Clinical Practice Guideline

Medication safety: Best practice for effective paediatric ward rounds

RCPCH/NPPG Joint Standing Committee on Medicines, December 2023

This document was written by the Royal College of Paediatrics and Child Health and Neonatal and Paediatric Pharmacy Group Joint Standing Committee on Medicines

This document should be referenced as:

RCPCH/ NPPG Joint Standing Committee on Medicines, Best Practice Consensus Guidelines for Medication Safe Paediatric Ward Rounds, December 2023

Guideline to be reviewed in five years

Published by the Royal College of Paediatrics and Child Health on behalf of RCPCH/NPPG Joint Standing Committee on Medicines

Acknowledgements

The Medicines Committee would like to thank the Guideline Development Group (GDG), the stakeholders, the Parents Group, and all those who inputted into the consultation. Their hard work and effort have shaped this Guideline.

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Funding

No funding declarations.

Executive Summary

A national investigation into weight-based medication errors in children was published in 2022 by the Healthcare Safety Investigation Branch (HSIB), following the case of unintentional repeated ten-fold overdoses with dalteparin in a four year old child who suffered neurological harm[1]. To prevent future errors HSIB recommenced the Royal College of Paediatrics and Child Health (RCPCH) to identify best practice principles for effective paediatric ward rounds in relation to medications and disseminates them to its members.

This best practice guideline covers the inclusion of medication analysis in the paediatric ward round environment. It aims to ensure that medications are considered at ward rounds to improve safety by encouraging medication reviews, reconciliations, and discussion with children, young people, and their families.

This guideline supplements the NICE guidelines on medication optimisation[2] and on medication adherence[3]. It should also be used in conjunction with The Royal College of Physicians (RCP) best practice principles for the modern ward round environment (written in relation to adult care)[4]. As per the RCP and Royal College of Nurses (RCN) it is important to consider medications on ward rounds as part of reviewing patients' progress and checking safety measures[5].

Who is it for?

- Healthcare professionals caring for paediatric inpatients
- Commissioners and providers
- Children and young people (CYP) and their families admitted to an inpatient environment

Contents

Definitions and acronyms

CYP	Children and Young People
EPMA	Electronic Prescribing and Medication Administration
GDG	Guideline Development Group
HSIB	Health and Safety Investigation Board
MDT	Multidiscplinary Team
NHS	National Health Service
NPPG	Neonatal and Paediatric Pharmacy Group
RCN	Royal College of Nurses
RCP	Royal College of Physicians
RCPCH	Royal College of Paediatrics and Child Health

1. Introduction

1.1 Overview

The medical ward round is a complex process with multiple factors and processes occurring in conjunction and parallel to one another[4]. There are variations among clinical areas on aspects of ward rounds, with the average patient being seen for 12 minutes[6]. The Royal College of Physicians(RCP) and the Royal College of Nurses (RCN) have developed recommendations for modern ward rounds, which should include a medication review[5]. The target population for these recommendations excluded children and young people (CYP).

Medications are a common intervention within healthcare. Errors involving medications are a global issue[7, 8]; harm from medication errors is three times more likely in children[9-11]. Medication errors can occur anywhere in the process from prescribing to when the patient receives and takes that medication[12]. The majority of paediatric medication errors within the UK involve an element of prescribing or administration[13]. Within paediatrics, medications often require personalisation of the drug doses, or altered formulations such as liquid rather than tablets, manipulation of tablets, dilutions of medications and off-label/unlicensed use of medications. This personalisation is not surprising considering a 200-fold variation in weight within paediatrics versus only a three-fold in adults; not withstanding changes in kinetics and dynamics of medicines.

The joint Royal College of Paediatrics and Child Health (RCPCH) and Neonatal & Paediatric Pharmacy Group (NPPG) Medicines Committee was asked by the Health and Safety Investigation Board (HSIB) to develop recommendations for paediatric ward rounds in relation to medications to reduce the risk of medication errors following a significant incident[1].

