2014 NQUM Indicator Manual[27] aims to guide practitioners in the use of the indicators and to develop a supportive structure to QI activities. It is strongly recommended that this section be read prior to QUM indicator measurement. Auditors and those with an interest in these activities are encouraged to develop a network of peers. The medSMART support group coordinated by NSW TAG has been one example of such a network of peers.

Benchmarking

The QUM Indicators have significant potential for benchmarking activities and such activities can be a potent driver for QI. However, the QUM Indicators have not been developed nor validated for benchmarking purposes. The 'Using the National Quality use of Medicines Indicators for Australian Hospitals 2014' section of the manual details considerations that are required for multisite projects and benchmarking. The QUM Indicators focus on local quality improvement and the measurement of multiple indicators at the same time can demonstrate a stepwise approach in optimal management of medicines in older patients. Interpretations of the results of multiple indicators may therefore be complex and makes benchmarking difficult to achieve. Nevertheless, if benchmarking is to take place, co-ordinators should ensure facilities are in agreement about methodology and the parameters and limitations of such comparisons.

It should also be noted that the indicator results may not be generalisable to private hospital emergency departments or those sites with very limited clinical pharmacist availability or resources.

Future directions

Multisite field testing of the indicators in this area of practice has yielded much interest from other organisations including the Australian Commission on Safety and Quality in Health Care, Safer Care Victoria, Australian Council on Healthcare Standards, community provider organisations, NSW Clinical Excellence Commission and the NSW Agency for Clinical Innovation (ACI) Frailty Network.

To the best of our knowledge, there had been no Australian specific process indicators for the assessment of medication related risk of harm for older patients prior to the development of these Polypharmacy QUM Indicators. These new QUM Indicators are designed in such a way that they can be tailored to local settings if required. Practice change, technology improvements, evidence-based gaps in care which are resolved, and new emerging gaps mean that the indicators will require periodic revision and updating. QUM indicators measuring the appropriateness and quality of medication based interventions as well as Patient Reported Outcome Measures were identified as being worthy indicators for development in the future.

Equally important is the implementation and appropriate use of the QUM Indicators. Measuring and managing quality improvement is not easy, especially when busy clinicians are focussed on providing care. Accreditation requirements for hospitals are likely drivers of indicator measurement. NSW TAG hopes to undertake future work to reference the indicators against the NSQHS Standards 2nd edition in order to provide a matrix guide on how the indicators can be used to meet specific action items required for each Standard. In general, measurement of the indicator alone will not provide sufficient evidence for compliance with NSQHS Standard item. Further work, including interpretation of the indicator results and follow up action, will usually be required. The accompanying

data collection tools, risk assessment tools and planned mapping to the NSQHS Standards are likely to facilitate indicator measurement. Nevertheless, resources will be required to maintain and update the indicators and tools. Significantly, recognition of QI as a science, and the need for health care practitioners, managers and health executives to obtain an understanding of this science or to obtain knowledge and skills in it as a QI practitioner, is critical to ensure improvement in QUM in Australia. Clinicians have the desire to ensure their actions are safe and effective and they have the ability to most directly drive change in their hospitals.

It is hoped that these new Polypharmacy QUM Indicators and PREMS will be included in the National QUM Indicator Set. The indicators support the following initiatives:

- Australia's response to WHO 3rd Global Patient Safety Challenge: Medication Without Harm.[73,74]
- Quality Use of Medicines and Medicines Safety the 10th National Health Priority Area[75] and the ACSQHC Quality Use of Medicines and Medicines Safety Discussion Paper.[76]
- Quality Use Of Medicines To Optimise Ageing In Older Australians: Recommendations for a National Strategic Action Plan to Reduce Inappropriate Polypharmacy.[77]
- SHPA Medication Safety Position Statement.[78]

Collaboration with NSW eHealth and other relevant stakeholders to extract screening data and process markers for electronic automation will assist QI activity. This work aligns with various aspects of the recently released five-year vision for clinical analytics in NSW which includes data transformation to enable point of care clinical decision support, algorithms to assess risk profiles and monitoring and measurement systems that reliably and sensitively assess health care services to guide improvement.[79]

Opportunities to disseminate the indicators and PREMs for adaptation to RACFs given Aged Care Quality and Safety Commission recommendations will be sought. Future work could also involve development of an implementation package that can be piloted, evaluated and finalised for large scale dissemination in community-based settings.

Given the history of involvement in the development of indicators for the quality use of medicines, NSW TAG and its member network look forward to further involvement in activities which support QUM Indicator measurement and promote their efficient and appropriate use in all Australian hospitals and beyond.

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Conclusion

Hospital-based systems that systematically measure and have processes to address medication-related harm are currently immature in Australia and resources for such measurement are limited. Numerous risk factors have been identified for various outcomes e.g. medication errors and/or adverse drug reactions during hospitalisation and/or medication-related harm post-discharge. Synthesis of these multiple factors remains a significant challenge in a busy clinical environment. Research using EMR data should be able to assist in risk factor identification and once identified and validated, provide a role in real time patient identification e.g. by calculating a risk score for a specific outcome. However, this use of EMR remains immature in most Australian hospitals. A new set of Polypharmacy QUM Indicators for Australian hospitals has been developed, including 3 deprescribing PREMs.

Measurability is enabled by standardised recording systems or documentation processes and it is hoped that the results of measuring the indicators will lead to the standardisation of or implementation of processes and tools that enhance system wide population based interventions to reduce medication related harm, decrease variation in practice and strengthen a culture of quality and safety to ultimately improve overall patient care.

This multisite field testing project provided an infrastructure for streamlined data collection, analysis and feedback. The project was one component of a multifaceted project and the development of these indicators required integration with and development of resources including deprescribing guides, education modules and risk assessment tools. Diversion of resources with several hospital implementations of EMR and/or EMM systems highlighted challenges for field testing participation and meeting the new requirements of the NSQHS Standards. It has underscored the need for automated data collection in order that implementation of quality improvement strategies can be efficiently and sustainably undertaken.

Delivering health care is increasingly complex and demanding. Identifying and unlocking the value that exists in every aspect of the health system is a long-term aspiration. It requires greater maturity of systems and the collective efforts of clinicians, managers, and health executives. Future development of an effective prospective electronically automated harm prediction model is desirable and NSW TAG's expertise in QUM indicator and implementation should continue to be supported. Planning and providing care that reflects clinical evidence and what is important to patients is a powerful means to ensure value in the health system.

