AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

TRIM: D19-15616

May 2019

National Standard Medication Chart

National audit technical report 2018

Published by the Australian Commission on Safety and Quality in Health Care
Level 5, 255 Elizabeth Street, Sydney NSW 2000

Phone: (02) 9126 3600
Fax: (02) 9126 3613

Email: mail@safetyandquality.gov.au
Website: www.safetyandquality.gov.au

ISBN: 978-1-925665-93-2

The Commission's preference is that you attribute this publication (and any material sourced from it) using the following citation:

> Australian Commission on Safety and Quality in Health Care. National Standard Medication Chart – National audit technical report 2018. Sydney: ACSQHC; 2019

Disclaimer

The content of this document is published in good faith by the Australian Commission on Safety and Quality in Health Care for information purposes. The document is not intended to provide guidance on particular healthcare choices. You should contact your health care provider on particular healthcare choices.

The Commission does not accept any legal liability for any injury, loss or damage incurred by the use of, or reliance on, this document.

Contents

Introduction

This report outlines the findings and recommendations of the National Standard Medication Chart (NSMC) national audit 2018. Where appropriate, the report also references previous audits of the National Inpatient Medication Chart (NIMC)[1]. The audit indicators are also linked to the National Safety and Quality Health Service (NSQHS) Standard 4: Medication Safety[2] and National QUM Indicators for Australian Hospitals[3] (Appendix 1).

Context

The Australian Commission on Safety and Quality in Health Care (the Commission) provides stewardship of the NSMC, in collaboration with the medication safety community in the public and private sector. The NSMC includes the Pharmaceutical Benefits Scheme hospital medication chart (PBS HMC) and the NIMC[*]. The Commission is advised on this stewardship role by an expert representative group: the Health Services Medication Expert Advisory Group (HSMEAG). The focus of this audit is to drive local safety and quality improvements in medicines management through the use of the NSMC. This aligns to the four priority areas of the Commission's Strategic Plan 2014–2019[4]:

- Patient safety
- Partnering with patients, consumers and communities
- Quality, cost and value
- Supporting health professionals to provide safe and high-quality care.

Background

The NIMC was established through the Australian Health Ministers' Advisory Council in 2007. National audits of the NIMC were conducted annually for the period 2009–2012. This audit was last conducted in 2014[1]. When the Pharmaceutical Benefits Scheme hospital medication chart (PBS HMC) was implemented in 2016, a new audit system was required.

In 2017, the Commission appointed NPS MedicineWise to undertake a review of the NIMC audit materials. This review focused on enabling hospitals to drive safety and quality improvements through the use of the NSMC which includes the NIMC and PBS HMC[*]. The revised materials were used to build a new NSMC audit module[†]. These materials included refined best practice indicators (Appendix 1).

The new online audit module was developed to streamline data collection and reporting for the 2018 national audit. It was designed to be user friendly, accessible and compatible with mobile and tablet devices. Participating hospitals are able to generate their own reports following the national audit. The module could also be used to conduct separate local audits at the discretion of the local organisation outside of the national audit period. Local audits could be customised based on the needs of the organisation. The *NSMC Audit System* is accessible on a secure web page on the Commission's website[§].

[*] https://www.safetyandquality.gov.au/our-work/medication-safety/medication-charts/
[†] https://www.safetyandquality.gov.au/our-work/medication-safety/nsmc-audit/
[§] https://nsmc.safetyandquality.gov.au/Login/?ReturnUrl=%2fUI%2f

Objective

The 2018 national audit report is focused on compliance with NSMC safety features and best practice indicators.

The NSMC audit report aims to:

- Determine compliance with the NSMC safety features in hospitals
- Identify if there are specific aspects of the NSMC or the audit process that might require modification
- Identify other medication safety considerations for the Commission's HSMEAG.

The NSMC audit system enables participating hospitals to produce their own report for internal reporting purposes. Participating hospitals are able to use the audit system to:

- Obtain a baseline measurement of the quality of NSMC chart use and identify areas for local medication management improvement
- Evaluate the effectiveness of local medication management quality improvement initiatives
- Identify any local prescribing and medicine administration behaviours that could be improved.

Scope

The audit results provide a snapshot of in-hospital prescribing on admitted individual patient charts and use of the NSMC safety features to evaluate the current level of compliance with NSMC safety features and best practice indicators. The clinical appropriateness of medicine, route, dose and frequency, and patient outcomes were not examined.

Australian hospitals and day procedure centres using a conforming NSMC were invited to participate in the NSMC national audit. The charts[*] included in the audit were:

- PBS HMC (acute)
- PBS HMC (long-stay)
- NIMC (acute)
- NIMC (long-stay)
- NIMC (paediatric)
- NIMC (paediatric long-stay).

The NSMC audit is not designed to audit specialised medication charts. The charts[*] not included in the audit were:

- National Subcutaneous Insulin Chart
- NIMC (clozapine)
- National Residential Medication Chart
- Six page versions of the NSMC (as the standard NSMC is only four pages)
- Other medication charts which do not conform to the NSMC.

Electronic medication management (EMM) systems were not part of the NSMC national audit.

[*] https://www.safetyandquality.gov.au/our-work/medication-safety/medication-charts/

Audit Framework

The NSMC audit is a prospective study of prescribing and administering documentation. The *NSMC Audit System* is accessible on a secure web page on the Commission's website[*].

Support tools available for auditing the NSMC include[†]:

- NSMC audit form
- NSMC auditing guide
- NSMC audit system user guide
- NSMC audit system – Reporting user guide for coordinators.

Instructional videos are also available for the NSMC audit system[†]:

- NSMC audit system video tutorial – Part 1 – User registration
- NSMC audit system video tutorial – Part 2 – Logging in and resetting passwords
- NSMC audit system video tutorial – Part 3 – Creating audits and entering audit data
- NSMC audit system video tutorial – Part 4 – Generating reports (for coordinators only).

It was recommended that a multidisciplinary team conduct the audit to reflect the way in which clinicians use the NSMC. Auditors were asked to work in pairs to eliminate bias from the assessment of audit questions. These pairings ideally included a nurse working with either a doctor or a pharmacist.

Participating hospitals were encouraged to audit all NSMCs. A sampling method was recommended when all NSMCs could not be audited (Table 1).

Table 1: Suggested hospital audit sample size

Number of adult beds in hospital	Sample size
150 or more	20% of current individual patient charts
30-149	30 current individual patient charts
Less than 30	All current individual patient charts

Where sampling was used, the selection of clinical units within each hospital may introduce factors that can influence audit results, including variation in the complexity and volume of prescribing. These factors are not taken into account in this report.

All available NSMCs on the selected wards were audited. All medicine orders on active NSMCs were reviewed, including those cancelled or previously changed.

The national audit was conducted between 1 October to 31 October 2018 for all participating hospitals across states and territories, including private hospitals.

[*] https://nsmc.safetyandquality.gov.au/Login/?ReturnUrl=%2fUI%2f
[†] https://www.safetyandquality.gov.au/our-work/medication-safety/nsmc-audit/

Findings of the NSMC national audit 2018

The findings of the NSMC national audit 2018 are presented in relation to identified best practice indicators reflecting individual NSMC safety features. The report references the 2014 NIMC audit[1]. The report links the best practice indicators to the NSQHS Standard 4: Medication Safety[2] and National QUM Indicators for Australian Hospitals[3] (Appendix 1).

Breakdown of hospital participation in the audit

Three hundred and sixty one hospitals from all states and territories participated in the 2018 NSMC audit held in October. The number of hospitals participating in the NSMC audit fell by 8% compared to the previous 2014 NIMC audit[1]. Increased implementation of EMM systems, particularly in New South Wales may have contributed to this participation decline.

The breakdown of hospital participation by state and funding was identified (Table 2).

Table 2: Hospital participation by state and funding

Hospital Type	State	Total
Public Hospitals (Total 295)	NSW	37
	Vic	50
	Qld	86
	SA	60
	WA	43
	Tas	17
	NT	0
	ACT	2
Private Hospitals (Total 66)	NSW	16
	Vic	13
	Qld	19
	SA	8
	WA	6
	Tas	2
	NT	1
	ACT	1

Breakdown of responses at the patient level from the audit

The 2018 NSMC audited 10,608 individual patient charts. This comprised 8,319 responses from public and 2,289 responses from private hospitals and can be viewed by state (Table 3).

Table 3: Total number of audit responses at the patient level by state

State	Public hospital responses	Private hospital responses	Total responses
NSW	1,352	581	1,933
Vic	1,393	386	1,779
Qld	2,637	631	3,268
SA	1,332	216	1,548
WA	1,237	293	1,530
Tas	285	67	352
NT	0	30	30
ACT	83	85	168

The NSMC national audit includes six different chart types. Responses can also be classified by chart type used (Table 4).

Table 4: Chart types and patient demographics audited

Chart type	Count (by response)	Audited patient demographic
PBS HMC (acute)	1,631	9,739 individual adult patient charts
PBS HMC (long-stay)	484	
NIMC (acute)	6,180	
NIMC (long-stay)	1,454	
NIMC (paediatric long-stay)	106	869 individual paediatric patient charts
NIMC (paediatric)	753	

NSMC Safety Features and Best Practice Indicators

The NSMC national audit comprises fourteen sections. Each section audits a particular safety feature of the NSMC. Medicine errors are associated with sub-optimal use of the NSMC safety features (Table 5).