1.2 Clinical need

Medication errors can cause significant harm to patients and within the UK, 13% of medication prescribed for CYP contain an error[10], these can cause morbidity and mortality[14]. Errors can occur with any medication, including antibiotics, immunosuppressants and chemotherapy agents, causing potential different levels of harm[10].

The World Health Organisation recognises the need to promote patient safety and in 2017 launched its third safety challenge: Medication Without Harm[8]. Ward rounds provide a regular multi-disciplinary environment to assess medication safety and review patients' medications.

1.3 Aims and objectives

The aim of this guideline is to support healthcare professionals in the ward round environment across paediatrics including intensive care, neonates, general medicine, surgery and specialities with specific emphasis on medication review to get it right the first time and to prevent errors occurring.

A wide range of multi-disciplinary healthcare professionals with different tasks and skills are involved in the medication process, from prescribing to dispensing, through to administration and follow up of outcomes. The remit of this guideline is to provide a framework within which roles could be delegated according to service resources. All healthcare professions should work within their legal and professional codes.

2. Background

The medical ward round is a complex clinical process encompassing multiple processes occurring in conjunction with one another[4]. As part of the ward round, active, safe checking against avoidable harm, such as medications should be undertaken. Paediatric patients add another level to the complexity in relation to medication review. Variation amongst calculations for dose based on age, weight or body surface area, formulations, and strengths of medications increase the potential for medication errors[10].

Improving medication safety is not a new concept, multiple national organisations provide resources to help support safe practice, with some developed in response to previous harms. Medication errors cost the NHS millions in claim settlements every year[12]. One concept is the introduction of electronic prescribing and medicines administration system (EPMA). The use of the EPMA system can help with errors relating to poor handwriting, illegibility, and data loss[15]. Most systems also have, some (but variable), inbuilt clinical decision support functionalities helping with recommended doses, routes, and frequencies. The use of EPMA systems is not 100% effective, errors can still occur particularly within paediatrics[16].

Another intervention is the move to pharmacists and medicine management technicians becoming a key member of the multi-disciplinary ward round. Pharmacists have traditionally undertaken daily visits and retrospectively reviewed medication-related issues. They make the necessary recommendations to healthcare professionals and patients[17]. Multi-disciplinary ward rounds and the presence of pharmacists during ward rounds have been shown to reduce medication errors[18]. The Royal Pharmaceutical Society (RPS) highlights the importance of the pharmacy team in medicine reconciliation and ongoing support around medicines[19]. However, there are barriers to the above interventions such as staffing cost and experience of staff, although some of these are being addressed such as with pharmacists qualifying with prescribing abilities from registration[17].

A systematic review undertaken as part of this guideline identified three papers that had implemented an intervention during a ward round; these included the use of checklists, acrostics, and specific 'prescribing ward rounds'[20-22]. All studies showed improvement in medication safety. Ward rounds are a fundamental aspect of clinical care[5] and an area that can be targeted to improve medication safety. The ability to have multiple avenues to improve medication safety is beneficial to both healthcare professionals and CYP and their families.

Ward round definition: There is no single universally accepted definition of a ward round. Wards differ based on environments served, e.g., an intensive care environment will differ from a virtual ward. The RCP describes a ward round as a 'complex clinical process during which the clinical care of hospital inpatients is reviewed'[4] and 'the focal point for a hospital's multidisciplinary teams (MDT) to undertake assessments and care planning with their patients.'[5]. The proposed guideline utilises ward round as the main focal point for a patient's assessment that occurs each day.

3. Clinical guideline recommendations

3.1 Summary of recommendations for improving the content and structure of a paediatric ward round.

We recommend that for CYP in hospital, the ward round following admission* should establish:

1. That existing medications have been prescribed [1C].
2. Whether changes to existing medications are required due to the clinical situation with clear documentation on withholding, stopping, or changing medication if required [1D].
3. That known medication allergies/intolerances have been recorded [1C].

