



**Health
Information
and Quality
Authority**

An tÚdarás Um Fhaisnéis
agus Cáilíocht Sláinte

Report of the announced inspection of medication safety at St Columcille's Hospital, Loughlinstown, Dublin.

**Date of announced inspection:
21 June 2017**

About the Health Information and Quality Authority

The Health Information and Quality Authority (HIQA) is an independent authority established to drive high-quality and safe care for people using our health and social care services in Ireland. HIQA's role is to develop standards, inspect and review health and social care services and support informed decisions on how services are delivered.

HIQA aims to safeguard people and improve the safety and quality of health and social care services across its full range of functions.

HIQA's mandate to date extends across a specified range of public, private and voluntary sector services. Reporting to the Minister for Health and the Minister for Children and Youth Affairs, HIQA has statutory responsibility for:

Setting Standards for Health and Social Services — Developing person-centred standards, based on evidence and best international practice, for health and social care services in Ireland.

Regulation — Registering and inspecting designated centres.

Monitoring Children's Services — Monitoring and inspecting children's social services.

Monitoring Healthcare Safety and Quality — Monitoring the safety and quality of health services and investigating as necessary serious concerns about the health and welfare of people who use these services.

Health Technology Assessment — Providing advice that enables the best outcome for people who use our health service and the best use of resources by evaluating the clinical effectiveness and cost effectiveness of drugs, equipment, diagnostic techniques and health promotion and protection activities.

Health Information — Advising on the efficient and secure collection and sharing of health information, setting standards, evaluating information resources and publishing information about the delivery and performance of Ireland's health and social care services.

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1. Introduction

Medications are the most commonly used intervention in healthcare, and advances in medication usage continue to play a key role in improving patient treatment success. However, where medicines are used, the potential for error, such as in prescribing, administering or monitoring, also exists. While most medication errors do not result in patient harm, medication errors have, in some instances, the potential to result in catastrophic harm or death to patients.

Medication related events were the third most common type of adverse event recorded in the Irish National Adverse Events Study.¹ Medication safety has also been identified internationally as a key focus for improvement in all healthcare settings and it is estimated that on average, at least one medication error per hospital patient occurs each day.² The World Health Organisation (WHO) has identified *Medication Safety* as the theme of the next Global Patient Safety Challenge.³ This global safety initiative, launched in March 2017, aims to address the weaknesses in health systems that lead to medication errors and the severe harm that result.

HIQA's medication safety monitoring programme, which commenced in 2016, aims to examine and positively influence the adoption and implementation of evidence-based practice in public acute hospitals around medication safety. HIQA monitors medication safety against the *National Standards for Safer Better Healthcare*⁴, to determine if hospitals have effective arrangements in place to protect patients from harm related to medication use.

An expert advisory group was formed to assist with the development of this medication safety monitoring programme. The advisory group membership included patient representation, alongside members with relevant expertise from across the Irish health service. Specific lines of enquiry were developed to facilitate medication safety monitoring. The lines of enquiry which are aligned to HIQA's *National Standards for Safer Better Healthcare* are included in Appendix 1 of this report. Further information can be found in a *Guide to the Health Information and Quality Authority's Medication Safety Monitoring Programme in Public Acute Hospitals 2016*⁵ which is available on HIQA's website: www.hiqa.ie

An announced medication safety inspection was carried out at St Columcille's Hospital by Authorised Persons from HIQA; Nora O' Mahony, Dolores Dempsey-Ryan, and Joan Heffernan. The inspection was carried out on 21 June 2017 between 09.30hrs and 15.00hrs. Interviews were held in the hospital with the following groups of managers and clinical staff:

- Group one: the Chairperson of the Drugs and Therapeutics Committee, the Chief Pharmacist and the Risk Manager

- Group two: the General Manager, the Clinical Director and the Director of Nursing.

Inspectors visited the following clinical area and spoke with staff and reviewed documentation:

- St Anne's Ward

In addition, a survey was conducted among outpatients in the Outpatient Department.

HIQA would like to acknowledge the cooperation of staff who facilitated and contributed to this announced inspection and the hospital outpatients who completed the survey.