Table 5: Medicine errors associated with sub-optimal use of the NSMC safety features

Safety Feature	Medicine Error
Patient Identification	Patient wrongly identified and receives unintended medicine
Prescriber details	Delay in therapy due to inability to clarify medicine order with prescriber
Weight Documentation	Wrong dose administered to the patient resulting in the an overdose or under-dose of a medicine
Adverse drug reactions (ADR)	Re-exposure of patients to a medicine or similar class of medicines previously causing an ADR
Medication History	Discontinuity of appropriate therapy, or inappropriate recommencement of previously ceased medicine
VTE risk assessment and VTE prophylaxis	Patient does not receive appropriate VTE prophylaxis and develops a deep vein thrombosis
Pharmaceutical review	Medicine error e.g. drug interaction not detected resulting in adverse outcomes for the patient
Chart numbering	Patient misses essential therapy as documentation unknowingly incomplete
Anticoagulant education record	Patient incorrectly uses anticoagulant resulting in harm as clinician unaware counselling had not been provided
Regular medicine orders	Patient receives incorrect medication, or intended medication via incorrect route, frequency or duration
PRN medicine orders	Patient receives incorrect medication, or intended medication via incorrect route, frequency or duration
Once only, nurse initiated and phone orders	Patient receives incorrect medication, or intended medication via incorrect route, frequency or duration
Variable dose medicine orders	Patient receives incorrect medication, or intended medication via incorrect route, frequency or duration
Orders in warfarin section	Patient receives and incorrect dose of warfarin resulting in harm

The findings for indicators which reflect each NSMC safety feature are presented in this report.

Patient Identification

Incomplete or illegible patient identification on any page of a medication chart presents a risk that a medicine is administered to the incorrect patient. The NSMC provides space for patient identification on each page and where a patient identification sticker is used, there is room for the prescriber to confirm the patient details by handwriting the patient's last name.

From the 2018 national audit, patient identification was completed correctly in full on all pages for 32% of individual patient charts (Figure 1). This is reflective of 33% of charts having the patient name handwritten by the first prescriber when a patient identification sticker was in use (Figure 2). Patient identification was included on 90% of charts irrespective of whether it was completed in full. This indicates a potential practice gap for the use of the handwritten surname confirmation safety feature when an identification sticker is used.

Figure 1: Patient identification completed correctly in full on all pages

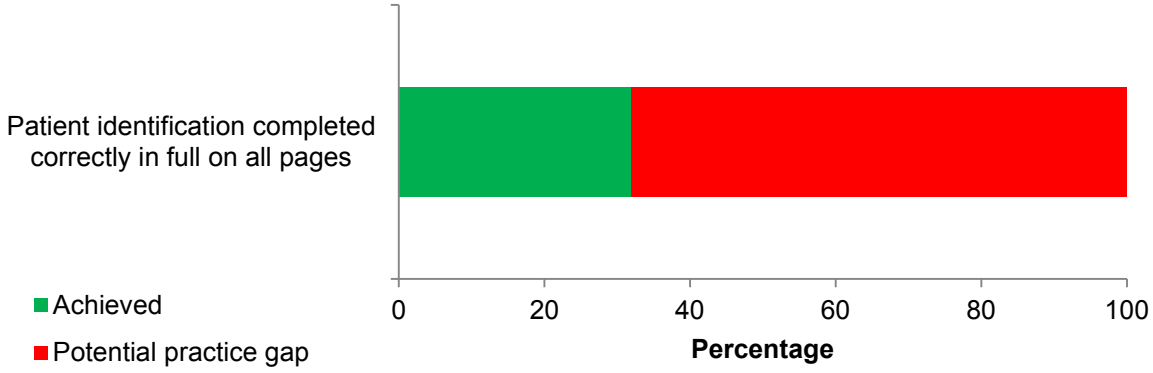
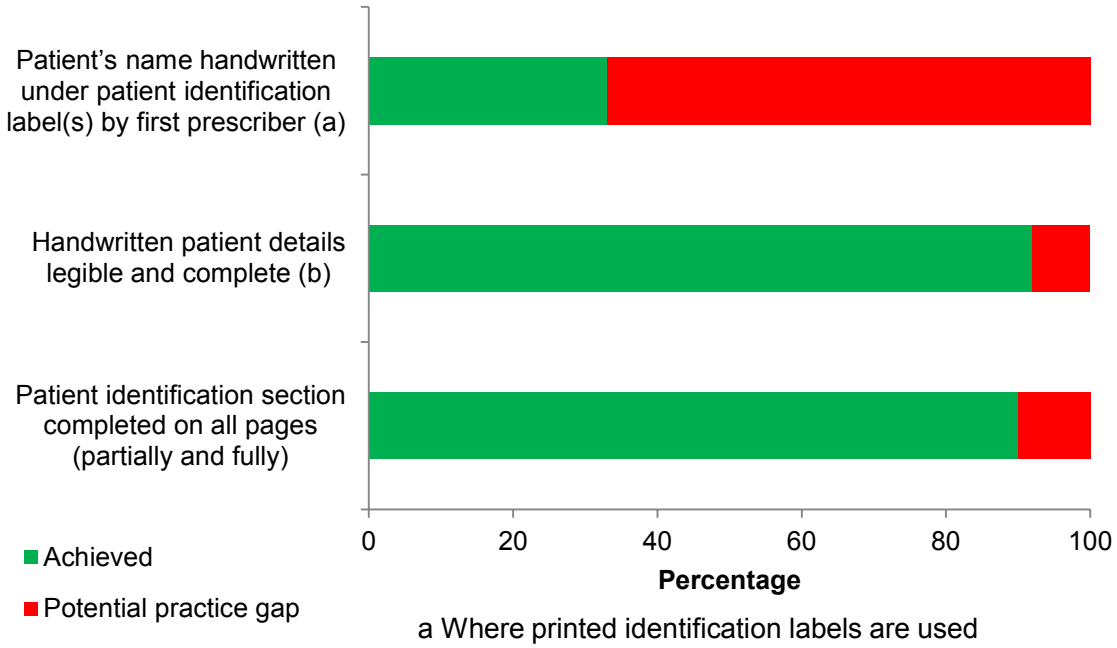


Figure 2: Components of patient identification completion



a Where printed identification labels are used
b Where patient details are handwritten

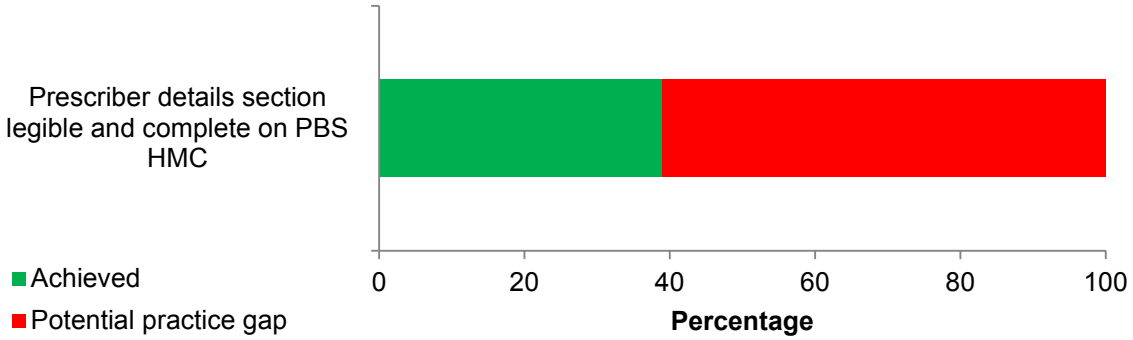
The NIMC 2014 national audit reported that complete patient ID on all pages of medication chart was seen for 46.1% of individual patient charts[1].

Prescriber details

On the PBS HMC, full prescriber details are required in order to confirm the prescriber's authority to prescribe and to provide contact details if follow up is required.

The 2018 national audit shows the prescriber details section was legible and complete for 39% of individual PBS HMC's (Figure 3). This chart was implemented in 2016 and with increased familiarity, it is expected that greater compliance with this feature will be seen.

Figure 3: Prescriber details section legible and complete on PBS HMC



Weight Documentation

Dosage errors are one of the most common medication errors in paediatric patients. A current and accurate weight should be available at the point of prescribing so that weight based doses can be calculated by clinicians. The date the weight was recorded is important as a paediatric patient's weight can change during admission.

The weight and date the child was weighed was documented for 49% of individual NIMC paediatric charts for patients aged 12 years and under (Figure 4). When excluding the date the patient was weighed, the weight was documented on all NIMC paediatric charts for 87% of NIMC paediatric charts (Figure 5). This identifies a potential practice gap of documenting the date the child was weighed.