The Polypharmacy QUM Indicators demonstrate an ongoing commitment by Australian health care professionals to ensure quality use of medicines within Australian hospitals and beyond. NSW TAG wishes to thank the many people and HSOs who have been involved in the development of these QUM Indicators. NSW TAG recommends these indicators to all health care practitioners interested in ensuring that older patients realise the best outcomes they can from their use of medicines.

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  - The Society of Hospital Pharmacists of Australia Committee of Specialty Practice in Geriatric Medicine
  - The Society of Hospital Pharmacists of Australia Committee of Specialty Practice in Transitions of Care

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- Cooma Hospital, NSW
- Corowa District Hospital, NSW
- Deloraine District Hospital, TAS
- Dubbo Health Service – Dubbo Hospital, NSW
- Flinders Island Multipurpose Centre, TAS

- Goulburn Base Hospital, NSW
- John Hunter Hospital, NSW
- Midlands Multi-Purpose Health Centre, TAS
- Redcliffe Hospital, QLD
- Royal Brisbane and Women's Hospital, QLD
- Royal North Shore Hospital, NSW
- Shoalhaven District Memorial Hospital, NSW
- Smithton District Hospital, TAS
- South East Regional Hospital, NSW
- The Tweed Hospital, NSW
- Young Hospital, NSW

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Appendices

Appendix A: Indicator 8.1 summary of collated results table

Site	Local list of high risk medicines (HRMs) in use?	Local risk prioritisation tool for inappropriate polypharmacy in use?	Total Number of Patients Audited	Indicator 8.1: % Older patients that are appropriately assessed for risk of inappropriate polypharmacy by the end of the next calendar day after admission	% Older patients that are appropriately assessed for risk of inappropriate polypharmacy at any time during admission	% With documentation that assessment of inappropriate polypharmacy was undertaken during admission	% With documentation present detailing the basis for risk categorisation	% With an appropriate health care professional(s) who conducted the inappropriate polypharmacy assessment	% With risk assessment completed by the end of the next calendar day after admission
E	yes	no	20	0%	0%	95.0%	0.0%	90.0%	65.0%
P	yes	no	18	0%	0%	0%	0%	0%	0%
R	yes	no	20	0%	0%	15.0%	0.0%	15.0%	10.0%

Appendix B: Indicator 8.1 summary of post field testing questionnaire responses table

Site	E	P	R
Did you have any difficulties in collecting data for this indicator?	yes	yes	yes
Do you think the key definitions provided are adequate?	yes	no	yes
Do you think the numerator provided for this measure is appropriate?	not answered	no	yes
Do you think the denominator provided for this measure is appropriate?	not answered	yes	yes
Do you think the instructions for data collection are adequate?	no	no	no
Do you think the suggested data sources are appropriate?	yes	yes	yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	yes	no	yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	yes	no	yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	no	no	yes

Appendix C: Indicator 8.2 summary of collated results table

Site	Local list of fall-risk-increasing drugs (FRIDs) in use?	Total Number of Patients Audited	Indicator 8.2: % of older patients that are appropriately assessed for medication-related falls risk by the end of the next calendar day after admission	% of older patients that are appropriately assessed for medication-related falls risk at any time during admission	% With documentation that an assessment of medication-related falls risk was undertaken during admission	% With documentation present detailing the basis for risk categorisation	% With an appropriate health care professional(s) who conducted risk assessment	% With risk assessment completed by the end of the next calendar day after admission
A	No	21	0.0%	0.0%	95.2%	95.2%	95.2%	95.2%
B	No	42	0.0% (correct measurement)	0.0%	0.0%	0.0%	N/A	0.0%
D	Yes	14	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
E	N/A	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
F	Yes	19	0.0%	0.0%	47.4%	0.0%	36.8%	42.1%
G	No	30	16.7%	26.7%	26.7%	26.7%	26.7%	16.7%
I	No	22	0.0%	0.0%	77.3%	0.0%	77.3%	72.7%
L	No	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
N	Yes	40	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%
O	No	10	70%	100%	100%	100%	100%	70%
R	No	20	0.0% (correct measurement)	0.0%	0.0%	0.0%	0.0%	0.0%
T	No	20	5.0% (correct measurement)	5.0%	40.0%	5.0%	35.0%	25.0%
U	No	22	54.5%	54.5%	90.9%	90.9%	90.9%	90.9%
V	No	15	0.0% (correct measurement)	0.0%	0.0%	0.0%	0.0%	0.0%
X	No	13	23.1%	23.1%	23.1%	46.2%	46.2%	30.8%
Y	Yes	30	73.3%	73.3%	73.3%	73.3%	73.3%	73.3%

Appendix D: Indicator 8.2 summary of post field testing questionnaire responses table

Site	A	B	D	E	F	G	I	L	N	O	R	T	U	V	X	Y
Did you have any difficulties in collecting data for this indicator?	no	yes	yes	yes	no	yes	yes	no	no	no	yes	yes	no	yes	No	yes
Do you think the key definitions provided are adequate?	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Do you think the numerator provided for this measure is appropriate?	yes	yes	no	n/a	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	unsure	yes
Do you think the denominator provided for this measure is appropriate?	yes	yes	yes	n/a	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	unsure	yes
Do you think the instructions for data collection are adequate?	yes	no	n/a	no	yes	yes	yes	yes	no	yes	no	yes	yes	n/a	yes	yes
Do you think the suggested data sources are appropriate?	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	n/a	yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	yes	potentially	no	no	yes	yes	yes	yes	no	yes	yes	no	yes	no	yes	yes

Appendix E: Indicator 8.3 summary of collated results table

Site	Total Number of Patients Audited	Indicator 8.3: % of older patients that had a risk assessment for medication-related cognitive and/or physical impairment before the end of the next calendar day following hospital admission	% Older patients that had a risk assessment for medication-related cognitive and/or physical impairment at any time during admission	% With documentation present that an assessment of risk for medication-related impairment of cognitive and/or physical function was undertaken during admission	% With documentation present detailing the basis for risk categorisation	% With an appropriate health care professional who conducted the risk assessment	% With risk assessment completed by the end of the next calendar day after admission
B	42	0%	0%	0%	0%	0%	0%
E	20	0%	0%	0%	0%	0%	0%
P	29	0%	0%	0%	0%	0%	0%
Q	15	15.0%	15.0%	60.0%	15.0%	60.0%	55.0%
R	20	0%	0%	5.0%	0.0%	5.0%	5.0%

