AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

TRIM: D23-9043

August 2024

National Standard Medication Chart (NSMC)

2022 National Audit Report

Published by the Australian Commission on Safety and Quality in Health Care
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ISBN: 978-1-922880-30-7

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 Report 2022. Sydney: ACSQHC; 2024

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Contents

Introduction

The Australian Commission on Safety and Quality in Health Care (the Commission) provides stewardship of the National Standard Medication Chart (NSMC), in collaboration with the medication safety community from the public and private sectors. The Commission is advised on this stewardship role by an expert representative group, the Health Services Medication Expert Advisory Group (HSMEAG).

The focus of the National Standard Medication Chart (NSMC) national audit is to drive local safety and quality improvements in medicines management through use of the NSMC across Australia.

Background

The NSMC national audit was conducted between 4 October 2022 to 31 October 2022. Participation in the 2022 NSMC national audit was voluntary. Invitations to participate were extended to Australian hospitals and day procedure services using standardised NSMC charts, with no local modifications. 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).

Objective

This report outlines some key findings from the 2022 NSMC national audit, with aims to:

- Determine hospitals' compliance with the NSMC safety features
- Identify if the NSMC or the NSMC audit system requires modification
- Identify other medication safety considerations.

Scope

The audit findings provide a snapshot of compliance with the NSMC safety features as defined by best practice audit indicators which are linked to the Medication Safety Standard of the National Safety and Quality Health Service (NSQHS) Standards[1] and National Quality Use of Medicines (QUM) Indicators for Australian Hospitals[2] (Appendix 1).

The NSMC is a documentation audit, therefore, clinical appropriateness of medicine, route, dose and frequency, and patient outcomes were not examined.

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

Participation in the 2022 NSMC national audit

There were 317 hospitals that participated in the 2022 audit, compared to 378 hospitals in 2020. There were 9,441 individual charts audited in the 2022 audit, compared to 10,359 individual charts in 2020. The breakdown of charts audited is in table 1 and 2 below.

Table 1 Individual patient charts by location and hospital type

Location	Public hospital	Private hospital	Total
NSW	158	1,001	1,159
VIC	1,049	915	1,964
QLD	1,892	1,042	2,934
SA	660	345	1,005
WA	1,215	394	1,609
TAS	312	178	490
NT	0	61	61
ACT	0	219	219
Total	**5,286**	**4,115**	**9,441**

The decrease in public hospital participation is likely due to the implementation of EMM systems. Increased workloads and limited workforce capacity during the COVID-19 pandemic may have impacted participation.

Table 2 Responses by chart type

Chart type	Responses	Patient charts	Age demographic
PBS HMC (acute)	2,574	8,794	8,853 individuals aged over 12
PBS HMC (long-stay)	572		
NIMC (acute)	4,234		
NIMC (long-stay)	1,414		
NIMC (paediatric long-stay)	90	647	588 individuals aged 12 and under
NIMC (paediatric)	557		

The chart type used and the patient's age are recorded independent of each other. The Commission specifies that a paediatric chart is for children 12 years and under. Of the 588 patient records for patients aged 12 years or under, 19 were recorded on non-paediatric charts.

In comparison to adult medication charts, paediatric medication charts contain an additional safety feature that allows the recording of dosage based on weight. The use of a non-paediatric medication chart for patients aged 12 years and under may represent a potential safety risk for these patients, as there is no prompt for a weight-based dosage calculation to be recorded.