We recommend that for CYP in hospital, every ward round should:

4. Review any new medicines or changes to medications (correct drug/dose/route/indication/formulation/frequency) [1C].
5. Review all prescribed medications when the clinical condition of the patient has changed (improved or deteriorated) [1D].
6. Assess the impact (efficacy and adverse drug reactions) of all medications of the patient and adjust as required [1D].

We recommend that for all CYP in hospital:

7. Regular reviews should be undertaken at regular intervals (e.g., ward rounds, medication review rounds) depending on the clinical state of the patient.

*first ward round/post-take round/first consultant review following admission

3.2 Summary of recommendations for communicating with families and CYP in regard to medications and paediatric ward rounds.

We recommend that during ward rounds, health professionals should arrange a suitable opportunity to confirm with CYP and families:

1. Their understanding of new medicines during an admission [1C].
2. Any changes to prescribed medications [1C].
3. Their concerns about medications during an admission [1D].

3.3 Summary of recommendations for preparing a patient's discharge during paediatric ward rounds.

We recommend that during ward rounds prior to discharge, health professionals should:

1. Confirm with CYP and their families their means of access to medications in the home or community environment [1D].
2. Ensure provision of medications, necessary equipment, and advice on how to get repeat prescriptions (if required) [1D].
3. Provide colleagues in primary care with clear contemporaneous communication on any updated medications (including use of the Discharge medicines Service to provide information to the community pharmacy) [1C].

4. Rationale for recommendations

4.1 Rationale for clinical practice recommendations for improving the content and structure of a paediatric ward rounds.

Recommendation:

1. We recommend for CYP in hospital, the ward round following admission* should establish that existing medications have been prescribed on admission

*first ward round/post-take round/first consultant review following admission

Rationale:

No relevant studies were identified for this review question. The importance of medicine reconciliation has been highlighted as an important safety initiative by national organisations[3].

Incomplete or inaccurate communication of existing medications at admission can lead to increase in prescribing errors and potential harm to patients[23, 24]. The reconciliation should happen within the first 24 hours of admission and come from multiple sources when appropriate, with family involvement[3]. This should also include medications that families may self-administer. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached). The Delphi panellists highlighted that although this should be done every ward round there is often a reliance on the pharmacist on the ward to undertake this.

Recommendation:

2. We recommend for CYP in hospital, the ward round following admission* should establish whether changes to existing medications are required due to the clinical situation.

*first ward round/post-take round/first consultant review following admission

Rationale:

No relevant studies were identified for this review question. Medications should be adapted and altered where appropriate and with discussion with both other healthcare professionals such as pharmacists and families. Communication should be clear particularly where families may be self-administering medications in hospital. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached).

Recommendation:

3. We recommend for CYP in hospital, the ward round following admission* should establish that known medication allergies/intolerances have been recorded.

*first ward round/post-take round/first consultant review following admission

Rationale:

No relevant studies were identified for this review question. The Department of Health has highlighted the need for allergy status to be recorded in patient records when prescribing medications. Medication allergies or intolerances should be ascertained at the time of admission or first prescription. Additional questions regarding other substances not just medications should be included in allergy lists. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached).

Recommendation:

4. We recommend that for all CYP in hospital, every ward round should review any new medicines or changes to medications (correctdrug/dose/route/indication/formulation/frequency).

Rationale:

No studies were identified as being directly relevant for this review question. However, the implementation of a checklist during ward rounds has been shown to reduce errors in prescription writing[20]. Medications should also be reviewed for interactions with other medicines. There was 96% agreement with this recommendation in the Delphi consensus process (consensus reached).

Recommendation:

5. We recommend that for all CYP in hospital, every ward round should review all prescribed medications when the clinical condition of the patient has changed (improved or deteriorated).

Rationale:

No relevant studies were identified. There was 89% agreement with this recommendation in the Delphi consensus process (consensus reached). Panellists highlighted that reviewing medications during an acute deterioration is not the priority over-resuscitation and stabilisation of patients, however, they acknowledged the importance of reviewing medications at the earliest opportunity after such an event.