2. Findings at St Columcille's Hospital

The following sections of this report present the general findings of this announced inspection which are aligned to the inspection lines of enquiry.

2.1 Governance and risk management

Lines of enquiry:

- Patient safety is enhanced through an effective medication safety programme underpinned by formalised governance structures and clear accountability arrangements.
- There are arrangements in place to identify report and manage risk related to medication safety throughout the hospital.

St Columcille's hospital is a model two hospital⁶ in the Ireland East Hospital Group. The hospital had formalised governance arrangements and organisational structures with clear lines of accountability in place to support the safe use of medications.

The Drugs and Therapeutics Committee was responsible for the governance of the hospital's medication management system and for ensuring its safety.⁷ The Committee had recently updated its terms of reference which outlined the Committee's aims and objectives, frequency of meetings, quorum, responsibilities of members, reporting structures and Committee membership. Membership of the Committee was multidisciplinary to reflect the fact that medicines management was the responsibility of a number of clinical professional groupings.⁷ Membership included clinicians, pharmacists, nurses, hospital management, and other healthcare professionals who participated in the medication-use process. However, some disciplines outlined in the Committee's membership had not attended meetings in the minutes provided for reviewed. Inspectors were informed that general practitioner (GP) representation was difficult due to timing of meetings. However, medicines related issues were raised as required at the Local Integrated Care Committee which was attended by hospital staff, GP's and community pharmacists.

The Drugs and Therapeutics Committee reported to the hospital's Clinical Governance Committee, and serious medicines related issues were escalated as required to the Ireland East Hospital Group through the General Manager. The hospital demonstrated how this reporting structure worked well when an issue related to the storage of medicines, outside the control of the hospital's risk management process, was escalated to Group level and resolved.

The Drugs and Therapeutics Committee was the designated committee to oversee the hospital's antimicrobial stewardship programme and the hospital's medication safety function. In addition this Committee was responsible for oversight and implementation of the hospital's medication safety annual plan. A member of the

hospital's Drugs and Therapeutics Committee was also a member of the St Vincent's University Hospital Drugs & Therapeutics Committee, which promoted learning and collaboration across sites.

The Drugs and Therapeutics Committee was responsible for administering an evidence based formulary* of medications approved for use in the hospital. The Committee formally adopted the St Vincent's University Hospital formulary and adapted it for use within the hospital. Decisions to add or remove medications from the formulary were guided by a recently introduced application form. The applications were assessed for therapeutic and ethical considerations, financial implications and the medicines only approved if all elements were fulfilled.

There was a clearly documented structure relating to medication safety in place at St Columcille's Hospital. It was evident that the medication safety agenda was being actively progressed at the hospital. Operational implementation of the medication programme was effectively facilitated by the Chief Pharmacist supported by the Risk Manager, the Drugs and Therapeutics Committee, the Clinical Governance Committee and staff at the hospital.

The hospital had an established system for reporting and addressing medication errors and near misses, this system was supported by a policy on the management of medication incidents. Medication incidents and near misses were tracked and trended to assess progress, identify emergent medication safety concerns and prioritise medication safety activities. For example, following the analysis of medication incidents, the hospital had identified a number of medication safety incidents related to the use of intravenous paracetamol and had introduced measures to address this risk. Measures included:

- the addition of intravenous paracetamol to the hospitals high-alert[†] medicines list
- the development of a poster outlining safe prescribing and administration of paracetamol guide
- review of the medication prescription and administration record to support staff to check that the total daily dose of paracetamol was not exceeded
- supporting education.

The chief pharmacist reviewed and graded all medication incidents using the National Coordinating Council for Medication Error Reporting and Prevention

* A formulary is a hospital's approved list of medicines that staff can use as a reference document to ensure safe and cost-effective prescribing.

[†] High-Alert Medications are medicines that bear a heightened risk of causing significant patient harm when they are not used correctly. Errors with these medicines may not be more common than those from other groups but their consequences can be more devastating as they have smaller margins of safety than other medications and therefore warrant particular caution in their handling.

(NCCMERP) Medication Error Index to categorise incidents in terms of patient harm (appendix 2). The index considered factors such as whether the error reached the patient and, if the patient was harmed, to what degree. All medication incidents categorised as D or higher (Appendix 2) were reported to the Risk Manager and these incidents were inputted to the National Incident Management System (NIMS) system[‡]. Issues which were considered to potentially compromise the safe administration of medication were included on the hospital's risk register.