Figure 4: Weight and date child weighed documented on all NIMC paediatric for patients aged 12 years and under

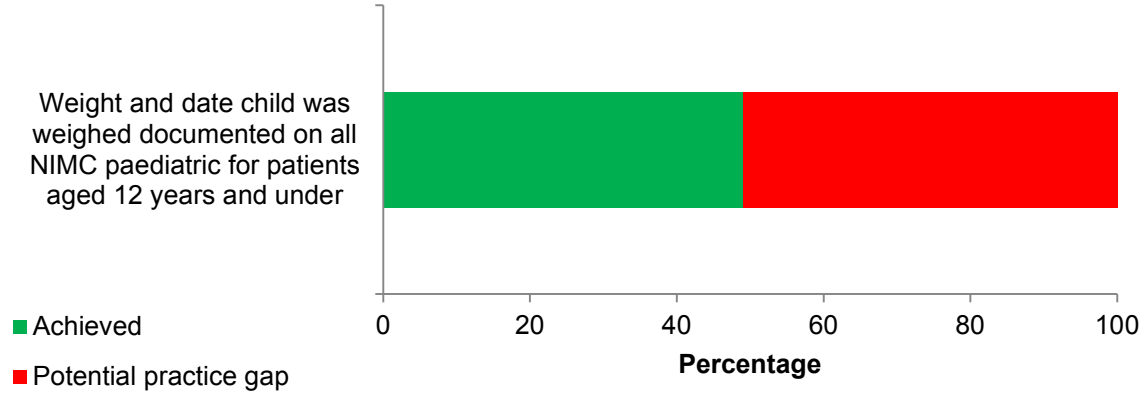
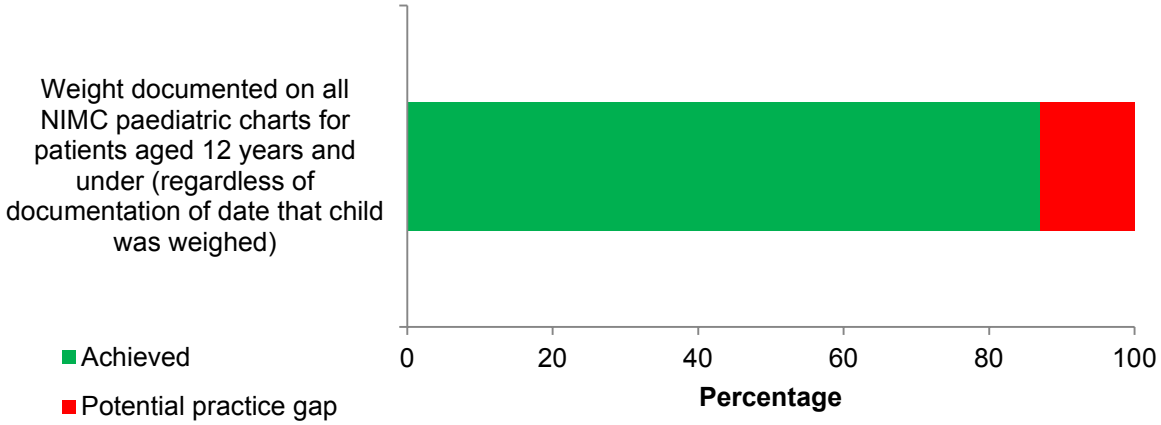


Figure 5: Weight documented on all NIMC paediatric charts for patients aged 12 years and under (regardless of documentation of date that child was weighed)



In the 2014 national audit of the NIMC, the weight was documented on 80% of paediatric medication charts[1].

Adverse drug reactions (ADR)

Complete documentation of ADR information prevents patient harm by alerting clinicians and avoiding the prescribing, dispensing or administration of a medicine, or similar that has previously caused an ADR.

Complete and correct ADR details were documented on all charts for 74% of individual patient charts (Figure 6). Where the patient had reported ADRs documented on the NSMC, 58% of charts had the medicine and reaction type documented and signed by the clinician documenting (Figure 7). For patients with a documented ADR, 67% of charts had the medicine and reaction type documented (Figure 7). Documentation of the medicine, reaction type and prescriber details is a potential practice gap in the use of the ADR section.

Figure 6: ADR details documented completely and correctly on all charts

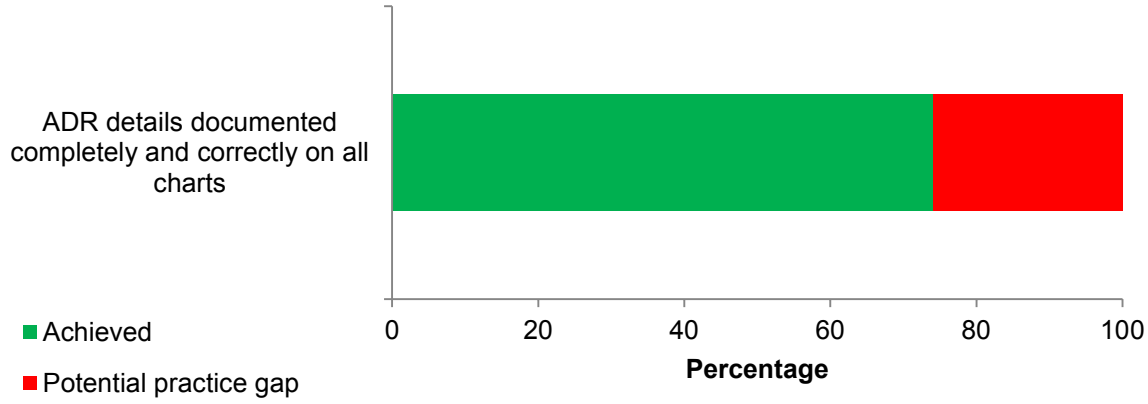
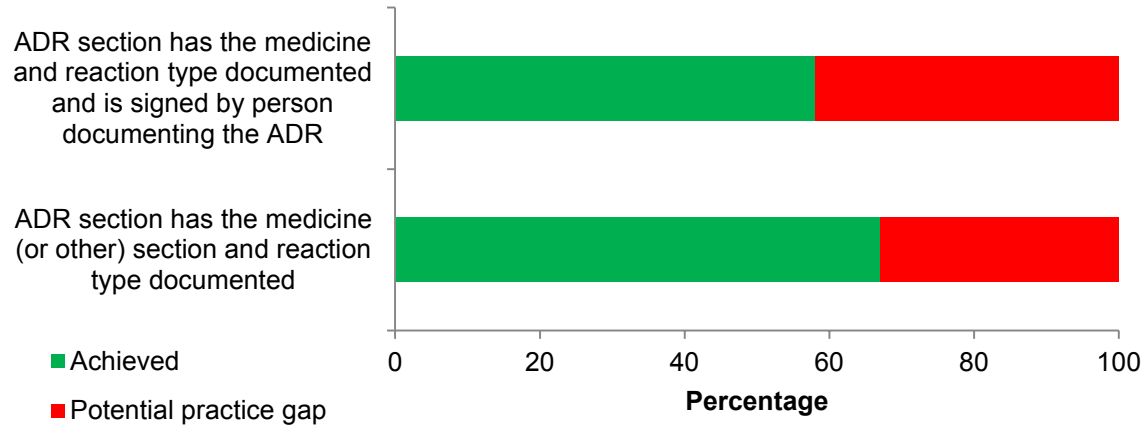


Figure 7: ADR section and medicine, reaction type, and signature of the person documenting



In 2014, the national audit of the NIMC reported that 83% of individual patient charts had a complete ADR history documented on the NIMC[1].

Medication History

Accurate information on medicines taken prior to admission should be available to clinicians at the point of prescribing. This informs decisions about treatment and improves safety and quality of care. Documented medication history details can prevent unintentional medication errors which are common during transitions of care and can often cause patient harm.

The medication history was either documented on the chart or documented elsewhere and cross-referenced on 44% of individual patient charts (Figure 8). For 37% of charts the history was documented elsewhere and cross-referenced, while for 7% it was documented on the chart. For those charts with the medication history documented elsewhere according to local protocol, 64% had the history cross-referenced with the NSMC (Figure 9). A potential practice gap exists with documenting or cross-referencing the medication history on the NSMC.

Figure 8: Documentation of medication history

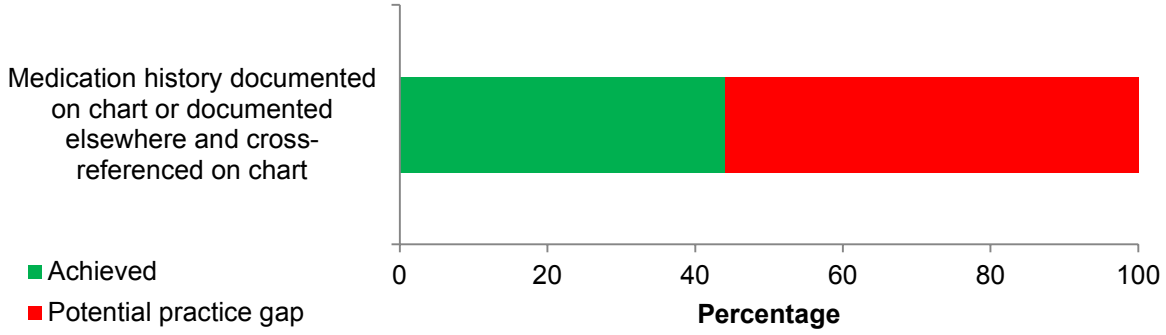
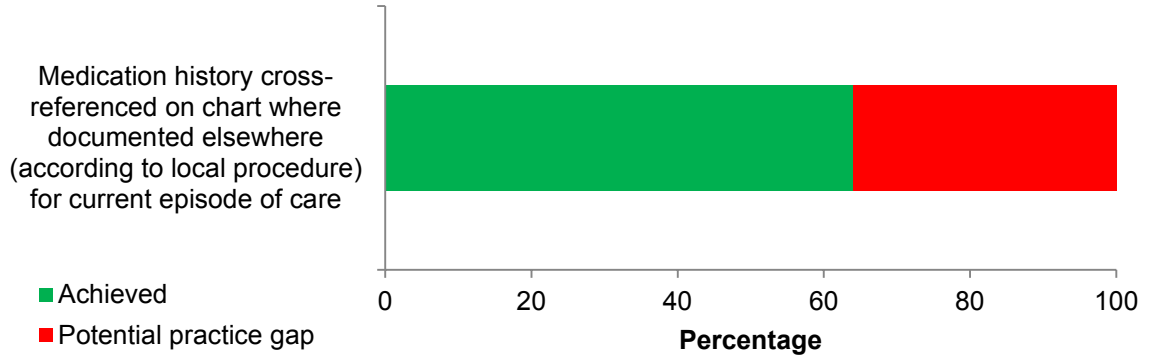


Figure 9: Medication history cross-referenced on chart where documented elsewhere (according to local procedure) for current episode of care



The 2014 national audit of the NIMC indicates that a documented medication history (on the NIMC or Medication Management Plan form) was accessible for 36.5% of individual patient charts[1].