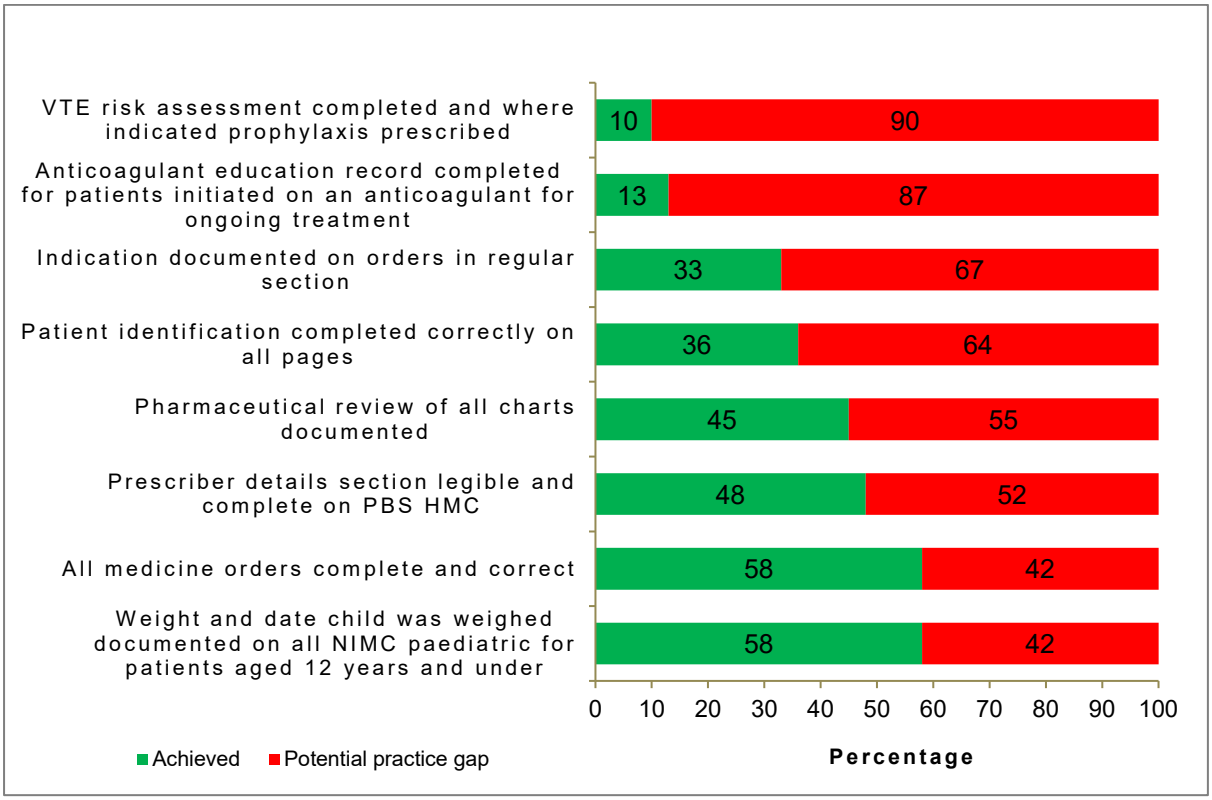
Results of the 2022 NSMC national audit

The results of the 2022 NSMC national audit are presented according to best practice indicators that reflect NSMC safety features.

Low compliance (less than 60%)

Several safety features of the NSMC had a level of compliance (less than 60%) where significant improvement is required. **Figure 1** provides a summary of these results. Given the low compliance with these safety features, some additional commentary has been included on their importance.

Figure 1: Safety features of the NSMC at a level of compliance that requires significant improvement



- **Venous Thromboembolism (VTE) Risk assessment**

Hospital-acquired VTE is a major cause of morbidity and mortality. Reducing the rate of hospital-associated VTE is a national safety and quality priority. There are patient safety benefits for the outcome of a VTE risk assessment to be documented at the point of prescribing.[3]

The Commission's VTE Prevention Clinical Care Standard[3], and associated Implementation Guide[4], support health service organisations to meet the requirements of the NSQHS Standards[1] for accreditation. Prevention of hospital-acquired VTE through appropriate interventions, such as pharmacological and mechanical prophylaxis, is a component of comprehensive care provision and has been shown to significantly reduce the incidence of VTE by 70%.[5]

National audit results show only 10% of charts had a complete VTE risk assessment documented and, where indicated, prophylaxis prescribed. This indicates a potential practice gap of 90% requiring review into the use of the VTE risk assessment section of the NSMC.