Recommendation:

6. We recommend that for all CYP in hospital, every ward round should routinely assess the impact (efficacy and adverse drug reactions) of all medications of the patient and adjust as required.

Rationale:

No relevant studies were identified for this review question. There was 86% agreement with this recommendation in the Delphi consensus process (consensus reached). The GDG noted that details regarding medications may change throughout a patient's admission and Delphi panellists highlighted the importance of reviewing medications. The HSIB report highlights that medications can cause adverse drug effects[1]. Adverse drug effects should be reported via the MHRA yellow card scheme and families should be signposted to the online reporting.

Recommendation:

7. We recommend that for all CYP in hospital, medication reviews should be undertaken at regular intervals (e.g., ward rounds, medication review rounds) depending on the clinical state of the patient.

Rationale:

No relevant studies were identified for this review question. A report highlighted that inadequate medicines management is present in 47% of deaths in children with epilepsy, they identified a lack of regular medication review[25]. The GDG agreed that different inpatient areas will require medications to be reviewed multiple times a day or less often depending on the patient, healthcare professionals and lay representatives. There should be a process to regularly review medications in hospitals with named people accountable for the reviews. Pharmacists, interventions such as checklists and medication safety huddles will support this process. A quality improvement study highlighted the benefits of having a clinical pharmacist present for ward rounds and showed a reduction in errors[21]. There was 96% agreement with this recommendation in the Delphi consensus process (consensus reached).

4.2 Rationale for clinical practice recommendations for communicating with families and CYP in regard to medications and paediatric ward rounds.

Recommendation:

1. We recommend that during ward rounds, health professionals should arrange a suitable opportunity to confirm with CYP and families their understanding of new medicines during an admission.

Rationale:

No relevant studies were identified for this review question. However, NICE guidelines highlight the use of shared care and decision making, this extends to decisions regarding medication changes[26]. A study of readability of patient information leaflets used in children highlighted that nine could not be read at a reading age of 13[27]. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached). Delphi panellists agreed that significant changes in medications and concerns should be discussed but this may not be every small change in relation to the medication.

Recommendation:

2. We recommend that during ward rounds, health professionals should arrange a suitable opportunity to confirm with CYP and families any changes to prescribed medications.

Rationale:

No relevant studies were identified for this review question. There was 89% agreement with this recommendation in the Delphi consensus process (consensus reached). Panellists highlighted that this may not occur during every ward round but parents and CYP should be aware of the medications prescribed, discussion with CYP and their families on the level of information they would like to receive is highlighted in NICE guidelines[26]. Clear communication should occur around self-administration of medications and changes to these as well as potential opportunity to change formulations of medications.

Recommendation:

3. We recommend that during ward rounds, health professionals should arrange a suitable opportunity to confirm with CYP and families their concerns about medications during an admission.

Rationale:

Studies have looked at communication on ward rounds, no studies have focussed specifically on medications in paediatrics[28, 29]. NICE guidance highlights the need for effective communication with patients and their families regarding their treatment[2]. There was 89% agreement with this recommendation in the Delphi consensus process (consensus reached). Panellists highlighted that this is often undertaken in collaboration or by the pharmacist on the ward.

4.3 Rationale for clinical practice recommendations for preparing a patient's discharge during paediatric ward rounds.

Recommendation:

1. We recommend that during ward rounds prior to discharge health professionals should confirm with CYP and their families means of access to medications in the home or community environment.

Rationale:

Studies have examined barriers to obtaining medications but not interventions to improve access[30, 31]. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached). GDG members agreed that it is useful to have a contact regarding access of medications if required.

Recommendation:

2. We recommend that during ward rounds prior to discharge health professionals should ensure that CYP and their families are provided with medications, necessary equipment, and advice on how to get repeat prescriptions (if required).

Rationale:

NHS improvement have highlighted services that can be used to ensure patients are supplied with required medication upon discharge[32]. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached). Delphi panellists highlighted that this should be tasked to an individual for accountability, ideally a prescriber or pharmacist with knowledge of the medications.