VTE risk assessment and VTE prophylaxis

Reducing the rate of hospital-associated VTE is a national safety and quality priority. Preventative measures are effective and there is high potential to improve safety and quality of care.

For the NIMC acute or PBS HMC acute, 9% of charts had a complete VTE risk assessment documented and where indicated prophylaxis prescribed (Figure 10). This indicates a potential practice gap with the use of the VTE risk assessment section of the NSMC. Where VTE prophylaxis was prescribed, on 89% of charts it was prescribed in the VTE prophylaxis order section only (Figure 11), which suggests good compliance with the use of this NSMC safety feature.

Figure 10: VTE risk assessment completed and where indicated prophylaxis prescribed

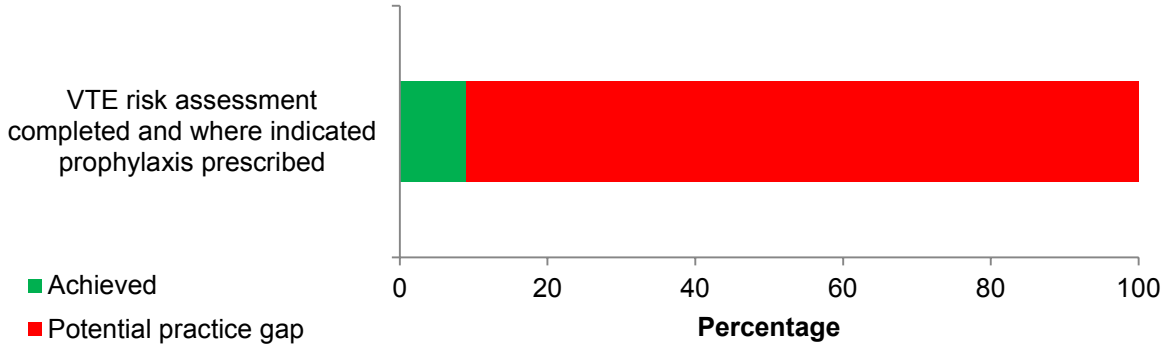
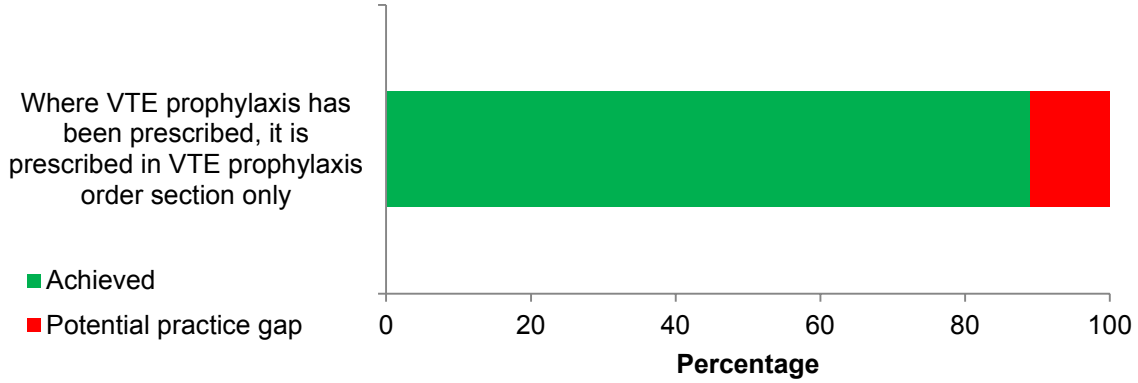


Figure 11: Where VTE prophylaxis has been prescribed, it is prescribed in VTE prophylaxis order section only



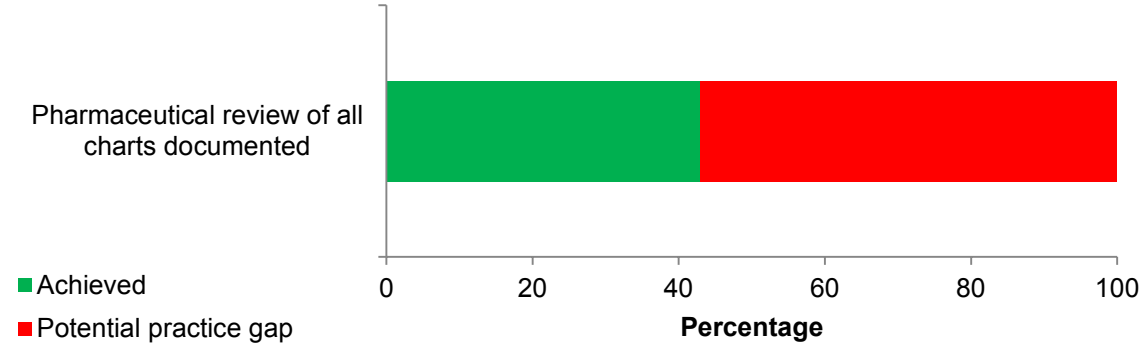
In the NIMC 2014 national audit, it was found that for VTE prophylaxis orders, 80.9% were documented in the designated VTE prophylaxis section[1].

Pharmaceutical review

Clinical review of a medication chart by pharmacists reduces the risk of patient harm from preventable medication errors.

The findings of the NSMC national audit show that for 43% of charts, pharmaceutical review has been documented at least once on all charts (Figure 12). This suggests a potential practice gap of documenting pharmaceutical review on the NSMC.

Figure 12: Pharmaceutical review of all charts documented



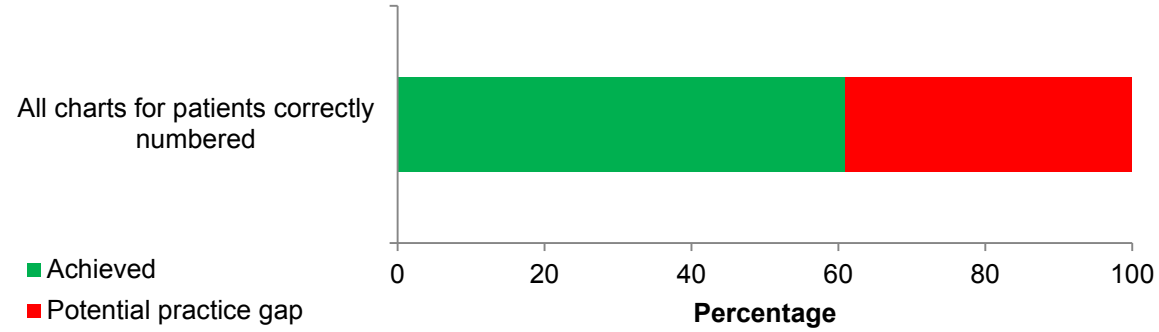
The 2014 national audit of the NIMC indicates that pharmaceutical review was documented in current medication charts for 45.9% of individual patient charts[1].

Chart numbering

Correct chart numbering reduces medication errors and promotes patient safety by ensuring clarity about available clinical information particularly when multiple charts are in use.

Of all individual patient charts, 61% were correctly numbered (Figure 13) revealing a potential practice gap for improvement.

Figure 13: All charts for patients correctly numbered

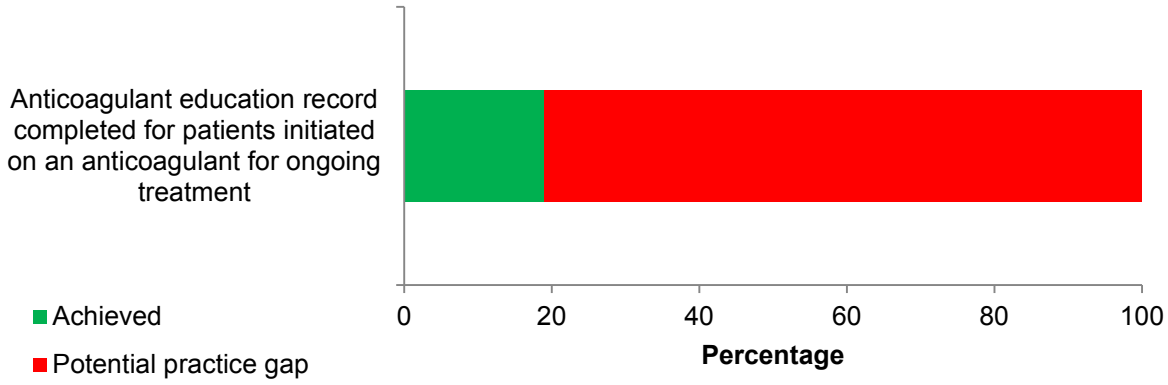


Anticoagulant education record

There are documented risks with anticoagulant use and all patients using therapeutic anticoagulation should receive structured verbal and written education. Documentation of this education ensures clinicians are aware that it has been completed.

When a patient was initiated on an anticoagulant for ongoing treatment, 19% of charts had a completed education record (Figure 14) thus identifying a potential practice gap for the use of this NSMC safety feature.

Figure 14: Anticoagulant education record completed for patients initiated on an anticoagulant for ongoing treatment



Medicine Orders

The medicine order should be complete and correct to reduce the risk of misinterpretation by clinicians responsible for dispensing, administering and transcribing orders. Intended medicine, formulation, dose, frequency and indication, where appropriate, should be included.

In 53% of individual patient charts, all medicine orders were complete and correct (Figure 15). This can be broken down by chart section (Figure 16):

- 29% of charts had PRN medicine orders complete and correct
- 47% of charts had variable dose medicine orders complete and correct
- 54% of charts had warfarin orders complete and correct
- 56% of charts had once only, nurse initiated and phone orders complete and correct
- 62% of charts had regular medicine orders complete and correct.