- **Anticoagulation education record**

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

- **Indication documented**

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

- **Patient identification**

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

- **Pharmaceutical review**

Review of a medication chart by pharmacists reduces the risk of patient harm from medication errors and optimises the quality use of medicines.

- **Medicine orders**

An accurate medicine order should be completed to reduce the risk of misinterpretation by clinicians responsible for dispensing, administering and transcribing orders. Intended medicine, formulation, route, dose, frequency and indication should be included.

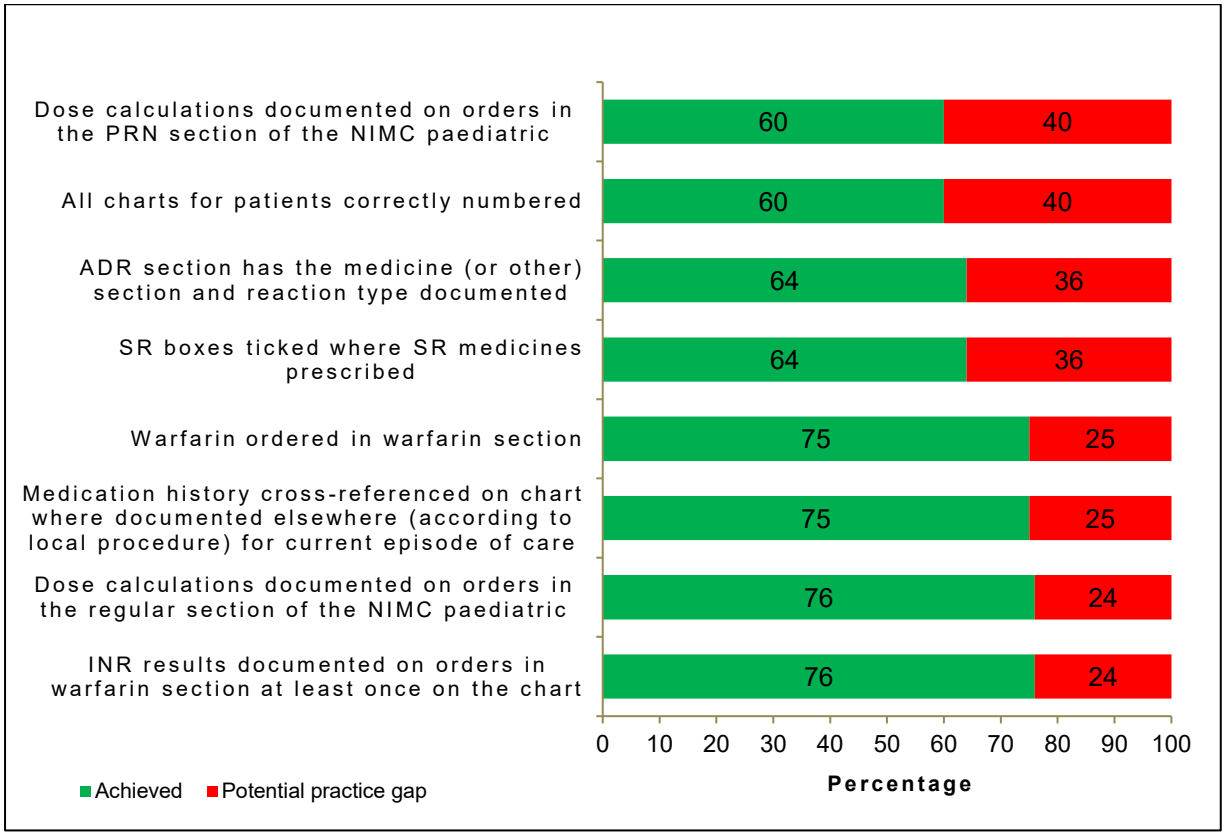
- **Weight documentation**

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. The date the weight was recorded is important as a paediatric patient's weight can change during admission.