Medication safety reports were submitted to the Drugs and Therapeutics Committee and the Clinical Governance Committee. The inspectors were informed of a notable increase in medicines related incidents reported in quarter one 2017. This increase coincided with the introduction of a risk manager post to the hospital, and reflected the emphasis placed on patient safety by the hospital and the willingness of front-line staff to report medication incidents. Higher incident reporting rates both demonstrate and promote an improved culture of safety.⁸ HIQA note that notwithstanding this positive trend in reporting, the majority of reports were submitted by clinical pharmacists, with some from nursing and medical staff. Therefore, the culture of reporting medication incidents needs to be broadened out to include all healthcare staff so that safety surveillance is improved, learning is shared, and a safety culture is promoted and enhanced across the organisation.

Open disclosure occurs when staff in the health and social care service communicate with patients in an open and honest manner when things go wrong with patient care.^{4,9} Inspectors were informed that training on open disclosure had been provided by the Risk Manager since January 2017 and that a culture of open disclosure was developing, although not formally audited to date. Staff outlined that a section in the medication safety report form, to indicate if open disclosure has occurred, will be used to facilitate audit and review going forward.

Medication-related incident reporting facilitates the identification of risk and opportunities for improvement. However, on its own it does not provide a complete picture of all potential sources of risk and patient harm.¹⁰ The hospital used a variety of additional information sources to identify strengths and weaknesses in the hospital medication management system including, direct observation, audit, risk assessment and nursing metrics.

[‡] The State Claims Agencies (SCA) National Incident Management System (NIMS) is a risk management system that enables hospitals to report incidents in accordance with their statutory reporting obligation to the SCA (Section 11 of the National Treasury Management Agency (Amendment) Act, 2000).

2.2 Audit and evaluation

Line of enquiry:

- The effectiveness of medication management systems are systematically monitored and evaluated to ensure they are effective.

Elements of medication safety were evaluated through audit at the hospital. These audits were not formally aligned to a medication safety strategy or centrally coordinated, however the hospital had recently set up an audit committee to support this function.

Documentation reviewed showed that a number of medication safety related audits had been undertaken, by clinical staff at the hospital, over the past 12 months which included audits of:

- point prevalence studies of healthcare associated infections and antimicrobial use
- anticoagulant[§] prescribing
- insulin storage in line with medication management policy
- venous thromboembolism^{**} (VTE) prophylaxis^{††}
- medication reconciliation and checking of rewritten patient medication and prescribing records
- nurse prescribing of medicinal products
- glucometer audits
- out of hours monitoring of pharmacy medications.

An audit of anticoagulant prescribing carried out over a nine month period in 2015 highlighted prescribing errors related to anticoagulants. Following this audit a quality improvement initiative was introduced in which red stickers were developed which warned staff to check for other prescribed anticoagulant, indications, renal function, age and interactions. These stickers were reviewed by a multidisciplinary group, approved by the Drugs and Therapeutics Committee and implemented. They were placed on the medication prescription and administration record by the clinical pharmacist when a patient was prescribed a DOAC^{*} (Direct Oral Anticoagulant). A re-audit, over the same time period in 2016, highlighted an improvement with a 61% reduction in anticoagulation prescribing errors. No reported incident caused patient harm.

§ Medications used to treat or prevent blood clots

** Thromboembolism is the obstruction of a blood vessel by a blood clot that has become dislodged from another site in the circulation.

†† A prophylaxis is a medication or a treatment designed and used to prevent a disease from occurring

Nursing and midwifery quality care metrics^{‡‡} were monitored monthly across the hospital to review practice around some aspects of medication storage and administration. The metric findings over a 12 month period were reviewed by inspectors. The results relating to medication storage, custody and administration were consistently between 94-100%. However, more improvement was required with regard to the medication prescription metrics; an issue escalated to the Hospital Group through the monthly performance meetings.

Notwithstanding the examples of audit outlined above, the hospital should continue to progress its audit programme, to formally align it with a medication safety strategy, and provide greater assurance to the senior hospital management team that all opportunities for improvement are being implemented and evaluated for effectiveness.