The percentages of medicine orders not complete and correct reveals a potential practice gap.

Figure 15: All medicine orders complete and correct

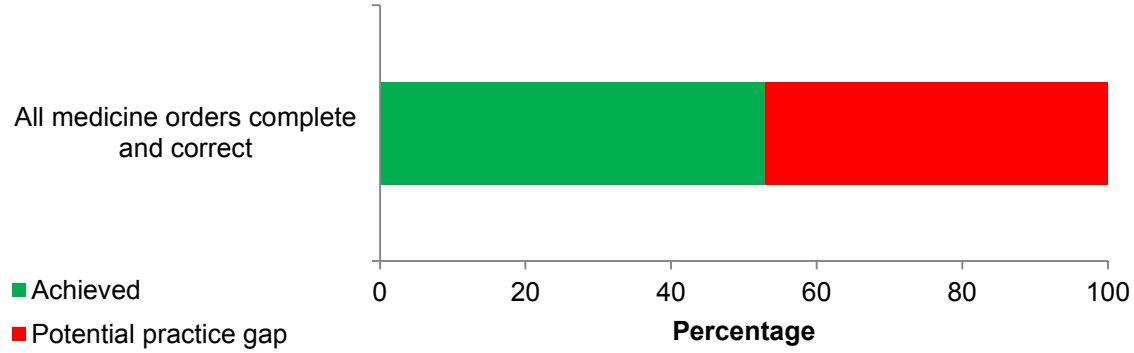
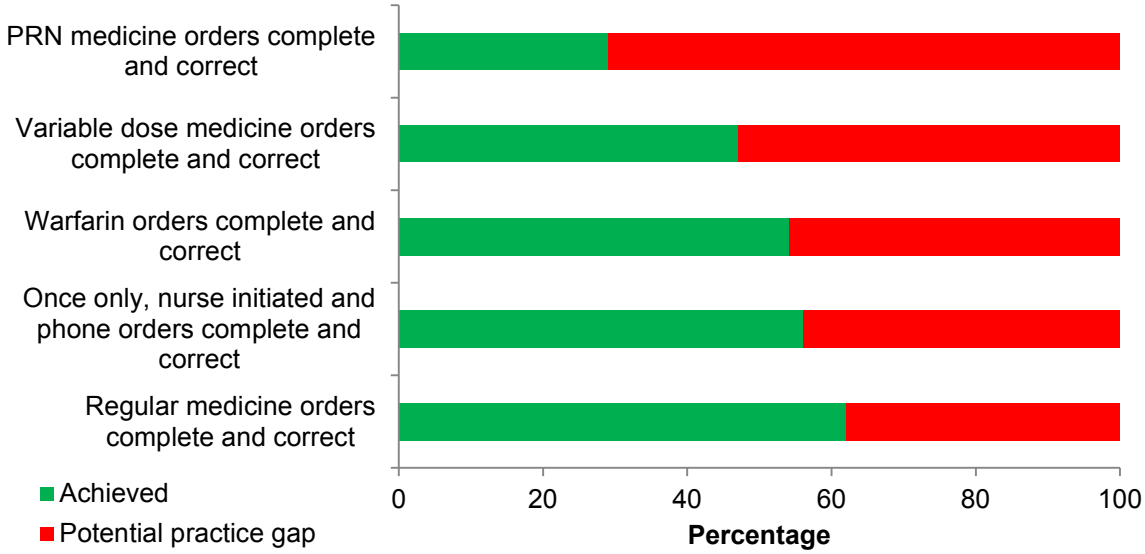


Figure 16: All medicine orders complete and correct by chart section



Documentation of the indication of therapy is important to assist clinicians to make an assessment on the appropriateness of therapy at the point of dispensing, administering and transcribing orders.

The indication was documented on all medicine orders for 33% of individual patient charts (Figure 17). Chart sections which require indication documentation were noted (Figure 18):

- 26% of charts had the indication documented for regular medicine orders
- 37% of charts had the indication documented for variable dose medicine orders
- 49% of charts had the indication documented for PRN medicine orders
- 75% of charts had the indication documented for warfarin orders.

Documentation of indication for all relevant sections of the NSMC is a practice gap.

Figure 17: Indication documented on all medicine orders

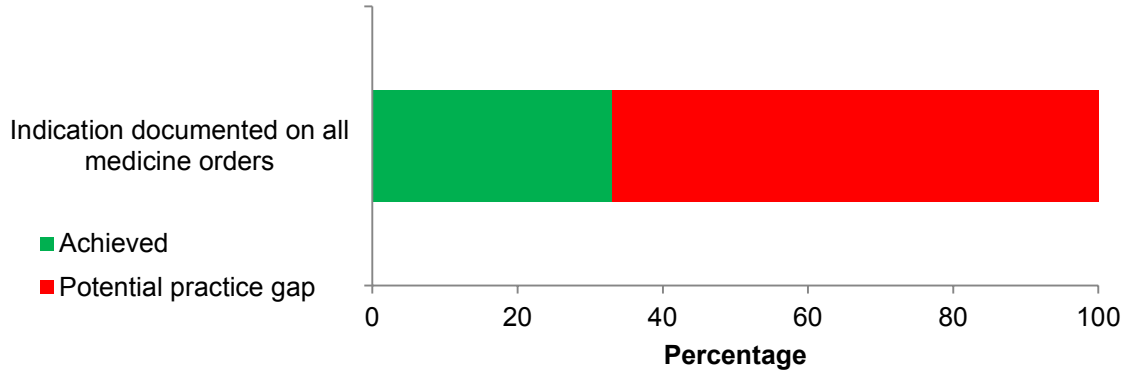
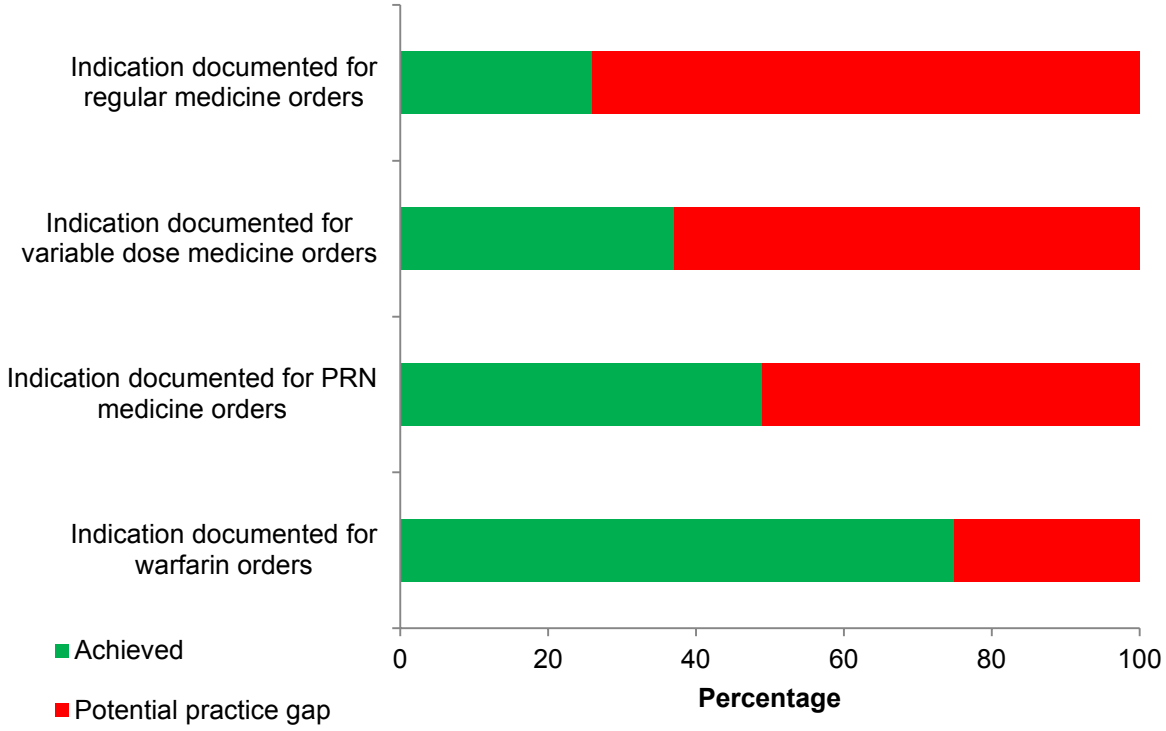


Figure 18: Indication documented on all medicine orders by chart section

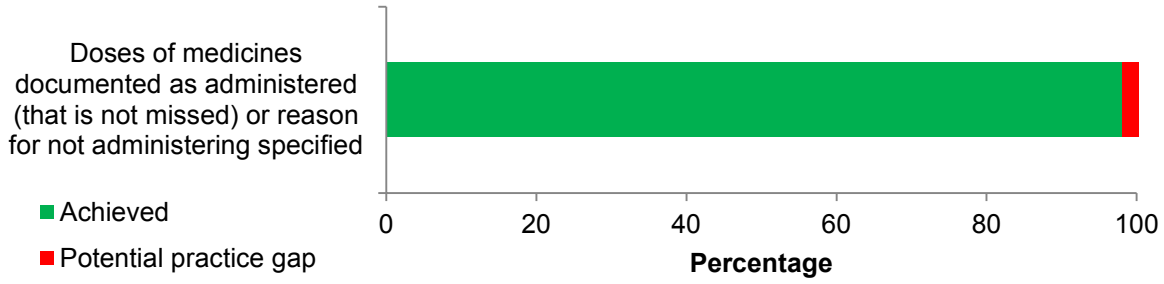


The 2014 national audit of the NIMC found that documentation of the indication was 21.8%[1]. By chart section it was reported as 16.6% for regular medicine orders, 24% for variable medicine orders, 35.6% for PRN medicine orders, and 56.6% for warfarin medicine orders[1].