Appendix F: Indicator 8.3 summary of post field testing questionnaire responses table

Site	B	E	P	Q	R
Did you have any difficulties in collecting data for this indicator?	yes	yes	no	yes	no
Do you think the key definitions provided are adequate?	yes	yes	yes	yes	no
Do you think the numerator provided for this measure is appropriate?	yes	n/a	yes	yes	yes
Do you think the denominator provided for this measure is appropriate?	yes	n/a	yes	yes	yes
Do you think the instructions for data collection are adequate?	yes	yes	no	yes	no
Do you think the suggested data sources are appropriate?	yes	yes	yes	yes	yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	yes	yes	no	no	yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	yes	yes	no	no	yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	yes	no	no	no	yes

Appendix G: Indicator 8.4 summary of collated results table

Site	Total Number of Patients Audited	Indicator 8.4: % of older patients at high risk of medication-related harms that receive a hospital-based medication review and, if applicable, a deprescribing plan, before the end of the third calendar day following hospital admission	% Older patients at high risk of medication harms that have a documented hospital-based medication review and, if applicable, a deprescribing plan, at least one day prior to discharge	% Older patients at high risk of medication-related harms who received a hospital-based medication review (HBMR)	% With findings & recommendations from the HBMR documented in the medical record (or other place as per local policy)	% With an approved health care professional who performed the HBMR	% of patients where HBMR completed by the end of the third calendar day after admission	% of patients where HBMR completed at least one day prior to hospital discharge	% With documentation where a deprescribing plan was recommended in the HBMR	% With documentation that a deprescribing plan was initiated (whether recommended or not)
C	15	0%	0%	6.7%	6.7%	6.7%	0.0%	6.7%	0.0%	0.0%
D	15	13.3%	20.0%	93.3%	93.3%	93.3%	80.0%	13.3%	60.0%	20.0%
E	20	5.0%	10.0%	30.0%	30.0%	30.0%	25.0%	5.0%	10.0%	10.0%
F	19	15.80%	26.30%	31.6%	31.6%	31.6%	21.1%	10.5%	26.3%	26.3%
J	22	0.0%	0.0%	77.3%	77.3%	77.3%	54.5%	22.7%	0.0%	9.1%
L	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
M	22	13.6%	13.6%	95.5%	100.0%	100.0%	95.5%	4.5%	22.7%	27.3%
O	10	0%	0%	0%	0%	0%	0%	0%	0%	0%
U	22	0%	0%	0%	0%	0%	0%	0%	0%	0%
Y	30	0%	0%	0%	0%	0%	0%	0%	0%	0%

Appendix H: Indicator 8.4 summary of post field testing questionnaire responses table

Site	C	D	E	F	J	L	M	O	U	Y
Did you have any difficulties in collecting data for this indicator?	no	yes	yes	no	yes	no	yes	no	no	no
Do you think the key definitions provided are adequate?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Do you think the numerator provided for this measure is appropriate?	yes	no	yes	yes	yes	yes	no	yes	yes	yes
Do you think the denominator provided for this measure is appropriate?	yes	yes and no	yes	yes	yes	yes	yes and no	yes	yes	yes
Do you think the instructions for data collection are adequate?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Do you think the suggested data sources are appropriate?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	yes	yes and no	yes	yes	yes	yes	yes and no	yes	yes	yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	yes	no	yes	yes	yes	yes	no	yes	yes	yes

Appendix I: Indicator 8.5 summary of collated results table

Site	Total Number of Patients Audited	Indicator 8.5: % of older patients at high risk of medication-related harms with a recommendation for a post-discharge medication review, when hospital-based medication review is not performed	% Older patients at high risk of medication-related harms who received a hospital-based medication review (HBMR)	% Older patients at high risk of medication-related harms with a recommendation for a post-discharge medication review
E	20	0%	60.0%	0.0%
F	19	0%	31.60%	0%
L	20	0%	0%	0%
O	10	0%	0%	0%
P	18	0%	100.0%	16.7%
R	20	0%	0%	0%
U	22	4.50%	0%	4.50%

Appendix J: Indicator 8.5 summary of post field testing questionnaire responses table

Site	E	F	L	O	P	R	U
Did you have any difficulties in collecting data for this indicator?	No	No	Yes	Yes	Yes	Yes	Yes
Do you think the key definitions provided are adequate?	Yes	Yes	Yes	Yes	Yes	No	Yes
Do you think the numerator provided for this measure is appropriate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Do you think the denominator provided for this measure is appropriate?	Yes	Yes	Yes	Yes	Yes	No	Yes
Do you think the instructions for data collection are adequate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Do you think the suggested data sources are appropriate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	Yes	Yes	Yes	Yes	No	No	Yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	Yes	Yes	Yes	Yes	No	No	Yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	Yes	Yes	Yes	Yes	No	No	Yes