2.3 Medication safety support structures and initiatives

Line of enquiry:

- Hospitals develop effective processes to promote medication safety that are implemented and supported by clear and up-to-date policies, procedures and or protocols.

A medication safety end of year report for 2016 was prepared by the Chief Pharmacist for the Drugs and Therapeutics Committee. This report provided a detailed review of medication incidents reported throughout the year and outlined a summary of medication safety programme actions undertaken in 2016 including:

- prescription and administration record review and update
- review of the hospital guidelines for the use of antimicrobials
- review of policies for medication management and medication incidents
- development of posters on sound-alike and look- alike drugs (SALADS), safe prescribing and administration of paracetamol guide and medications that increase the risk of falls
- availability of NEWT Guidelines^{§§} for advice on administering medication to patients with swallowing difficult or feeding tubes
- participation in the national collaborative on venous thromboembolism (VTE) prophylaxis
- continued use of medication stickers to support safer administration of direct oral anticoagulants (DOAC's) and methotrexate.

‡‡ Metrics are parameters or measures of quantitative assessment used for measurement and comparison or to track performance.

§§ The NEWT Guidelines aims to provide prescribers and other healthcare professionals with a single point of reference which draws together the available information relating to medicines management in patients with enteral feeding tubes or swallowing difficulties, and presents it in a practical fashion.

- education sessions provided on safe prescribing, administration and safe use of antimicrobials and promotion of e-learning on high-alert medicines.

There are currently no agreed national standards outlining requirements for the provision of clinical pharmacy services in hospitals. International studies support the role of clinical pharmacists in hospital wards in preventing adverse drug events.^{11,12,13,14,15,16} The hospital had a clinical pharmacist^{***} in all clinical areas. The clinical pharmacists reviewed inpatient medication prescription and administration records to ensure safe, effective, economic use of medicines, to monitor interaction, adverse reaction and where possible that the therapy was achieving the therapeutic effect.

Medication reconciliation at the time of admission is a systematic process conducted by an appropriately trained individual, to obtain an accurate and complete list of all medications that a patient was taking prior to admission.^{17,18,19,20} In St Columcille's hospital the doctor undertook initial medication reconciliation on admission. The clinical pharmacist also completed medication reconciliation following admission and when patient's medication prescription and administration record was rewritten. An audit undertaken in June 2017 identified that 92% of patients had documented evidence of medication reconciliation completed by a clinical pharmacist. In addition 94% of all rewritten medication prescription and administration records were checked by a clinical pharmacist. These results compare favourably with what inspectors have found in other hospitals so far during this monitoring programme.

The Drugs and Therapeutics Committee reviewed and approved the hospital's list of high-alert medications which was supported by policy. This list was developed using information from the Irish Medication Safety Network, Health Products Regulatory Authority (HPRA) website, St Vincent's University Hospital and the hospital's medication safety incidents. Of note, the medicines which rated highest in the hospital's medicine related errors were included on this high-alert list. Risk reduction strategies²¹ were implemented to ensure that high-alert medications were stored, prescribed, dispensed and administered safely included:

- use of alert stickers to support safe administration of direct oral anticoagulants and methotrexate
- use of premixed potassium chloride solutions
- a safe prescribing and administration of intravenous paracetamol guide
- redesign of the medication prescription and administration record to incorporate a section of venous thromboprophylaxis, warfarin and direct oral anticoagulants
- insulin pen labelling and storage.

^{***} Clinical pharmacy describes the activity of pharmacy teams in ward and clinic settings.

The existence of confused medication names is one of the most common causes of medication error and is of concern worldwide.²² The hospital has also developed a poster of sound-alike and look- alike drugs (SALADs).²³

Interruptions during medication administration rounds are thought to be a prominent causative factor of medication errors.²⁴ Managers told inspectors that, to reduce interruptions red "do not disturb" tabards were worn by nursing staff while administering medications. This intervention was designed to draw attention to the fact that the medication round was in progress, and that nurses should not be interrupted while administering medications.