Moderate compliance (60 - 85%)

Some safety features of the NSMC were found to be at a moderate level of compliance (60-85%) where some improvement is required. See **Figure 2** for a summary of these results, noting the additional comments under some safety features of concern.

Figure 2: Safety features of the NSMC at a level of compliance that requires some improvement



- **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.

- **Adverse drug reactions (ADR)**

Complete documentation of ADR information prevents patient harm. Clinicians can be alerted to avoid prescribing, dispensing, or administering a medicine, or similar medicine, that has previously caused an ADR.

- **Medication history**

Accurate information on medicines taken prior to admission should be available to clinicians at the point of prescribing. This informs treatment decisions and improves safety and quality of care. Documented medication history details can prevent unintentional medication errors that are common during transitions of care and can cause patient harm. If an individual's medication history can be documented elsewhere, such as in the medication management plan, it is important that this information is cross-referenced on the chart to inform clinicians.

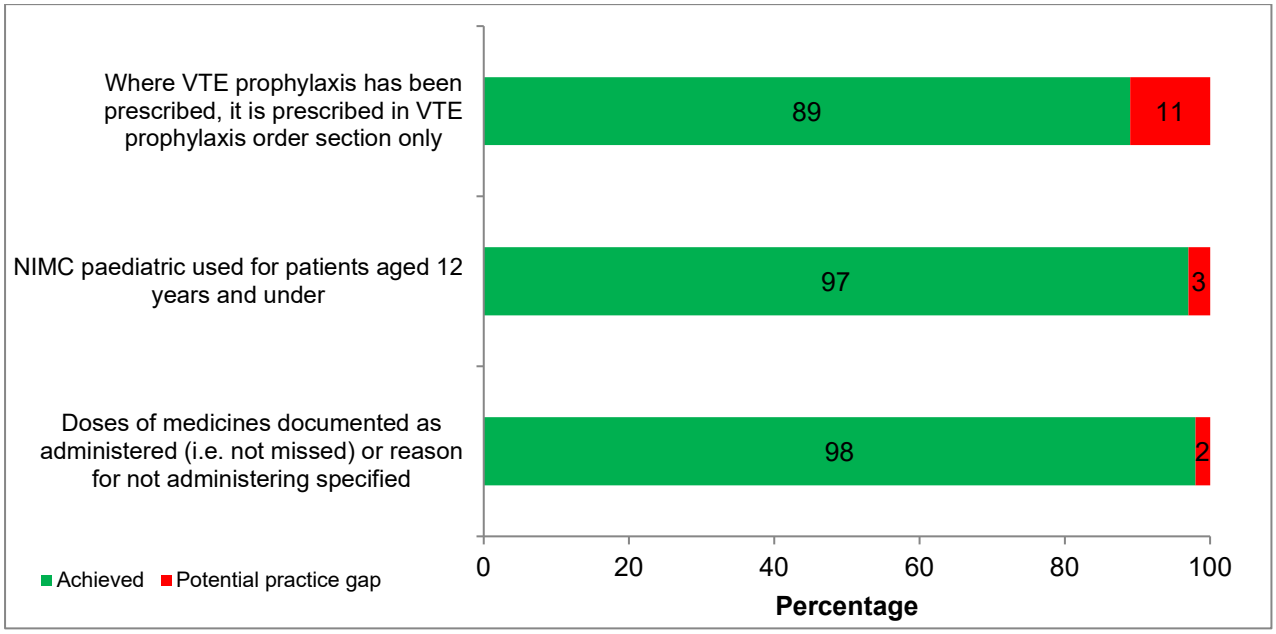
- **Warfarin orders**

  Warfarin is an anticoagulant and can cause harm. It is important that the warfarin section of the medication chart is properly documented. The international normalised ratio (INR) is important to measure as it assesses the effectiveness of the therapy and monitors if dosing is correct for the individual.