Appendix K: Indicator 8.6 summary of collated results table

Site	Total Number of Patients Audited	Indicator 8.6: % Older patients taking medicine(s) at discharge whose discharge summaries contain a current, accurate and comprehensive medicines list, including explanations for any medication changes and details of a deprescribing plan, where applicable	% Of older patients with a documented discharge summary/ letter AND a medicines list included	% Of the older patients with a discharge summary containing a medicines list, the list is current, accurate and comprehensive medicines and includes explanations for any medication changes and details of a deprescribing plan, where applicable	% With a documented discharge summary/ letter	% With a medicines list included in the discharge summary / letter	% With all ongoing medicines listed	% For all the medicines listed, all required information, i.e. dose, frequency, route, duration (if required) been provided	% With all listed medicines current (i.e. there are no medicines listed that should NOT be prescribed on discharge)	% With all allergies and intolerances listed (If the patient has no known allergies/ unknown allergy status this must be stated)	% With a deprescribing plan recommended/ initiated in hospital	% When a deprescribing plan was recommended/ initiated in hospital, the details of the deprescribing plan been provided with/in the discharge summary
D	8	25%	5.0%	40%	75.0%	62.5%	62.5%	62.5%	50.0%	62.5%	25.0%	12.5%
E	20	0%	19.0%	0%	95.0%	95.0%	70.0%	95.0%	90.0%	90.0%	10.0%	0.0%
F	19	52.6%	18.0%	55.6%	100.0%	94.7%	89.5%	78.9%	89.5%	89.5%	5.3%	5.3%
H	10	100%	10.0%	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	50.0%	50.0%
I	22	9.1%	7.0%	28.6%	72.7%	31.8%	27.3%	31.8%	18.2%	31.8%	9.1%	0.0%
K	30	3.30%	27.0%	3.70%	90.0%	90.0%	83.3%	30.0%	73.3%	86.7%	30.0%	20.0%
L	20	0%	4.0%	0%	95.0%	20.0%	5.0%	15.0%	15.0%	0.0%	5.0%	0.0%
M	22	22.70%	20.0%	25%	100.0%	90.9%	90.9%	81.8%	77.3%	72.7%	45.5%	45.5%
O	10	0%	2.0%	0%	100.0%	20.0%	20.0%	20.0%	20.0%	0.0%	0.0%	0.0%
R	20	15%	19.0%	15.80%	100.0%	95.0%	50.0%	70.0%	70.0%	95.0%	10.0%	10.0%
T	20	0%	17.0%	0%	95.0%	85.0%	55.0%	50.0%	55.0%	60.0%	5.0%	0.0%
U	22	0%	6.0%	0%	63.6%	27.3%	22.7%	9.1%	13.6%	0.0%	9.1%	4.5%
V	14	21.40%	9.0%	33.30%	92.9%	64.3%	50.0%	64.3%	35.7%	64.3%	0.0%	0.0%
W	25	4%	25.0%	4%	100.0%	100.0%	96.0%	100.0%	92.0%	76.0%	72.0%	72.0%
Y	30	0%	11.0%	0%	86.7%	36.7%	23.3%	20.0%	20.0%	36.7%	3.3%	3.3%

Appendix L: Indicator 8.6 summary of post field testing questionnaire responses table

Site	D	E	F	H	I	K	L	M	O	R	T	U	V	W	Y
Did you have any difficulties in collecting data for this indicator?	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes	no
Do you think the key definitions provided are adequate?	yes	no	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
Do you think the numerator provided for this measure is appropriate?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Do you think the denominator provided for this measure is appropriate?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes
Do you think the instructions for data collection are adequate?	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Do you think the suggested data sources are appropriate?	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	yes	yes	yes	yes	no	yes	yes	yes	yes	no	yes	yes	yes	no	yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	no	no	yes	no	no	yes	yes	no	yes	yes	yes	no	no	no	yes

Appendix M: Indicator 8.7 summary of collated results table

Site	Total Number of Patients Audited	% Of patients who receive a medication list	% Of the older patients who receive a medicines list, the list is current, accurate and comprehensive and includes explanations for any medication changes and details of a deprescribing plan, where applicable	Indicator 8.7 % Older patients who receive a current, accurate and comprehensive medicines list, including explanations for any medication changes and details of a deprescribing plan, where applicable	% With allergies and intolerances listed	% With all medicines to be continued or recommenced at discharge listed	% With all medicines listed using active ingredient/generic names	% With all information on the medication list provided in lay terms (without medical terminology)	% With a deprescribing plan recommended/ initiated in hospital	% With details of the deprescribing plan included in the medication list	% With information about all other medication changes provided, e.g. dose changes, new medicines	% With information about ceased medicines provided
C	15	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E	20	95.0%	26.3%	25.0%	90.0%	70.0%	70.0%	85.0%	15.0%	5.0%	80.0%	80.0%
F	19	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
G	30	3.3%	0.0%	0.0%	0.0%	3.3%	3.3%	3.3%	0.0%	0.0%	0.0%	3.3%
I	22	36.4%	87.5%	31.8%	36.4%	36.4%	31.8%	31.8%	0.0%	0.0%	31.8%	31.8%
J	22	45.5%	100.0%	45.5%	45.5%	45.5%	45.5%	45.5%	9.1%	9.1%	45.5%	45.5%
L	20	30.0%	100.0%	30.0%	30.0%	30.0%	30.0%	30.0%	0.0%	0.0%	30.0%	30.0%
O	10	30.0%	100.0%	30.0%	30.0%	30.0%	30.0%	30.0%	0.0%	0.0%	30.0%	30.0%
R	20	95.0%	26.3%	25.0%	95.0%	85.0%	90.0%	55.0%	0.0%	0.0%	45.0%	95.0%
T	20	60.0%	0.0%	0.0%	0.0%	35.0%	60.0%	55.0%	0.0%	0.0%	20.0%	50.0%
U	22	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
W	25	96.0%	0.0%	0.0%	0.0%	96.0%	96.0%	96.0%	72.0%	36.0%	84.0%	84.0%
Y	29	51.7%	40.0%	20.7%	51.7%	44.8%	31.0%	48.3%	3.4%	3.4%	37.9%	48.3%

Appendix N: Indicator 8.7 summary of post field testing questionnaire responses table

	C	E	F	G	I	J	L	O	R	T	U	W	Y
Did you have any difficulties in collecting data for this indicator?	no	yes	yes	yes	no	no	no	no	yes	yes	no	no	no
Do you think the key definitions provided are adequate?	yes	no	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes
Do you think the numerator provided for this measure is appropriate?	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Do you think the denominator provided for this measure is appropriate?	yes	yes	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes
Do you think the instructions for data collection are adequate?	yes	yes	yes	no	yes	yes	yes	yes	no	yes	yes	yes	yes
Do you think the suggested data sources are appropriate?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Would you use the result from this indicator to guide a review or change in practice in your hospital?	yes	yes	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes
Would you be comfortable using this indicator to compare your performance now with your performance at a later date?	yes	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Would you be comfortable using this indicator to compare your performance with other hospitals?	yes	no	yes	no	no	yes	yes	yes	yes	no	yes	no	yes

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Appendix O: Inappropriate Polypharmacy Risk Assessment Tool (IPRAT)

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/

Tool for use with the Polypharmacy Quality Use of Medicines Indicators

Inappropriate Polypharmacy Risk Assessment Tool (IPRAT)

This tool enables clinicians and health service organisations to categorise risk of harm from inappropriate polypharmacy and outlines recommended actions that should be taken as a result of risk categorisation.