St Columcille's Hospital was also participating in the Health Service Executive (HSE) Quality Improvement Division venous thromboembolism (VTE) quality improvement collaborative. This is a collaborative among multidisciplinary teams in Irish adult acute public and voluntary hospitals who are working together to achieve appropriate thromboprophylaxis for their hospital's inpatients, to reduce the risk of venous thromboembolism and to minimise harm and expenditure associated with unnecessary thromboprophylaxis. The medication prescription and administration record had been revised to include VTE risk assessment and VTE prophylaxis orders for medical patients. This was approved by the Drugs & Therapeutics Committee in May 2017 and was observed in use on the ward visited by inspectors.

2.4 Person-centred care

Line of enquiry:

- Patients and/ or carers are informed about the benefits and associated risks of prescribed medications in a way that is accessible and understandable.

Patients should be well informed about any medications they are prescribed and any possible side-effects. This is particularly relevant for those patients who are taking multiple medications.^{25, 26}

Inspectors were informed during interviews that patient education related to medication was provided by doctors, nurses and pharmacists. Clinical pharmacists offered counselling to patients on newly prescribed oral anticoagulant medication and to patients during phase II of the cardiac rehabilitation programme. Patient information leaflets were available and viewed on ward areas.

As part of this HIQA inspection, a small sample of patients attending the Outpatient Department completed an anonymised questionnaire in relation to prescribed medications. The questionnaire was completed by 13 patients who had been inpatients in St Columcille's Hospital within the past year and who were prescribed regular medications. Of the 13 patients surveyed, one patient had not been

prescribed any new medicines and 12 patients had been prescribed new medicines. Of these 12 patients:

- nine patients said that a staff member had explained the purpose of new medication in a way that they could understand
- six patients said that a staff member told them about possible medication side effects to look out for following discharge home
- seven patients said they received instruction on how to take their medications at home.

It is acknowledged that the sample size of patients who completed the anonymised questionnaire was small, and therefore was not representative of all recently discharged patients taking prescribed medication. However, patient education is an integral component of the safe, effective and cost-effective use of medications. This patient questionnaire did provide some baseline information about outpatient's understanding of medications and may be used as a focus for further improvement.

2.5 Policies procedures and guidelines and access to information

Lines of enquiry:

- Hospitals develop effective processes for medication management that are implemented and supported by clear and up to date policies, procedures and/or protocols.
- Essential information supporting the safe use of medicines is readily available in a user friendly format and is adhered to when prescribing, dispensing and administering medications.

The Pharmacy Department had developed a number of multi-disciplinary medication management policies which were approved by the Drugs and Therapeutics Committee and the Clinical Governance Committee. Inspectors observed that up-to-date versions of medication policies, procedures, protocols and guidelines were available to staff in clinical areas in printed and electronic versions. In the absence of an electronic document control system, the hospital had a manual system in place to update all paper and electronic copies of policies, procedures, protocols and guidelines.

Multiple sources of medication information were readily available to staff involved in medication use including:

- the British National Formulary
- guidelines for the use of antimicrobials in printed and electronic versions
- intravenous drug administration guide
- guide on the treatment of both high and low blood potassium levels

- guidelines for treatment of low blood magnesium levels
- NEWT guidelines available on line for advice on administering medication to patients with swallowing difficult or feeding tubes
- insulin prescription record which contained guidelines for management of hyperosmolar hyperglycaemic state^{†††} and diabetic ketoacidosis.^{‡‡‡}

The hospital provided copies of internal communications which had been circulated to staff on medication safety for example, updates on the medication prescription and administration record and medicines information resources available in all clinical areas.

Healthcare staff require access to complete and accurate patient information, relevant to the safe use of medications, at the point of clinical decision making to help ensure patient safety. Clinical staff had ready access to patients' diagnostic results on computers in clinical areas across the hospital.

2.6 Training and education

Line of enquiry:

- Safe prescribing and drug administration practices are supported by mandatory and practical training on medication management for relevant staff.

Staff education is an important error prevention strategy when combined with other strategies that strengthen the medication use system.^{21,27} Inspectors were informed that all nurses and pharmacy staff attended training on the safe use of medications upon commencement of employment in the hospital, and the chair of the Drugs & Therapeutics Committee and pharmacy staff provided education sessions on medication safety for non-consultant hospital doctors on induction.