Recommendation:

3. We recommend that during ward rounds prior to discharge health professionals should provide colleagues in primary care with clear contemporaneous communication on any updated medications.

Rationale:

No relevant studies were identified. The Department of Health highlight the importance of clear communication between colleagues in order to reduce potential errors that may occur[27]. Interventions to improve current communications may be beneficial such as discharge medicine services or electronic records that update in real time[33]. There was 93% agreement with this recommendation in the Delphi consensus process (consensus reached).

5. Implementation

5.1 Barriers and Facilitators

To aid implementation of the recommendations in the guideline, the GDG identified a number of existing barriers and facilitators for implementation.

Existing barriers

- Time constraints within a ward round environment; particularly to engage with the CYP and carers
- Drug knowledge by different members of the MDT
- Resource implications to have the correct staff

Existing facilitators

- Patient decision aids to help with communication around medications during a patients stay and on discharge
- The use of the MDT team, such as pharmacists on the ward round.
- Ward rounds designate responsibility and accountability to individual health professionals
- Parental administration and self-management of medications whilst in hospital

5.2 Audit measures

A number of audit measures have been discussed and proposed by the GDG.

Key priority for implementation	Audit measure	Standard and justification (if needed)
Pharmacist on ward rounds	Proportion of patient episodes where a pharmacist review has been undertaken on a ward round.	Pharmacists are a key member of the MDT to help improve medication safety. Paediatric pharmacist review have been associated with reduced medication incidents.
Communication around medications with families	Proportion of CYP and their families who receive information about their medications during their stay and at discharge.	Measure using the 9-item Shared Decision Making Questionnaire.
Medicine reviews	Proportion of reviews of medications including potential changes that occur during a ward round.	

5.3 Research Recommendations

The GDG identified several topics where the evidence was lacking and propose the following research recommendations.

- For CYP inpatients, does specific/enhance communication with families reduce medication errors?
- For CYP, what interventions reduce medication errors on paediatric ward rounds?
- For CYP, does the use of EMPA systems help to reduce paediatric medication errors?

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Appendix 1: Methodology used to arrive at recommendation

A guideline scope was developed and circulated via the RCPCH to RCPCH&Us, MHRA, NPPG, RCN, Generation R and RCPCH members on the e-bulletin. The guideline development group involved members of the RCPCH/NPPG Medicines Committee. The final scope was agreed by the guideline development group following stakeholder consultation, see table 1 for comments from scoping document.

A systematic review was undertaken in relation to CYP, medication and interventions in ward rounds[34]. Online literature databases, Pubmed, Web of Sciences and Cochrane Register of Trials were searched. A search strategy was developed by the guideline committee to ensure that all relevant papers that answered the clinical question were identified, search terms were based on PICO methodology (Table 2).

Abstracts were screened by two reviewers against the pre-determined inclusion and exclusion criteria, as per the search strategy (Appendix 2). The full papers were assessed with data extracted using a standardised form developed by the two reviewers. Descriptive analysis was undertaken due to the paucity of evidence available.

The review highlighted the lack of evidence around interventions implemented in paediatric ward round environments in relation to medication. A formal Delphi consensus methodology was employed where evidence was lacking. The Delphi panel consisted of representatives from different specialist areas covered by the guideline; pharmacists, nurses both prescribing and non-prescribing, paediatric critical care specialists, paediatric speciality clinicians, general paediatric clinicians, CYP representatives and parent/carer representatives. Each panel group required a minimum of three panellists to be involved. A Likert scale was utilised for panellists to provide their responses to the statements. Consensus agreement was defined as 80% of panellists selecting ‘agree’. Disagreement was considered if >30% panellists selected ‘neither agree or disagree’ and ‘disagree’. Responses were anonymised to the working group, with the exception of the reviewer (CK). Two rounds were undertaken, there was a respondent rate of 28 panellists in round one and 28 panellists in round two. For round one, the denominator for statements that reached consensus was 28, for round two the denominator was 28 for statements. Each specialist area achieved the minimum requirement of panellists. Sensitivity analysis was undertaken for each statement. Statements that reached consensus agreement in the first round were removed from subsequent rounds. A comments section was used for panellists to provide further opinion regarding the statements. The statements that reached consensus were then utilised as minimum standards for the guideline.