Health Service Organisations (HSOs) may have other approved tools to assess inappropriate polypharmacy and identify patients at high risk. This tool may be amended/adapted by HSOs that do not have their own risk stratification tool.

Risk category	Identification criteria	Action required
High	The patient's admission is due to a medication-related problem* **OR** The patient is prescribed: • 10 or more medicines; **OR** • 5 or more medicines where at least one is a locally designated HRM; **OR** • a HRM with no current supporting indication^.	Referral for a hospital-based medication review. Other further medication-related interventions may also be appropriate.
Moderate	The patient is prescribed: • 5 or more but less than 10 medicines; **OR** • less than 5 medicines where at least one is a locally designated HRM.	Medication-related interventions such as medication review may be appropriate.
Low	The patient is prescribed less than 5 medicines, none of which is a locally designated HRM.	Requirement and referral for medication-related interventions to be determined by treating clinicians.

*For the purposes of this risk assessment tool, medicine-related problems do not include intentional overdoses.

^A supporting indication for a HRM should be documented in the patient's past medical or surgical histories and/or history of their presenting complaint.

HRMs are those that have a high risk of causing significant patient injury or harm (including death) if they are misused or used in error.[1-3] Medicines considered to be HRMs may vary between hospitals and other healthcare settings. It is recommended health service organisations keep a list of locally designated HRMs.

If further risk stratification is required due to limited resources for intervention, the addition of risk factors such as frailty, age over 75 years, previous ADR, recent and/or frequent hospitalisation may be added to the risk assessment.

NSW TAG QUM Indicator 8.1 provides further information about inappropriate polypharmacy and the requirements for appropriate medical record documentation of the risk assessment related to inappropriate polypharmacy. Available here: https://www.nswtag.org.au/qum-indicators/

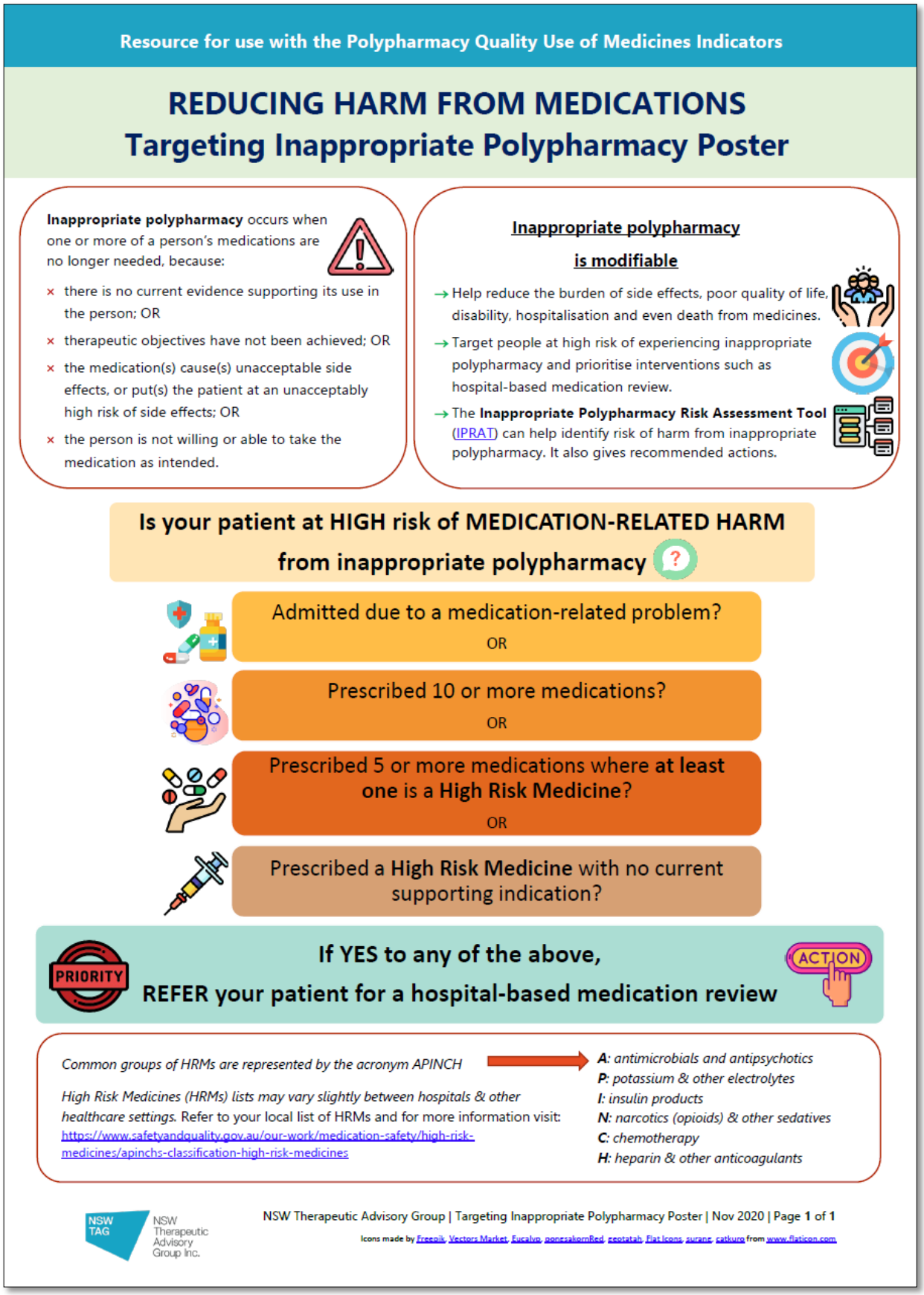
Abbreviations: HRM = High Risk Medicine; ADR= Adverse Drug Reaction; QUM = Quality Use of Medicines

References
1. The Clinical Excellence Commission (CEC). High-risk medicines [Internet]. Sydney: CEC; 2018 [cited 2020 Mar 4]. Available from: http://www.cec.health.nsw.gov.au/patient-safety-programs/medication-safety/high-risk-medicines
2. Institute for Safe Medication Practices (ISMP) list of high-alert medications in acute care settings. Pennsylvania 2018 [cited 2020 Mar 4]. Available from: https://www.ismp.org/sites/default/files/attachments/2018-08/highAlert2018-Acute-Final.pdf
3. Institute for Safe Medication Practices (ISMP) list of high-alert medications in community/ambulatory healthcare. Pennsylvania 2011 [cited 2020 Mar 4]. Available from: https://www.ismp.org/sites/default/files/attachments/2017-11/highAlert-community.pdf

NSW TAG NSW Therapeutic Advisory Group Inc.