Appropriate documentation of dose administration or reason for not administering is important to minimise misinterpretation which could lead either to double dosing or omission of a dose.

The audit identifies that 98% of doses were either administered or a reason for not administering was specified (Figure 19). This identifies good practice in use of the administration box safety feature of the NSMC.

Figure 19: Doses of medicines documented as administered (that is not missed) or reason for not administering specified



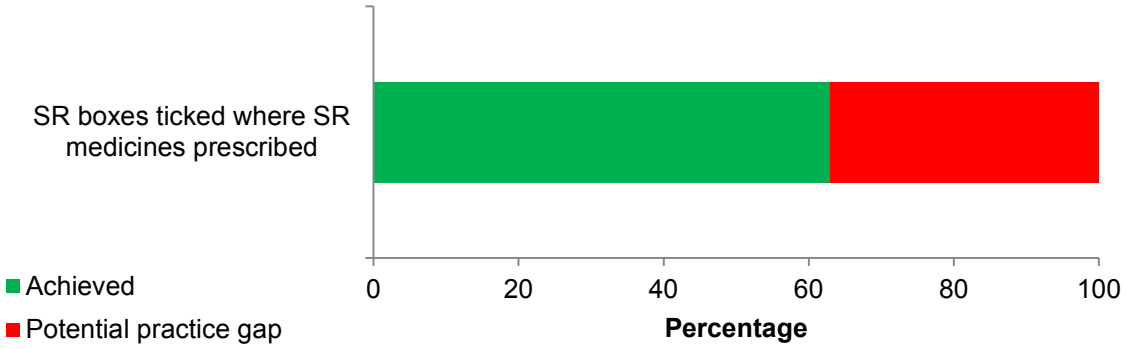
In 2014 the audit of the NIMC found the percentage of orders with dose administered or reason for not administering specified as 91%[1].

Regular medicine orders

Ensuring the SR box is ticked for medicines that are slow-release (SR) minimises the risk of an incorrect formulation being dispensed, administered or transcribed.

Where SR medicines were prescribed, the SR box was ticked for 63% of orders (Figure 20). This indicates a practice gap in the use of the SR box on the NSMC.

Figure 20: SR boxes ticked where SR medicines prescribed

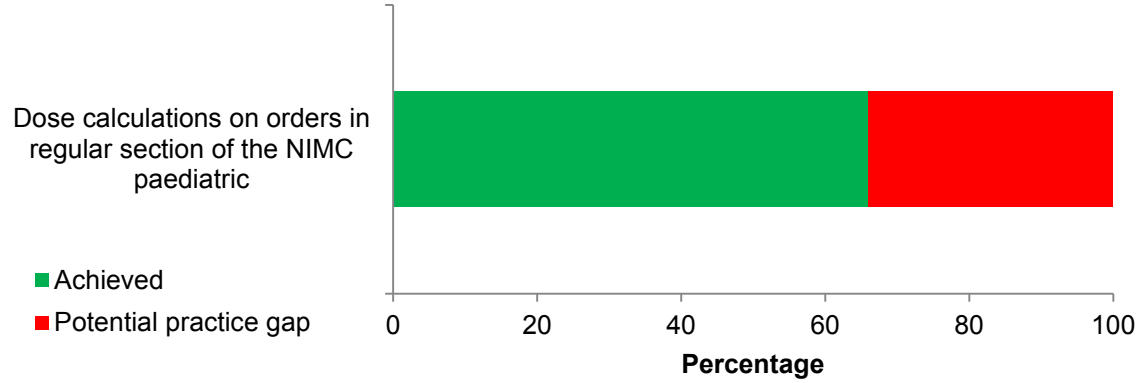


The NIMC 2014 audit reported that 59.9% of SR boxes were ticked when a SR medicine was supplied[1].

Dosage errors are one of the most common medication errors in paediatric patients. Documenting the dose calculation enables double checking by clinicians involved in the medicines management process.

The results show that 66% of orders in the regular section of the NIMC paediatric included the dose calculation (Figure 21). There is gap in practice documenting the dose calculation using the NSMC safety feature.

Figure 21: Dose calculations documented on orders in regular section of the NIMC paediatric



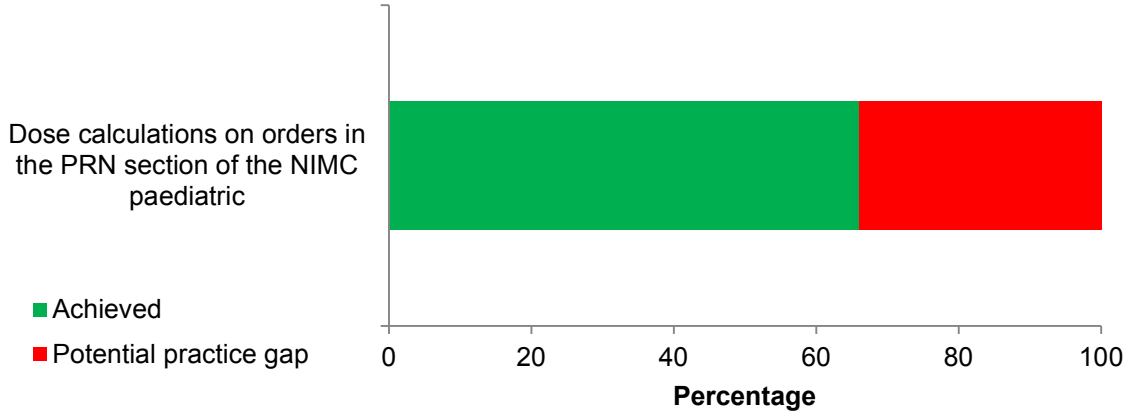
The 2014 national audit of the NIMC identified that 37.9% of medicine orders on paediatric charts had the basis for the dose calculation documented[1]. It did not give a breakdown by chart section.

PRN medicine orders

Dosage errors are one of the most common medication errors in paediatric patients. Documenting the dose calculation enables double checking by clinicians involved in the medicines management process.

The findings show that 66% of orders in the PRN section of the NIMC paediatric included the dose calculation (Figure 22). There is gap in practice documenting the dose calculation using the NSMC safety feature.

Figure 22: Dose calculations documented on orders in the PRN section of the NIMC paediatric



The 2014 national audit of the NIMC identified that 37.9% of medicine orders on paediatric charts had the basis for the dose calculation documented[1]. It did not give a breakdown by chart section.

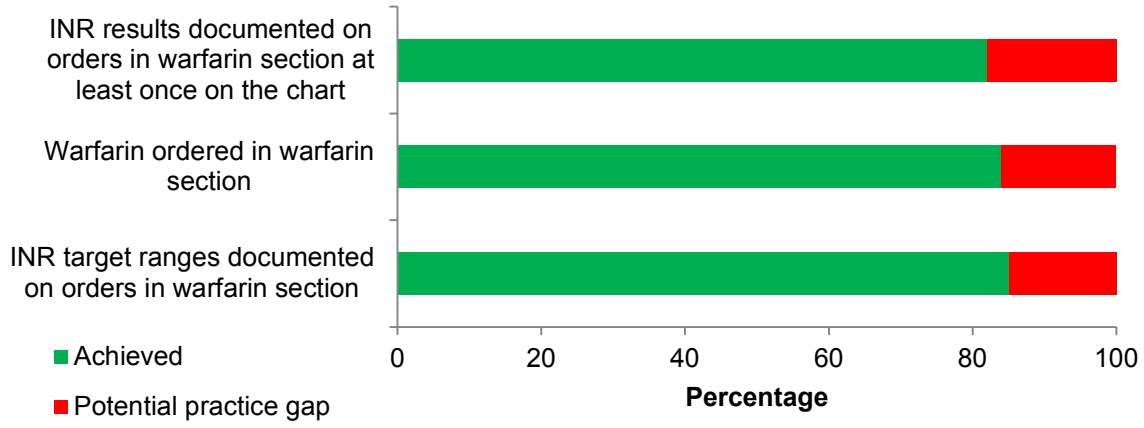
Orders in warfarin section

Warfarin is an anticoagulant which requires additional monitoring for patient safety. A specific section that prompts for indication, target INR range and INR results at the point of

prescribing assists the prescriber to make informed decisions on warfarin therapy promoting patient safety.

Where warfarin was prescribed for a patient, 84% of orders were placed in the warfarin section (Figure 23). For 82% of warfarin orders prescribed in the warfarin section, INR results were documented at least once on the NSMC (Figure 23). Similarly, 85% of warfarin orders in the warfarin section had INR target ranges documented.

Figure 23: Warfarin indicators



In the 2014 National audit of the NIMC, 45% of warfarin orders were prescribed in the specific warfarin section[1]. When the warfarin section was used, 71% of patients had a target INR documented[1].

Feedback about the audit and audit process

Participants in the NSMC national audit 2018 provided the Commission with feedback about the audit and audit process. In total, 47 items of feedback were received from various users in regard to the following:

- Communication prior to the audit
- Registration process
- Adding patient audit data
- Audit form sections and interpreting the indicators
- Saving the audit data
- Reporting audit results
- Scope of the audit.

As this was the first year this audit system was used, it was expected that there would be participants who experienced some difficultly. The Commission reviewed all of the feedback received and identified areas where the audit and auditing process could be improved. This includes enhancements to the tab function and access to the user guide at the point of data entry. An identified discrepancy with the results has also been escalated to the development team for correction. Where an issue has only been reported once it was logged and will be monitored.