Recommendations were graded using the following methodology. These guidelines represent consensus opinion from experts in the United Kingdom. They represent a snapshot of evidence at the time of writing. It is recognised that recommendations are made even when the evidence is weak. It is felt that this is helpful to clinicians in daily guideline.

In these guidelines the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system has been used to rate the strength of evidence and the strength of recommendations(35). Explicit recommendations are made on the basis of the trade-offs between the benefits on one hand, and the risks, burden, and costs on the other.

For each recommendation the quality of evidence has been graded as:

A (high)
B (moderate)
C (low)
D (very low)

Grade A evidence means high quality evidence that comes from consistent results from well performed randomised controlled trials, or overwhelming evidence of another sort (such as well-executed observational studies with very strong effects).

Grade B evidence means moderate quality evidence from randomised trials that suffer from serious flaws in conduct, consistency, indirectness, imprecise estimates, reporting bias, or some combination of these limitations, or from other study designs with special strength.

Grade C evidence means low quality evidence from observational evidence, or from controlled trials with several very serious limitations.

Grade D evidence is based only on case studies or expert opinion.

Level 1 recommendation is a strong recommendation to do (or not to do) something where the benefits clearly outweigh the risks (or vice versa) for most, if not all patients.

Level 2 recommendation is a weaker recommendation, where the risks and benefits are more closely balanced or are more uncertain.

Comments on behalf of: Esther Ip, Feng Li (Croydon University Hospital), Ashifa Trivedi, Will Carroll (University Hospital of North Midlands), Ebraheem Junaid (University Hospitals of North Midlands), Nick Lipscomb, Joanne Shaw, Oliver Rackham (Betsi Cadwaladr University Health Board).

Table 1: comments from scoping document

	Section number	Page number	Comment
1	5	1	Will this include neonatal units? If not, why not?
2	9	2	Does prescribing during the ward round lead to more errors than prescribing away from/after the ward round?
3	9	2	Does prescribing take home medication at the time of ward round improve safety and timeliness of discharge?
4	9	2	We suggest looking at the safety implications of informing and involving children and family members in medication issues. It seems reasonable to imagine that CYP who understand their medication are better placed to prevent errors in the hospital and beyond. For example, there is a well-documented case of a mother preventing a member of the hospital team giving her baby a x10 overdose of insulin.
5	9.1	2	Yes, in hospital settings attendance of a paediatric pharmacist on ward rounds will result in improved medication safety.

	Section number	Page number	Comment
6	9.1	2	Having a paediatric pharmacist on ward rounds would help to improve medication safety, especially on a paediatric surgical ward. Often, surgeons are unfamiliar with drug doses and prescribe adult doses for children. Also, paediatric pharmacists are very good at coming up with formulation options that can tailor around patient's needs and to improve palatability of medications.
7	General	General	Will the guideline consider the safety implications of patients (children/ parents) self-managing their own medication for long term conditions while in hospital, such as asthma inhalers and diabetes drugs?
8	General	General	It needs clarity as to whether this covers prescribing on day case units, ambulatory care, theatres etc.
9	General	General	This will be essential guidance especially to help establish the role of the paediatric pharmacist on the wards and how they can demonstrate their effectiveness in interventions, prescribing (if a prescriber), de-prescribing, formulation issues. Consideration for issues with excipients, prescribing error audits and sharing best practice at ward rounds. The pharmacist must prepare prior to the ward round and ready to answer medication related questions or follow-up after the ward round. Happy to be involved with implementation of this guideline. Role of the pharmacist already established on wards/ward rounds especially PICU and NICU.
10	General	General	Pharmacists can also highlight evidence-based guidelines, tools and writing up SOPs/monograph if there is a gap. We work collaboratively in a multi-professional approach to ensure safe and effective use of medicines including contribution to safety/team huddles.
11	General	General	It is important to consider the value of teaching and teaching about prescribing as part of the 'ward round experience'. Things that worked for us: 1. Regular 2-minute teaching on how medicines work, which was interdisciplinary. 2. Specific teaching on the top 100 drugs (that led to the production of Practical Paediatric Prescriber – Elsevier). 3. Attendance of pharmacist on 'simulated in situ cardiac arrests/ simulation training'. Medicines are the physician's scalpel. We use them poorly most often through ignorance in how they work and why we use them. Safety really starts with moving the team away from 'what and how' to 'why'.
12	General	General	This is important work which can change the way ward rounds are conducted. Much of the published literature around decreasing error rates is based around paediatric pharmacists and having a standard involving their attendance as part of a ward round could decrease medication related errors.