On commencing employment in the hospital nursing staff completed an intravenous medication study day in St Vincent's University Hospital and clinical supervision was provided locally. Nursing staff were encouraged to complete the HSElanD medicines management module.

Medicines related education sessions were delivered by Pharmacist for example, medication safety and administration of medicines to patients with dysphasia. Education slides on the venous thromboembolic improvement collaborative and the launch of the related risk assessment tool were also viewed by inspectors.

^{†††} Hyperosmolar hyperglycaemic state (HHS) is a complication of diabetes mellitus (predominantly type 2) in which high blood sugars cause severe dehydration, increases in osmolality (relative concentration of solute) and a high risk of complications, coma and death.

^{‡‡‡} Diabetic ketoacidosis (DKA) is a serious condition that can lead to diabetic coma (passing out for a long time) or even death. When your cells don't get the glucose they need for energy, your body begins to burn fat for energy, which produces ketones.

An online medication safety programme which focused on high risk medication was available and recommended to doctors, nurses and pharmacy staff.

3. Conclusion

Medications represent the primary measure for treatment intervention in hospitalised patients. Error associated with medication usage constitutes one of the major causes of patient harm in hospitals. Medication safety should therefore be a priority area for all hospitals as they seek to ensure a high quality and safe service for patients.

The medication safety agenda was being proactively progressed at St Columcille's Hospital. Medication safety was prioritised at organisational level and it was evident that this had been driven by effective local leadership and executive management support. There was strong multidisciplinary involvement, and evident engagement and support from senior clinicians working collaboratively to maximise the quality of medication safety across the hospital.

The Drugs and Therapeutics Committee had effective leadership with clear governance arrangements in place with systems, processes and practices to support medication safety in the hospital. The Committee had formal and effective links with St Vincent's University Hospital Drugs and Therapeutics Committee which promoted learning and collaboration across sites.

The hospital demonstrated a variety of quality improvement initiatives which had been implemented relating to medication safety, for example the hospital had developed a list of high-alert medicines and associated risk reduction strategies to enable safer storing, prescribing, and administration of these high risk medicines.

Important lessons can be learned from analysis of medication incidents and near misses.⁹ Medicines related incidents and near misses were tracked, trended and graded, and where trends were identified, action was taken to prevent re-occurrence of such variance. However medication incident reporting by all healthcare staff was identified by HIQA and the hospital as an areas requiring further improvement.

Audit represents a key component of all effective clinical governance programmes and examples of audits undertaken by hospital staff were reviewed by inspectors. The hospital should continue to work to promote quality assurance systems including auditing of medication safety aligned to a formalised medication safety strategy.

It is recommended that, following this inspection, this report is shared with senior managers, clinicians and other relevant staff at St Columcille's Hospital to highlight both what has been achieved by the hospital to date in implementing medication safety activities, and to foster further collective progression from this time point.