High compliance (greater than 85%)

Some NSMC safety features showed high levels of compliance (>85%) in the national audit (**Figure 3**).

Figure 3: Safety features of the NSMC at a high level of compliance



Discussion and limitations

NSMC safety features are known to prevent medication errors. Auditing is designed to identify the compliance of safety features that reduce the risk of harm from medicines. This data can be used to prioritise and drive quality improvement processes.

The 2022 NSMC national audit provided insight to compliance to safety features nationally, with results showing similar trends to the 2020 audit. However, caution should be exercised when reviewing and interpreting these results, noting that the:

1. National aggregated data should not be used as a benchmark for individual hospitals and health services. Due to variable demographics across jurisdictions and the selection of clinical units and medication charts audited within each hospital, meaningful comparisons against previous national audits or individual hospital findings are limited. Health services should instead be aiming to reach full compliance with the use of all safety features.

2. Complexity and volume of prescribing can vary within hospitals of varying sizes, and the sampling method could influence the findings. Also, as some sections of the NSMC are used less frequently in certain areas or specialities of a hospital, there may be some safety features that are being assessed against limited data. To

facilitate more appropriate and clinically meaningful assessment of results, when health services are conducting future local NSMC audits, they should specify a minimum sample number of NSMCs that contain the safety features.

The Commission developed a Checklist for assessors[6] after the 2020 audit, to draw attention to the low performing indicators as areas to target for quality improvement initiatives. However, some of these indicators have shown worse results in 2022.

Of particular concern is the result for the indicator *VTE risk assessment completed and where indicated prophylaxis prescribed*, which reduced from 11% to 10%. While this indicator suggests very poor compliance to this NSMC safety feature, there is high compliance for *VTE prophylaxis prescribed in VTE prophylaxis order section only* (89%).

Feedback provided by HSMEAG on the following two NSMC safety features indicates that they may be process driven, and potentially, to avoid duplication, documented elsewhere in an individual's clinical or progress notes rather than on the NSMC:

- *VTE risk assessment completed and where indicated prophylaxis prescribed*
- *Anticoagulation education record completed for patients initiated on an anticoagulant for ongoing treatment*.

Upon further investigation, it was confirmed that the 'VTE risk assessment indicator' is calculated based on several 'conditions', which need to be met to achieve a positive result. One of these conditions is that the 'VTE risk assessment box' is ticked. Hence, this indicator does not capture evidence of a VTE risk assessment completion or documentation elsewhere. This could be a factor contributing to consistently low results across the past two NSMC audits. There is also a possibility that incorrect data entry by the auditor could have contributed to the low result.

Further investigation is required into these medication safety processes at a hospital and/or health service level. A recommendation to address this has been added.

Recommendations

Recommendation 1

Hospitals to use the NSMC audit system as a quality improvement tool to track individual performance over time.

Since its establishment in 2018, individual hospitals have been using the NSMC audit system to conduct local audits, outside of the three national audits. Therefore, it is proposed a national audit will no longer be coordinated by the Commission. However, the NSMC audit system will be maintained so individual sites can access the system to conduct local audits and review their audit results.

It is recommended that individual hospital sites continue to use the NSMC audit system on a regular basis to produce their own report for internal reporting and quality improvement purposes. They can:

- Obtain a baseline measure of the quality of NSMC chart use and identify priority focus areas in medication management for local attention
- Identify if there are local prescribing and medicine administration behaviours that could be improved
- Implement quality improvement initiatives and trend improvements.

Once a health service has implemented a quality improvement initiative(s), it is important to reaudit to evaluate its effectiveness in improving compliance. Audit results should be shared locally (see **Recommendation 2**) to determine the timeframe for repeat audits, which may vary depending on the level of compliance. This data can be used as evidence for the NSQHS standards, specifically the Medication Safety Standard (**Appendix 1**).

While the NSMC National audit results may provide an overview of compliance to NSMC safety features at a national level, they should not be used as a benchmark for individual sites due to the variation in sites and reporting.