Table 2: PICO characteristics

Population	Intervention	Comparison	Outcome
CYP aged between 0 and equal or less than 18 years old. Population is not restricted to the United Kingdom (UK), we will examine papers from all over the world.	Any intervention or combination of interventions implemented that alters how paediatric ward rounds review inpatient medications including (but not restricted to) acronyms, checklists and inclusion of different health care professionals in the ward round environment.	Standard ward round or inpatient review practice that is undertaken for CYP in a hospital environment.	Reduction in prescribing medication errors, improvement in documentation concerning inpatient medications, healthcare professionals' opinion regarding improvement in medication prescribing in the ward round environment, reduction in adverse events and adverse drug reactions due to the implementation of the intervention.

Appendix 2: Search Strategy

Clinical Questions

1. For children admitted to hospital, what interventions improve medication safety on ward rounds?

Sources

Pubmed, Web of Science and Cochrane Register of Trials.

Inclusion Criteria

Population:

Children aged less than or equal to 18.

Study Designs:

All study designs included. Systematic reviews will be screened for eligible studies. e.g.;

1. Randomised Controlled Trials (RCT).
2. Non-randomised studies (NRS) if no RCT identified, if adjusted for key confounders:
   a) Age
   b) Health at baseline
   c) Comorbidities

Prognostic observational studies and systematic reviews of prognostic observational studies.

Exclusion Criteria

The guideline will not address:

If people aged over 18 years old are included, if they are not done in a hospital inpatient setting such as an emergency department. If they examine interventions that are implemented after a ward round has been completed.

Population:

Children and young people aged 18 or under.

Study Design:

All studies are considered eligible.

Search (MeSH) Terms

	Search Terms
1	Paediatric
2	Pediatric
3	Child
4	Child*
5	Paed*
6	children
7	infant
8	neonate
9	Neonat*
10	baby
11	teenager
12	adolescent
13	pubescent
14	Medicine*
15	Medica*
16	Prescip*
17	Drug*
18	Prescription*
19	Safety
20	Safe*
21	Improv*
22	Ward round
23	Inpatient review
24	Medication review

Search methodology

The clinical questions form the basis of the systematic review of all evidence answering these questions. A systematic search will be conducted using PubMed, web of science and Cochrane trials register. There is no limit on time period or language.

Two members of the working group will independently screen the abstracts of identified studies for potential inclusion and full text papers will be obtained for all papers that one or both members of the working group identify as potential for inclusion in this review. No searching of grey literature and no hand searching of conference proceedings or journals is planned. All searches will be completed in June 2022 and no publications after this date will be included.

Papers will be assessed for inclusion, firstly by checking that their populations, interventions and outcomes fit with the clinical questions for this review. The papers will be critically appraised for methodological quality using the Cochrane risk of bias tool for randomised control trials and the Newcastle-Ottawa Score for observational studies. The evidence will then be graded. Data relevant to this review will be extracted for each paper. Where there is disagreement between the two members about the inclusion of a study, this will be resolved through discussion or by arbitration with a third senior working group member.