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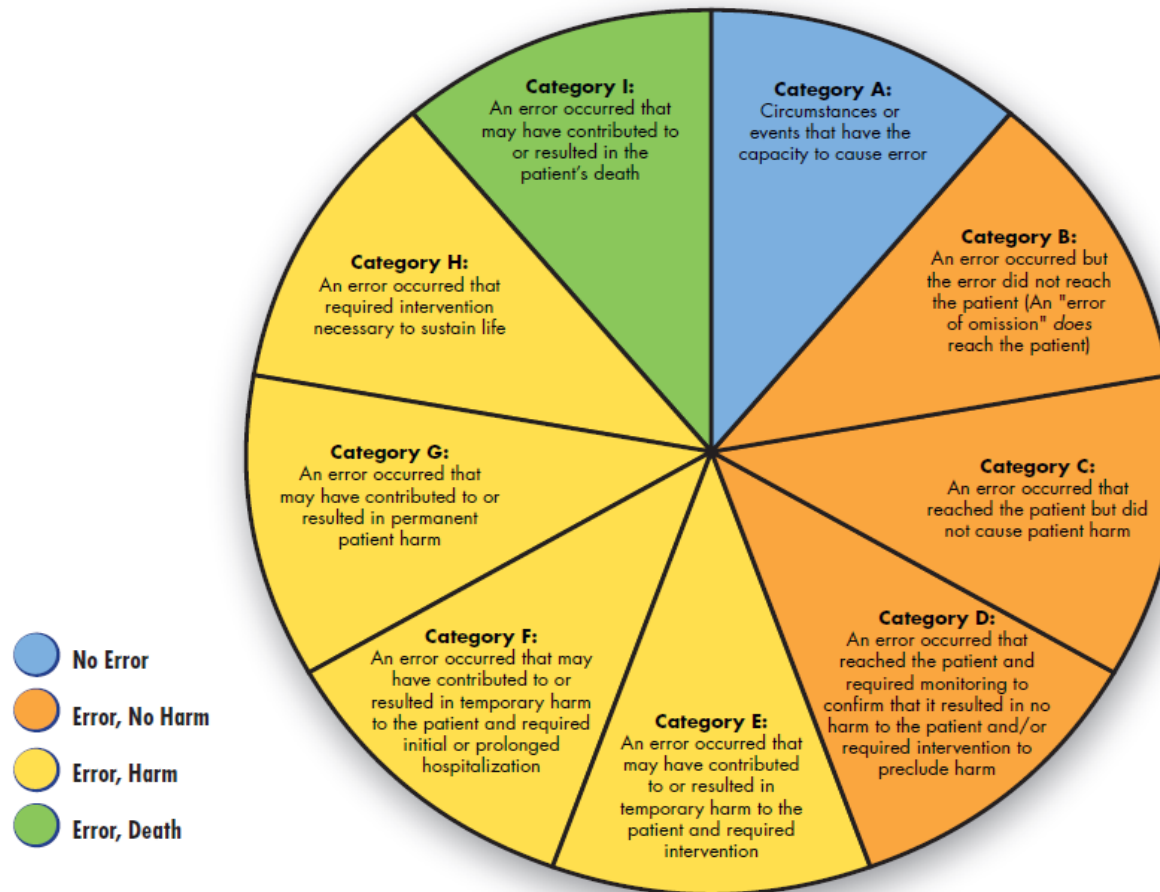
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5. Appendices

Appendix 1 : Medication safety monitoring programme Phase One: Lines of Enquiry and associated National Standard for Safer Better Healthcare

Area to be explored	Line of enquiry ¹	National Standards for Safer Better Healthcare
Clear lines of accountability and responsibility for medication safety	Patient safety is enhanced through an effective medication safety programme underpinned by formalised governance structures and clear accountability arrangements.	3.1, 5.1, 5.2, 5.4, 5.5, 5.6, 5.8, 5.9, 5.10, 7.1
Patient involvement in service delivery	Patients and or carers are informed about the benefits and associated risks of prescribed medicines in a way that is accessible and understandable.	1.4, 1.5, 1.7, 3.1, 4.1
Policies procedures and guidelines	Hospitals develop effective processes to promote medication safety that are implemented and supported by clear and up-to-date policies, procedures and or protocols.	2.1, 3.1, 3.2, 3.3, 3.5, 3.6, 3.7, 5.8, 5.11, 8.1
Risk management	There are arrangements in place to identify, report and manage risk related to medication safety throughout the hospital.	3.1, 3.2, 3.3, 3.5, 3.6, 3.7, 5.8, 5.10, 5.11, 8.1
Audit and evaluation	The effectiveness of medication management systems are systematically monitored and evaluated to ensure they are effective.	2.8, 3.1, 5.8, 8.1
Education and training	Safe prescribing and drug administration practices are supported by mandatory and practical training on medication management for relevant staff.	6.2, 6.3
Access to information	Essential information of the safe use of medications is readily available in a user-friendly format and is adhered to when prescribing, dispensing and administering medications.	2.5, 8.1

Appendix 2. National Coordinating Council for Medication Error Reporting and Prevention. Index for Categorizing Medication Errors.



Definitions

Harm

Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting there from.

Monitoring

To observe or record relevant physiological or psychological signs.

Intervention

May include change in therapy or active medical/surgical treatment.

Intervention Necessary to Sustain Life

Includes cardiovascular and respiratory support (e.g., CPR, defibrillation, intubation, etc.)

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