Discussion

Breakdown of hospital participation in the audit and responses at the patient level

Participation in the NSMC national audit 2018 fell by 8% in comparison to the last NIMC national audit in 2014[1]. As more sites transition to EMM systems, participation may continue to decline. Three hundred and sixty one hospitals from all states and territories participated in the 2018 national audit with public hospitals the majority (82%). There were 10,608 individual patient charts audited, with 9,739 responses relating to adult patient charts and 869 responses relating to paediatric patient charts.

Compliance with NSMC safety features

Safety features of the NSMC are known to prevent medicine errors (Table 5). The NSMC 2018 national audit identifies a number of safety features of the NSMC that are at a level of compliance where significant improvement is required to prevent medicine errors. These include:

- VTE risk assessment completed and where indicated prophylaxis prescribed
- Anticoagulant education record completed for patients initiated on an anticoagulant for ongoing treatment
- Patient identification completed correctly on all pages, specifically the first prescriber handwriting the patient's name under an identification sticker
- Indication documented on all medicine orders
- Prescriber details section legible and complete on PBS HMC
- Pharmaceutical review of all charts documented
- Medication history is documented on chart or documented elsewhere and cross-referenced on chart
- Weight and date child weighed documented on all NIMC paediatric for patients aged 12 years and under, specifically the date of weight
- All medicine orders complete and correct.

Safety features of the NSMC which were found to be at a moderate level of compliance (60-85%) requiring some improvement to prevent medicine errors include:

- ADR details documented completely and correctly on all charts
- All charts for patients correctly numbered
- SR boxes ticked where SR medicines prescribed
- Dose calculations documented on orders in the regular section of the NIMC paediatric
- Dose calculations documented on orders in the PRN section of the NIMC paediatric
- Warfarin orders ordered in the warfarin section
- INR results documented on orders in warfarin section at least once on the chart.

The NSMC safety features which showed high levels of compliance (>85%) in the 2018 national audit include:

- Weight documented on all NIMC paediatric charts for patients aged 12 years and under (regardless of documentation of date that child was weighed)
- Where VTE prophylaxis has been prescribed, it is prescribed in VTE prophylaxis order section only

- Doses of medicines documented as administered (that is not missed) or reason for not administering specified.

Comparison with the NIMC 2014 national audit

Comparison to findings from previous NIMC national audits is not always possible, given the redesign of the NSMC national audit. Changes between audit years may be as a result of: improved clarity with audit definitions, improved audit system useability, or actual change in indicator outcomes. An analysis of this is not included in this report.

Nine indicators that could be compared are summarised (Table 6). Seven of these indicators either showed improvement or moderate change. However, indicators relating to patient identification and ADR documentation declined notably. The potential for patient harm through poor use of these features (Table 5) makes it imperative that local organisations review their results and implement strategies for improvement.

Table 6: Comparison of 2018 national audit findings against similar indicators from NIMC 2014 national audit

Indicator	2018 Result	2014 Result[1]
Patient identification completely correct on all pages	32%	46.1%
Weight documented on all NIMC paediatric charts for patients aged 12 years and under	87%	80%
ADR details documented completely and correctly on all charts	74%	83%
Medication history documented on chart or documented elsewhere and cross-referenced on chart	44%	36.5%
VTE prophylaxis when prescribed, prescribed in the VTE prophylaxis order section	89%	80.9%
Pharmaceutical review of all charts documented	43%	45.9%
Indication documented on all medicine orders	33%	21.8%
Doses of medicines documented as administered (i.e. not missed) or reason for not administering specified	98%	91%
SR boxes ticked where SR medicines prescribed	63%	59.9%

Predicted effects of EMM on the best practice indicators

The implementation of complete EMM systems may improve compliance with some of the indicators that relate to the NSMC safety features (Table 7).

Table 7: Indicators where compliance will improve following EMM implementation

Indicator	EMM effect[5]
Patient identification completed correctly on all pages, specifically the first prescriber handwriting the patient's name under an identification sticker	Medications will only be able to be prescribed in a specific patient profile with full identification available to the user
Indication documented on all medicine orders	The indication field can be made mandatory. Where recording of the patient's indication is not mandatory, a report from the EMM system of the number of medication orders without indication recorded, sorted by prescriber, by specialty or by class of medicine, can be used for follow-up education and training
Pharmaceutical review	A report can indicate the extent to which pharmacists have reviewed medication orders
Weight and date child weighed documented on all NIMC paediatric for patients aged 12 years and under, specifically the date of weight	Documentation of weight prior to ordering medications for a paediatric patient can be made mandatory. Where recording of the patient's weight is not mandatory, a report from the EMM system of the number of medication orders without indication recorded, sorted by prescriber, by specialty or by class of medicine, can be used for follow-up education and training
All medicine orders complete and correct	Error-prone abbreviations will not be configured in the EMM system and legibility will not be an issue. Certain fields e.g. drug name, route, dose, frequency and indication can be made mandatory
ADR details documented completely and correctly on all charts	Recording allergy and ADR information can be made mandatory at the time of prescribing. Where recording of the indication is not mandatory at the time of prescribing, a report from the EMM system of the number of patients without allergy and ADR information recorded can be used for follow-up education and training
All charts for patients correctly numbered	Complete EMM systems will have all medication orders contained within the system. Where other paper based charts are still in use, reference to these can be made within the system
SR boxes ticked where SR medicines prescribed	The formulation can be built into order sentences, identifying slow release formulations
Dose calculations documented on orders in the regular section of the NIMC paediatric	Order sentences can be built as weight based calculations.
Dose calculations documented on orders in the PRN section of the NIMC paediatric	Order sentences can be built as weight based calculations.
INR results documented on orders in warfarin section at least once on the chart.	Documentation of INR prior to the prescribing of warfarin can be made mandatory. Where recording of the INR is not mandatory at the time of prescribing, a report from the EMM system of the number of patients without allergy and ADR information recorded can be used for follow-up education and training

Conclusions

The following indicators have been found to be at a level of compliance requiring significant improvement and they are not expected to automatically improve with the implementation of a complete EMM system:

- VTE risk assessment completed and where indicated prophylaxis prescribed
- Anticoagulant education record completed for patients initiated on an anticoagulant for ongoing treatment
- Prescriber details section legible and complete on PBS HMC
- Medication history is documented on chart or documented elsewhere and cross-referenced on chart.

The findings of the NSMC national audit indicate sub-optimal compliance (9%) to the VTE risk assessment section on the NSMC. The scope of the NSMC national audit does not include documentation of VTE risk elsewhere in the medical record. There are patient safety benefits for the outcome of a VTE risk assessment to be documented at the point of prescribing. Hospital-acquired VTE is a major cause of morbidity and mortality[6]. Prevention strategies have been shown to significantly reduce the incidence of VTE by about 70%[6]. Local organisations should identify their compliance with the VTE risk assessment safety feature. The review of current initiatives by local organisations is required to improve the use of the VTE risk assessment section.

Use of the NSMC safety feature for anticoagulation education documentation for patients initiated on an anticoagulant was also sub-optimal. The audit findings indicate 19% of patients newly initiated on anticoagulants had education documented on the NSMC. The NSMC national audit does not consider alternate places this could be documented in the medical record. However this should be reviewed locally. The difficulty in auditing this particular indicator, specifically determining whether an anticoagulant is newly initiated could have contributed to this result. Local organisations should review their audit findings and consider their use of the anticoagulant education section.

The PBS HMC has only recently been implemented and an increased familiarity is expected to improve findings in future audits. Local intervention at sites using the PBS HMC should address issues of legibility within the prescriber details section.

Standard 4.5 from the NSQHS Standards requires a best possible medication history to be documented for patients as early as possible in the episode of care[2]. The findings from the NSMC national audit 2018 indicate that 44% of patients have the medication history documented on the NSMC or documented elsewhere and cross-referenced against the NSMC. However, medication history documentation has improved since 2014 (36.5%)[1]. Future NSMC audits should continue to monitor the compliance with medication history documentation and if sustained improvement is not observed, local interventions may be required. Process changes with EMM implementation will affect rates of medication history documentation and this should continue to be monitored locally.

Informal feedback received by the Commission after the audit indicates no major issues with the audit design or content. Increased familiarity with the new audit system will resolve the majority of issues raised. Some minor changes to the audit support material have been made following feedback. These include enhancements to the tab function and access to the user guide at the point of data entry. An identified discrepancy with the results has also been escalated to the development team for correction.

Audit Limitations

Some limitations to the audit should be acknowledged and considered when interpreting the findings.

Aggregated data, hospital and patient demographics

Using national aggregated data to compare individual hospital findings is limited due to variable demographics across jurisdictions and audit years. With the increased uptake of EMM, participation rates are expected to decline further limiting the pool of data for analysis.

Comparison to the NIMC national audit

Comparison to previous audits of the NIMC may not be reliable as the audit design has changed, patient and hospital demographics vary, hospitals are unmatched across audits, and there is an unequal mix of public and private participation.

Unfamiliarity with the audit process and definitions

A change to the audit design and definitions since the NIMC national audit in 2014 could also have affected the findings, particularly as subjective judgement and interpretation is required for some criteria.

Use of a sampling method

Given the size of some facilities the sampling method (Table 1) may have been used. As the complexity and volume of prescribing can vary within a facility, the use of sampling could influence the findings. Also, as some sections of the NSMC are used less frequently, there may be some safety features that are being assessed against limited data.

Recommendations

The recommendations following the NSMC national audit 2018 are consistent with the Commission's strategic plan and focus on activities which align to the Commission's operational work plan.

Recommendation 1

Participating hospitals should share audit findings with clinicians to drive local review and development of action plans to address areas of sub-optimal performance.