Appendix P: Targeting Inappropriate Polypharmacy Poster

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/



Appendix Q: Medication-related Falls Risk Assessment Tool (MFRAT)

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/

Tool for use with the Polypharmacy Quality Use of Medicines Indicators

Medication-related Falls Risk Assessment Tool (MFRAT)

This tool enables categorisation of falls risk related to medication use and outlines recommended actions that should be taken as a result of risk categorisation.

Health Service Organisations (HSOs) may have other approved tools to assess medication-related falls risk and identify patients at high risk. This tool may be amended/adapted by HSOs that do not have their own risk stratification tool.

Risk category	Identification criteria			Action required
High	Patient's vFRAT category or score is high **AND** The patient is prescribed (or has had temporarily withheld during hospital admission) **2 or more FRIDs.**			Referral for a hospital-based medication review. Other further medication-related interventions may also be appropriate.
Moderate	Patient's vFRAT category or score is high **AND** The patient is prescribed (or has had temporarily withheld during hospital admission) **1 FRID.**	OR	Patient's vFRAT category or score is NOT high **AND** The patient is prescribed (or has had temporarily withheld during hospital admission) **2 or more FRIDs.**	Medication-related interventions such as medication review may be appropriate.
Low	The patient is **NOT on any FRIDs** (nor is any FRID on a temporary withheld medication list).			Non-medication-related interventions for falls reduction may still be applicable.

FRIDs include medicines causing adverse effects such as postural hypotension, drowsiness, dizziness, blurred vision or confusion.[1] See accompanying table for a list of medicines commonly associated with falls risk.

If further risk stratification is required due to limited resources for intervention, the addition of risk factors such as frailty, age over 75 years, previous ADR, recent and/or frequent hospitalisation may be added to the risk assessment.

NSW TAG QUM Indicator 8.2 provides further information about identifying risk of and preventing medication-related falls in older hospitalised patients. Available here: https://www.nswtag.org.au/qum-indicators/

Abbreviations: vFRAT = validated Falls Risk Assessment Tool; FRIDs = Fall-Risk-Increasing Drugs; ADR= Adverse Drug Reaction; QUM = Quality Use of Medicines

Reference:
1. Australian Medicines Handbook Aged Care Companion [Internet]. Adelaide: Australian Medicines Handbook Pty Ltd; 2020 [cited 2020 May]. Available from: https://agedcare.amh.net.au/chapters/musculoskeletal/fall-prevention?menu=hints

Common Fall-Risk-Increasing Drugs (FRIDs)

Disclaimer: The list provided is not exhaustive; for a more comprehensive list or further detailed information, consult medicine reference texts such as the current Australian Medicines Handbook.
Hyperlinks to relevant Australian Medicines Handbook (January 2020 edition) information are provided.

Psychotropic medicines			
Antidepressants	Monoamine oxidase inhibitors SSRIs	SNRIs Other antidepressants	Tricyclic antidepressants Comparative adverse effects
Antipsychotics	All Comparative adverse effects		
Anxiolytics/ Sedatives/ Hypnotics	Benzodiazepines	Z-drugs	Other • Suvorexant
Cardiovascular medicines			
Antiarrhythmics	• Amiodarone • Digoxin	• Flecainide • Sotalol	
Antihypertensives	ACE inhibitors Sartans Beta-blockers	Calcium channel blockers Thiazide & Related Diuretics	Other antihypertensives • Clonidine • Methyldopa • Prazosin
Heart failure medicines	Aldosterone antagonists	Loop diuretics	Other HF medicines • Ivabradine • Sacubitril with valsartan
Nitrates and other vasodilators	Nitrates	Pulmonary hypertension medicines	Other vasodilators
Other medicines			
Anticholinergics	Numerous drugs have anticholinergic effects	• Hyoscine (butylbromide & hydrobromide)	• Inhaled bronchodilators
Antihistamines	Sedating antihistamines	Less sedating antihistamines	
Parkinsonism Medicines	Dopamine agonists	Monoamine oxidase type B inhibitors	Anticholinergics • Benzatropine • Trihexyphenidyl
Opioids	All, alone or in combination		
Beta-blocker eye drops	• Betaxolol	• Timolol	
Genitourinary	Selective alpha blockers	Phosphodiesterase inhibitors	Anticholinergics
Hypoglycaemics	Sulfonylureas	Insulins	
Other	• Prochlorperazine		