The Commission may facilitate input from focus groups to seek ongoing feedback from states, territories, and private hospitals on results of their local NSMC audits. This information may be used to inform the development of future quality improvement resources by the Commission.

Recommendation 2

Hospitals should share local audit findings from the 2022 NSMC national audit, and subsequent local audits, with clinicians and quality improvement teams to drive local review and development of action plans to address areas of sub-optimal performance.

This national audit report identifies several NSMC safety features where improvement is required. Participating hospital governance committees should review their local 2022 NSMC national audit and subsequent local audit findings to identify areas of sub-optimal performance and determine when a repeat audit is required. Clinicians should be engaged to drive local improvement, including review of clinical safety and documentation processes.

Recommendation 3

Hospitals should review their local NSMC educational resources and training requirements for clinicians.

It is recommended that local education on use of the NSMC audit system and importance of the safety features should occur for all new healthcare staff. This includes review of the relevant user guides and learning modules. Re-education of existing healthcare staff may also be required to ensure there continues to be a full understanding of compliance with the safety features of the NSMC.

The Checklist for assessors[6] provides a list of the indicators where performance was assessed as poor in the 2020 national audit and may also be used to identify and drive quality improvement initiatives.

Recommendation 4

The Commission to hold targeted consultation to review compliance to the NSMC safety features at hospital sites with paper-based medication charts.

It is recommended that the Commission facilitates input from focus groups to identify why compliance for certain indicators has been consistently low in the last few audits, and how compliance to the NSMC safety features can be improved. This may include consultations with a variety of high-performing and low-performing sites to enable adequate comparisons. If a functional issue with a NSMC safety feature is identified, additional consultation may be necessary to determine what action is required. Further engagement with accrediting bodies, professional organisations/colleges and health services to enhance prescribing practices may be considered in this investigation.

Focus groups will enable an in-depth review of:

- National and local NSMC education and training materials and processes which may be contributing to poor compliance
- NSMC auditing processes which may be resulting in incorrect data collection and entry
- Local medication safety processes which may be contributing to poor compliance.

This will support development of targeted medication safety resources and initiatives to improve safe and quality use of the NSMC. This may also assist with identification of problematic NSMC safety features which may require review and update.

VTE risk assessment

A specific review of VTE risk assessment and stewardship processes is required so organisations can create a quality improvement process to increase compliance.

The VTE Prevention Clinical Care Standard[3] specifies that a patient potentially at risk of VTE is to receive a timely assessment of VTE risk, using a locally endorsed evidence-based tool to determine their need for VTE prevention. The result is to be documented at the time of the assessment, and in a place that is easily accessible to all clinicians involved in the patient's care. The Checklist for assessors[6] requires that there is evidence of the documentation of VTE risk assessment completion.

It is recommended that health services' organisational policies and procedures clearly reflect VTE risk assessment and stewardship processes to ensure compliance with completing and documenting VTE risk assessments, regardless of which system (paper, electronic or hybrid) is being used. Including a requirement for the 'VTE risk assessment box' to be ticked will ensure that the results of a health service's future local NSMC audit are more indicative of clinical practice.

Appendices

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

Best practice indicators		NSQHS Standard 4	National QUM Indicators
1	**Patient identification completed correctly on all pages**	4.1	
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	
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 indicated prophylaxis prescribed**	4.15	1.1
6a.1	VTE prophylaxis prescribed (in the VTE prophylaxis order section, regular medicines section or both) where indicated		

Best practice indicators		NSQHS Standard 4	National QUM Indicators
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**	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		
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		

Best practice indicators		NSQHS Standard 4	National QUM Indicators
11b	**Indication documented on orders in PRN section**	4.1, 4.15	3.3
11c	**Dose calculations documented on orders in PRN section.**	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 correct**	4.1, 4.15	3.3
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

Best practice indicators		NSQHS Standard 4	National QUM Indicators
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 section**	4.1, 4.13, 4.15	5.4
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

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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.