The NSMC national audit report 2018 identifies a number of safety features of the NSMC that are at a level of compliance where significant improvement is required nationally. Participating hospitals should determine areas of sub-optimal performance within their own site and engage clinicians to drive local improvement. Particular attention should be made to safety features identified at a level of compliance where significant improvement is required.

Recommendation 2

Participating hospitals review current initiatives to improve the use of the VTE risk assessment safety feature on the NSMC.

The findings of the NSMC national audit indicate sub-optimal compliance (9%) to the VTE risk assessment section on the NSMC. As VTE is a major cause of morbidity and mortality for patients admitted to hospital[6] failure to optimally use the VTE risk assessment section can lead to patient harm. Prevention strategies have been shown to significantly reduce the incidence of VTE by about 70%[6]. The prevention of hospital-acquired VTE relates to the following National Safety and Quality Health Service (NSQHS) Standards[2]:

- Standard 1: Clinical Governance
- Standard 2: Partnering with Consumers
- Standard 4: Medication Safety
- Standard 6: Communication for Safety
- Standard 8: Recognising and Responding to Acute Deterioration.

Resources to assist with this review are available from the Commission[*].

Recommendation 3

The Commission should seek comment from HSMEAG to evaluate the audit process, use of results, and changes made following the audit to assess the utility of the NSMC national audit.

The 2018 national audit of the NSMC was the first since the NIMC national audit was adapted in 2017. Feedback from end-users at participating facilities will help the Commission evaluate the audit process changes and identify any areas for improvement. Feedback from non-participants could also be beneficial to identify barriers to participation.

[*] https://www.safetyandquality.gov.au/our-work/clinical-care-standards/venous-thromboembolism-prevention-clinical-care-standard/

Appendix

Appendix 1 – Best practice indicators linked to NSQHS Standard 4: Medication Safety[2] and National QUM Indicators for Australian Hospitals[3]

Best practice indicators		Link to NSQHS Standard 4: Medication Safety[2]	Link to National QUM Indicators for Australian Hospitals[3]
1	**Patient identification completed correctly on all pages**	4.1, 5.1	
1.1	Patient ID section completed on all pages		
1.2	Handwritten patient details legible and complete		
1.3	Patient's name handwritten under patient identification label(s) by first prescriber		
2	**Prescriber details section legible and complete on PBS HMC**	4.4, 5.4	
2.1	All prescribers listed in prescriber details section of PBS HMC		
3	**Weight and date child was weighed documented on all NIMC paediatric for patients aged 12 years and under**	4.11, 4.13	3.4
3.1	Weight documented on all NIMC paediatric charts for patients aged 12 years and under (regardless of documentation of date that child was weighed)		
4	**ADR details documented completely and correctly on all charts**	4.7, 4.8	3.2
4.1	ADR section has the medicine (or other) section and reaction type documented.		
4.2	ADR section has the medicine and reaction type documented and is signed by person documenting the ADR		
5	**Medication history documented on chart or documented elsewhere and cross-referenced on chart**	4.5, 4.6, 4.13	3.1
5.1	Medication history documented on the chart for current episode of care		
5.2	Medication history cross-referenced on chart where documented elsewhere (according to local procedure) for current episode of care		
6a	**VTE risk assessment completed and where**	4.15	1.1

Best practice indicators		Link to NSQHS Standard 4: Medication Safety[2]	Link to National QUM Indicators for Australian Hospitals[3]
	indicated prophylaxis prescribed		
6a.1	VTE prophylaxis prescribed (in the VTE prophylaxis order section, regular medicines section or both) where indicated		
6a.2	VTE prophylaxis prescribed in VTE prophylaxis order section only		
7	**Pharmaceutical review of all charts documented**	4.10	6.2
8	**All charts for patients correctly numbered**	4.1, 4.13	
9	**Anticoagulant education record completed for patients initiated on an anticoagulant for ongoing treatment**	4.3, 4.11, 4.15	5.4
10a	**Regular medicine orders complete and correct**	4.1, 4.15	3.3
10a.1	Orders are legible		
10a.2	Orders do not contain error-prone abbreviations		
10a.3	Medicine name complete and correct on orders		
10a.4	Route complete and correct on orders		
10a.5	Dose complete and correct on orders		
10a.6	Frequency complete and correct on orders		
10a.7	Prescriber name legible on the chart		
10a.8	Orders signed by prescriber		
10b	**Indication documented on orders in regular section**	4.1, 4.15	3.3
10c	**SR boxes ticked where SR medicines prescribed**	4.1, 4.13	
10d	**Dose calculations documented on orders in regular section {NIMC paediatric only}**	4.1, 4.11, 4.13	3.4
10e	**Doses of regular medicines documented as administered (i.e. not missed) or reason for not administering specified**	4.1, 4.13	
11a	**PRN medicine orders complete and correct**	4.1, 4.15	3.3
11a.1	Orders are legible		

Best practice indicators		Link to NSQHS Standard 4: Medication Safety[2]	Link to National QUM Indicators for Australian Hospitals[3]
11a.2	Orders do not contain error-prone abbreviations		
11a.3	Medicine name complete and correct on orders		
11a.4	Route complete and correct on orders		
11a.5	Dose complete and correct on orders		
11a.6	Hourly frequency complete and correct on orders		
11a.7	Prescriber name legible on the chart		
11a.8	Orders signed by prescriber		
11a.9	Maximum PRN dose in 24 hours documented on orders		
11b	**Indication documented on orders in PRN section**	4.1, 4.15	3.3
11c	**Dose calculations documented on orders in PRN section {NIMC paediatric only}**	4.1, 4.11, 4.13	3.4
12a	**Once only, nurse initiated & phone orders complete and correct**	4.1, 4.15	3.3
12a.1	Orders are legible		
12a.2	Orders do not contain error-prone abbreviations		
12a.3	Medicine name complete and correct on orders		
12a.4	Route complete and correct on orders		
12a.5	Dose complete and correct on orders		
12a.6	Frequency complete and correct on orders {phone orders only}		
12a.7	Double signatures complete on orders {phone orders only}		
12a.8	Prescriber name legible on the chart		
12a.9	Orders signed by prescriber		
12b	**Doses of once only, nurse initiated & phone orders documented as administered (i.e. not missed) or appropriate code for not administering specified**	4.1, 4.13	
13a	**Variable dose medicine orders complete and**	4.1, 4.15	3.3

Best practice indicators		Link to NSQHS Standard 4: Medication Safety[2]	Link to National QUM Indicators for Australian Hospitals[3]
	correct		
13a.1	Orders are legible		
13a.2	Orders do not contain error-prone abbreviations		
13a.3	Medicine name complete and correct on orders		
13a.4	Route complete and correct on orders		
13a.5	Dose complete and correct for each day of administration on orders		
13a.6	Frequency complete and correct on orders		
13a.7	Time to be given documented on orders		
13a.8	Prescriber name legible on the chart		
13a.9	Orders signed by prescriber		
13b	**Indication documented on variable dose medicine orders**	4.1, 4.15	3.3
13c	**Doses of variable dose medicines documented as administered (i.e. not missed) or appropriate code for not administering specified**	4.1, 4.11, 4.13	3.4
14a	**Warfarin orders complete and correct**	4.1, 4.15	3.3
14a.1	Orders are legible		
14a.2	Orders do not contain error-prone abbreviations		
14a.3	Brand name selected on orders		
14a.4	Route complete and correct on orders		
14a.5	Prescriber name legible on the chart		
14a.6	Orders signed by prescriber		
14a.7	Daily doses of warfarin documented and signed on orders		
14b	**INR results documented on orders in warfarin section at least once on the chart**	4.1, 4.13, 4.15	5.4
14c	**INR target ranges documented on orders in warfarin**	4.1, 4.13, 4.15	5.4

Best practice indicators		Link to NSQHS Standard 4: Medication Safety[2]	Link to National QUM Indicators for Australian Hospitals[3]
	section		
14d	**Indication documented on orders in warfarin section**	4.1, 4.15	3.3
14e	**Doses of warfarin documented as administered (i.e. not missed) or appropriate code for not administering specified**	4.1, 4.13	
14f	**Warfarin ordered in warfarin section**	4.1, 4.13, 4.15	5.4

Glossary

Term	Definition
ADR	adverse drug reaction
EMM	electronic medication management
GEM	geriatric evaluation and management
ID	identification
INR	international normalised ratio
NIMC	National Inpatient Medication Chart
NSMC	National Standard Medication Chart
NSQHS	National Safety and Quality Health Service
PBS HMC	Pharmaceutical Benefits Scheme Hospital Medication Chart
PRN	when necessary
QUM	quality use of medicines
SR	slow-release
VTE	venous thromboembolism

References

1. Australian Commission on Safety and Quality in Health Care 2015, National Inpatient Medication Chart 2014 National Audit Report, ACSQHC, Sydney

2. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards. 2nd ed. Sydney: ACSQHC; 2017.

3. Australian Commission on Safety and Quality in Health Care and NSW Therapeutic Advisory Group Inc. National Quality Use of Medicines Indicators for Australian Hospitals. Sydney: ACSQHC; 2014.

4. Australian Commission on Safety and Quality in Health Care. Strategic Plan 2014–2019. Sydney: ACSQHC; 2014.

5. Australian Commission on Safety and Quality in Health Care. Electronic medication management systems: a guide to safe implementation. 3rd edition. Sydney: ACSQHC; 2017.

6. Australian Commission on Safety and Quality in Health Care. Venous Thromboembolism Prevention Clinical Care Standard. Sydney: ACSQHC; 2018

Acknowledgements

This report was developed following the contribution of many individuals and organisations who freely gave their time and expertise to contribute to the development of the NSMC national audit. In particular, the Commission thanks the participating hospitals and auditors for gathering and submitting data for the audit.