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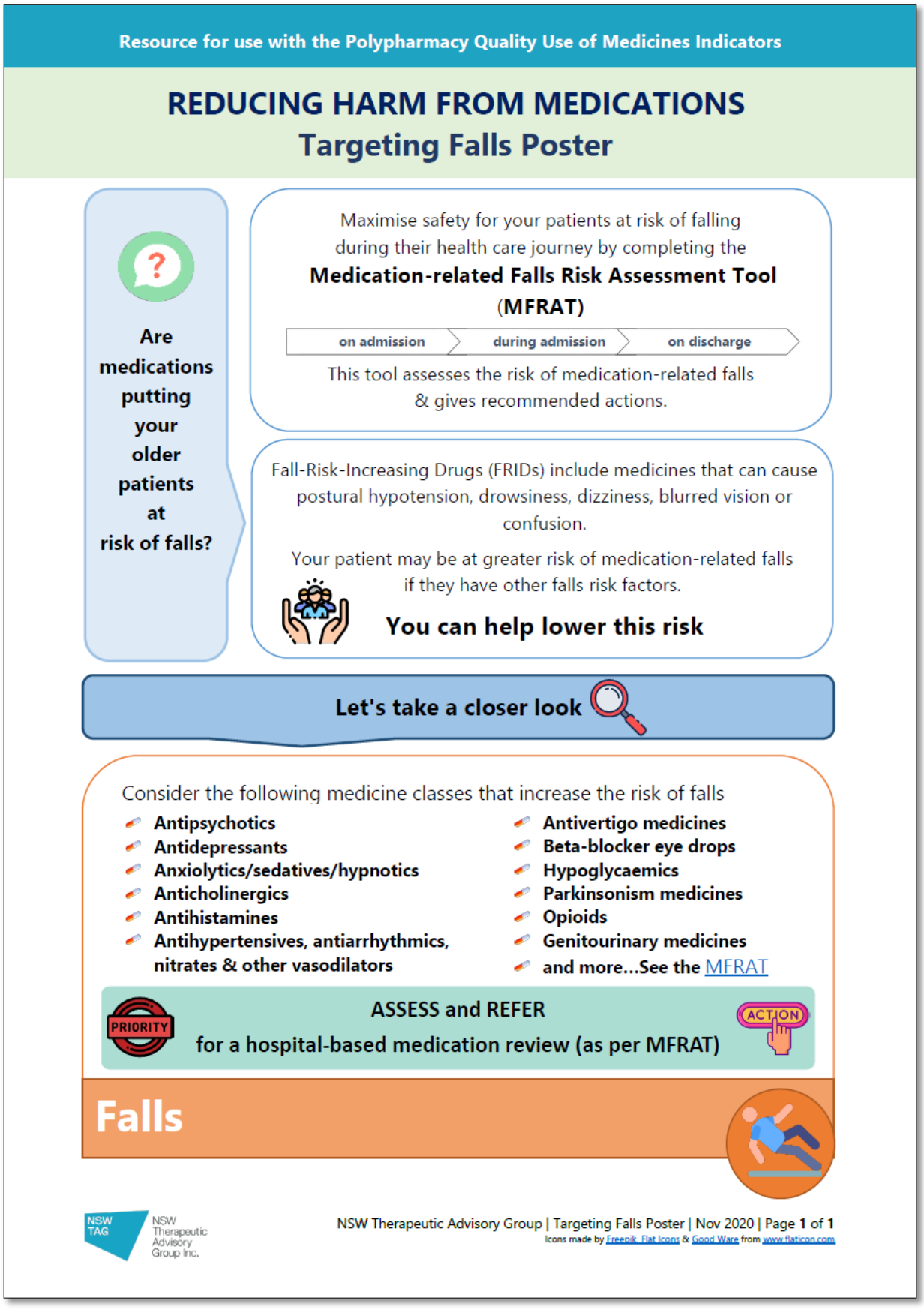
Appendix R: Targeting Falls Poster

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/



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Appendix S: Medication-related Impairment of Cognitive and/or Physical Function Risk Assessment Tool (FUN-RAT)

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/

Tool for use with the Polypharmacy Quality Use of Medicines Indicators

Medication-related Impairment of Cognitive and/or Physical Function Risk Assessment Tool (FUN-RAT)

This tool enables categorisation of impairment of cognitive and/or physical function risk related to medication use and outlines recommended actions that should be taken as a result of risk categorisation.

Health Service Organisations (HSOs) may have other approved tools to assess medication-related cognitive and/or physical function impairment risk and identify patients at high risk. This tool may be amended/adapted by HSOs that do not have their own risk stratification tool.

Risk category	Identification criteria	Action required
High	The patient is prescribed (or has had temporarily withheld during hospital admission) **2 or more anticholinergic and/or sedative medications** **OR** The patient has a calculated **DBI score greater than or equal to 1**, for those with a DBI tool.	Referral for a hospital-based medication review. Other further medication-related interventions may also be appropriate.
Moderate	The patient is prescribed (or has had temporarily withheld during hospital admission) **only 1 anticholinergic or sedative medication** **OR** The patient has a **DBI score greater than 0 and less than 1** (i.e. 0 < DB I < 1), for those with a DBI tool.	Medication-related interventions such as medication review may be appropriate.
Low	The patient is prescribed (or the list of temporarily withheld medicines during hospital admission contains): **No anticholinergic or sedative medications** **OR** **The patient has a DBI score of 0**, for those with a DBI tool.	Non-medication-related interventions for reducing the risk of cognitive and/or physical impairment may still be applicable.

See accompanying table for a list of anticholinergic and central nervous system (CNS) medicines commonly associated with impairment of cognitive and/or physical impairment risk. Some medicines have both anticholinergic and sedative properties. Some medications associated with delirium may not have anticholinergic or sedative properties, for example, corticosteroids.

If further risk stratification is required due to limited resources for intervention, the addition of risk factors such as frailty, age over 75 years, previous ADR, recent and/or frequent hospitalisation may be added to the risk assessment.

NSW TAG QUM Indicator 8.3 provides further information about risks of medication-related impairment of cognitive and/or physical function. Available here: https://www.nswtag.org.au/qum-indicators/

Abbreviations: DBI = Drug Burden Index; ADR = Adverse Drug Reaction; QUM = Quality Use of Medicines

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Common Medicines Associated with Impairment of Cognitive and/or Physical Function in Older Persons

Disclaimer: The list provided is not exhaustive; for a more comprehensive list or further detailed information, consult medicine reference texts such as the current Australian Medicines Handbook.
Hyperlinks to relevant Australian Medicines Handbook (January 2020 edition) information are provided.

Antiepileptic medicines	• Phenytoin	• Carbamazepine	• Valproate
Antidepressants	Tricyclic antidepressants Comparative adverse effects	Other antidepressants • Mianserin • Mirtazapine	
Antihistamines	Sedating antihistamines	Less sedating antihistamines	
Parkinsonism Medicines	• Levodopa • Amantadine • Entacapone	Dopamine agonists • Bromocriptine • Rotigotine	Anticholinergics • Benzatropine • Trihexyphenidyl
Antipsychotics	All Comparative adverse effects		
Anxiolytics/ Sedatives/ Hypnotics	Benzodiazepines	Z-drugs	
Gastro-intestinal medicines	• Hyoscine (hydrobromide or butylbromide)	• Prochlorperazine	
Genitourinary medicines	• Anticholinergics		
Opioids	All, alone or in combination		
Other	• Orphenadrine	• Pizotifen	

References:
1. Australian Medicines Handbook Aged Care Companion [Internet]. Adelaide: Australian Medicines Handbook Pty Ltd; 2020 [cited 2020 Mar]. Available from: https://agedcare.amh.net.au/appendices/appendix-anticholinergic-drugs
2. Australian Medicines Handbook [Internet]. Adelaide: Australian Medicines Handbook Pty Ltd; 2020 [cited 2020 Mar]. Available from: https://amhonline.amh.net.au/

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Appendix T: Targeting Cognitive & Physical Functioning Poster

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/

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Appendix U: Summary Tool: Criteria to Identify Patients at High Risk of Medication-Related Harm

Download the original document here: https://www.nswtag.org.au/polypharmacy-qum-indicators-and-resources/

Tool for use with the Polypharmacy Quality Use of Medicines Indicators

Criteria to Identify Patients at High Risk of Medication-Related Harm

This tool provides criteria to identify patients at high risk of medication-related harm. These patients should receive a hospital-based medication review (HBMR). In the event that a HBMR cannot be undertaken, a post-discharge medication review recommendation or referral should occur. In some circumstances, both hospital-based and post-discharge medication reviews may be appropriate.

This tool assists identification of sample patients when undertaking audits using NSW TAG QUM Indicators 8.4 and 8.5.

Health Service Organisations (HSOs) may have other approved tools to assess inappropriate polypharmacy and identify patients at high risk. This tool may be amended/adapted by HSOs that do not have their own risk stratification tool.

Types of medication-related harm	High risk criteria	Comments
Inappropriate polypharmacy	The patient's admission is due to a medication-related problem* **OR** The patient is prescribed: • 10 or more medicines; **OR** • 5 or more medicines where at least one is a locally designated HRM; **OR** • a HRM with no current supporting indication^.	See NSW TAG QUM Indicator 8.1 & NSW TAG IPRAT
Medication-related falls	Patient's vFRAT category or score is high **AND** The patient is prescribed (or has had temporarily withheld during hospital admission) **2 or more FRIDs.**	See NSW TAG QUM Indicator 8.2 & NSW TAG MFRAT
Medication-related cognitive and/or physical functional impairment	The patient is prescribed (or has had temporarily withheld during hospital admission) **2 or more anticholinergic and/or sedative medications** **OR** The patient has a calculated **DBI score greater than or equal to 1**, for those with a DBI tool.	See NSW TAG QUM Indicator 8.3 & NSW TAG FUN-RAT

*For the purposes of this risk assessment tool, medicine-related problems do not include intentional overdoses.

^A supporting indication for a HRM should be documented in the patient's past medical or surgical histories and/or history of their presenting complaint.

If further risk stratification is required due to limited resources for intervention, the addition of risk factors such as frailty, age over 75 years, previous ADR, recent and/or frequent hospitalisation may be added to the risk assessment.

See NSW TAG QUM Indicators 8.1 – 8.3 for further information about risks of medication-related harm. Available here: https://www.nswtag.org.au/qum-indicators/

Abbreviations: HRM = High Risk Medicine; QUM – Quality Use of Medicines; FRIDs = Fall-Risk-Increasing Drugs; DBI = Drug Burden Index; ADR = Adverse Drug Reaction

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Appendix V: Post field testing questionnaire

NSW Therapeutic Advisory Group

Field testing of polypharmacy indicators

The polypharmacy indicators which you are field testing are undergoing a developmental process that will end with an updated set of indicators that address significant gaps in the management of inappropriate polypharmacy in older hospitalised Australian patients.

The aims of this evaluation are to:
- test measurability of the indicators
- ensure the indicator specifications are clear
- assess indicator usefulness including suitability for intra- and inter-hospital comparisons
- explore innovative methods for collection of indicator measures

Your feedback is essential in ensuring the indicators meet the stringent criteria that have been set. Please review these questions prior to field testing and consider your responses during the field test and as issues or ideas arise. **Please complete a separate questionnaire for each indicator you have tested.**

Please contact the project team if you need any help during the field test period.

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INDICATOR NAME / NUMBER: _____

Q1: Having collected data for this indicator, what do you think this data actually measures?

_____

Regarding the process of collecting data for this indicator:

Q2: How many records were in your sample? _____

Q3: How long did data collection take per record (in minutes)? _____

Q4: What was/were your data source/s for this indicator? _____

Q5: Which disciplines were involved in collecting data for this indicator? _____

Q6: Did you have any difficulties in collecting data for this indicator? _____

Circle answer: Yes / No

If yes, please explain what these were and suggest how they could be overcome

_____

_____

Regarding the information provided on the specifications sheet:

Q7: Do you think the key definitions provided are adequate?

Circle answer: Yes / No

If no, please explain why and include suggestions for any changes needed to achieve this goal.

_____

_____

Q8: Do you think the numerator provided for this measure is appropriate?

Circle answer: Yes / No

If no, please explain why and suggest a better alternative

_____
_____

Q9: Do you think the denominator provided for this measure is appropriate?

Circle answer: Yes / No

If no, please explain why and suggest a better alternative

_____
_____

Q10: Do you think the instructions for data collection are adequate?

Circle answer: Yes / No

If no, please explain why and include suggestions for any changes needed to achieve this goal.

_____
_____

Q11: Do you think the suggested data sources are appropriate?

Circle answer: Yes / No

If no, please explain why

_____
_____

Q12: Please suggest alternative or additional data sources that may be more accurate and / or easily collected routinely

_____
_____

Q13: Please suggest any other automated or simpler way of collecting data routinely e.g. through use of your hospitals electronic discharge referral system or through software downloaded on to personal digital assistants for concurrent data collection (even if such systems do not currently exist in your hospital)

_____
_____

Regarding the usefulness of this indicator:

Q14: Would you use the result from this indicator to guide a review or change in practice in your hospital?

Circle answer: Yes / No

If no, please explain why and include suggestions for any changes needed to achieve this goal.

_____
_____

Q15: Would you be comfortable using this indicator to compare your performance now with your performance at a later date?

Circle answer: Yes / No

If no, please explain why and include suggestions for any changes needed to achieve this goal.

_____
_____

Q16: Would you be comfortable using this indicator to compare your performance with other hospitals?

Circle answer: Yes / No

If no, please explain why and include suggestions for any changes needed to achieve this goal.

_____
_____

Q17: What would facilitate regular use of this indicator in your hospital?

_____
_____

Q18: Based on your experience with this indicator, please outline any other suggestions you have for improving this indicator in the space below.

_____
_____

Q19: Do you have any other comments about this indicator?

_____
_____

THANK YOU FOR YOUR HELP

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