Medication Errors

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Governance for Quality and Safety

we are all responsible...and together we are creating a safer healthcare system
Clinical governance is described as the system through which healthcare teams are accountable for the quality, safety and experience of patients in the care they have delivered. For health care staff this means: specifying the clinical standards you are going to deliver and showing everyone the measurements you have made to demonstrate that you have done what you set out to do

Quality & Patient Safety Directorate
Find it, fix it and confirm it (O’Connor & Patton 2008)

**Find it:** Clinical audit, performance indicators, evaluation of effectiveness, incidents/complaints investigation, reporting of frequent selected events, root cause analysis, coroner/external investigations

**Fix it:** Clinical service redesign, clinical practice improvements, development of policies & procedures, education and training, service planning & development, implementation of recommendations of external reviews & investigations

**Confirm it:** Systematic re-audit of previously targeted indicators, recommendation database
Model (Braithwaite & Travaglia 2008)

- Promote quality & safety
- Patient centred approach
- Structure to improve safety & quality
- Effective use of data & evidence
Good practice (Chambers et al 2007)

- Risk management
1. Out of date clinical practice
2. Lack of continuity of care
3. Poor communication
4. Mistakes in patient care (Known & Unknown)
5. Patient complaints and a lack of response to complaints
6. Financial risk
7. Concerns about reputations
8. Low staff morale
Quality Standards (adapted from Swage 2000)

- National Service Frameworks
  - NICE
- Clinical Governance
- Lifelong learning
- HIQA
- MHC

- Professional Self-Regulation
- Monitoring standards
- Dependable local delivery
- Clear Service Standards
- Patient & Public Involvement
Quality & Risk Standard (HSE 2007)

Internal Control Model
<table>
<thead>
<tr>
<th>Domains</th>
<th>Structure</th>
<th>Process</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Board/Community Healthcare Organisation</td>
<td>Quality and performance indicators</td>
<td>Patient care</td>
</tr>
<tr>
<td></td>
<td>Quality and Safety Board Committee</td>
<td>Learning and sharing information</td>
<td>Patient experience</td>
</tr>
<tr>
<td></td>
<td>Executive Management Team</td>
<td>Patient and public involvement</td>
<td>Staff experience</td>
</tr>
<tr>
<td></td>
<td>Quality and Safety Executive Committee</td>
<td>Risk management and patient safety*</td>
<td>Service improvement</td>
</tr>
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<td></td>
<td>Directorates</td>
<td>Clinical effectiveness and audit</td>
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<td></td>
<td>Clinical leadership</td>
<td>Staffing and staff management</td>
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<td></td>
<td>Accountability spine</td>
<td>Information management</td>
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<td></td>
<td></td>
<td>Capacity and capability</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Context</th>
<th>Individual Practitioner</th>
<th>Service/Department/Directorate</th>
<th>Senior/Executive Management Team</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Board/Community Healthcare Organisation</td>
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<tr>
<td></td>
<td></td>
<td>National Health Body</td>
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</table>
National Standards for Safer, Better Healthcare
HIQA 2012
Assurance Check (HSE 2012)

- To provide a baseline for clinical governance.
- Review structures and processes.
- Embed good clinical governance.
- Lead in quality patient safety care
- Assist in implementation of regulatory standards
- Prepare for licensing system
- Internal process- does not go to HSE/other agency
2 Parts

- 1: Clinical governance structures
- Based on giving evidence or actions being taken to achieve and person responsible
Pre-requisites

- A) Elements of clinical governance must be described explicitly
- B) Elements must include a comprehensive set of systems and processes that will ensure safe, high quality and continually improving processes of care
- C) There must be specified roles and responsibilities across all levels of the health service
- D) Lines of direction, reporting and accountability and ownership, checks, balances and initiative within teams and communities of clinicians
- E) Embedded in the organisation to enable effective action to be taken

(O’Connor & Patton 2008)
Key focus areas for quality and patient safety in 2014

- Commitment to supporting the development of an open and transparent culture with defined accountability for quality and safety
- Clear governance and accountability for quality and safety at all levels of the Health Service and Divisions
- Improving the patient experience within health services
- Supporting quality improvement throughout the health system to improve outcomes and reduce patient harm
- Ensuring that standards, policies and guidelines are understood and appropriately implemented
- The development and use of a comprehensive set of quality and safety indicators to measure the quality and safety of our services and take appropriate action to improve poor performance including medication safety, healthcare associated infections (HCAI) and the national early warning score (NEWS)
- Ensuring that there is robust risk assessment (from a patient safety perspective) of any reconfiguration of services required to meet financial and staffing constraints
- Continued development of the controls assurance process that requires all managers to provide assurance on their accountabilities for clinical and social services to the same level as is required for financial accountability
Adverse Events

- State Authorities are obliged to report adverse incidents promptly to the State Claims Agency under the National Treasury Management Agency (Amendment) Act (2000).

- State authorities and the State Claims Agency are required to develop and implement risk mitigation strategies.

- Report via the National Adverse Event Management System (Formally STARSWeb): Personal injuries, property damage.

- An early study demonstrated that 1:20 an have unintended negative outcomes (Leape et al. 1991)
Clinical Indemnity Scheme

- Established in 2002
- Remit - claims management and risk management.

**Mandate**

1. **Enterprise liability**
2. **Manage claims made against the enterprise in a timely and effective manner**
3. **Assist the enterprise to reduce the volume of claims by risk management**
4. **Lead on and support safe care**
5. **Guide and support clinical risk management in all enterprises’**

(Quinlan 2013)
Context 2012 (NTMA 2013)

- Inpatient or day care: 1.4 million people
- 1.2 million A & E attendances
- 76,842 adverse events
- Underreporting: 2.9%
- Developed countries: 4-16% (Lang 2005)
Adverse events for between 1/1/12 & 31/12/12 & reported by 16/4/13

Ranked third

Source: NTMA 2013
Adverse events: where they occur

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>25</td>
</tr>
<tr>
<td>Disability</td>
<td>16.4</td>
</tr>
<tr>
<td>Mental Health</td>
<td>12.4</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>10.1</td>
</tr>
<tr>
<td>Elderly Services</td>
<td>9.8</td>
</tr>
<tr>
<td>Surgery</td>
<td>9.4</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>3.1</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>3.1</td>
</tr>
<tr>
<td>Community Health Services</td>
<td>1.7</td>
</tr>
<tr>
<td>Gynaecology</td>
<td>1.3</td>
</tr>
<tr>
<td>Haematology</td>
<td>0.9</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>0.9</td>
</tr>
<tr>
<td>Radiology</td>
<td>0.8</td>
</tr>
<tr>
<td>Anaesthesia</td>
<td>0.5</td>
</tr>
<tr>
<td>Allied Professional Services</td>
<td>0.4</td>
</tr>
<tr>
<td>Laboratory Services</td>
<td>0.2</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: NTMA 2013
All adverse events reported by specialties

Mostly medicine
Staff category of reporters

Source: NTMA 2013
Adverse events reported by medical staff

Adverse events reported by nursing staff

Source: NTMA 2013
A medication is a ‘product that contains a compound with proven biological effects, plus excipients or excipients only; it may also contain contaminants; the active compound is usually a drug or prodrug, but may be a cellular element’ Aronson (2005:852)
Definition of medication error

Prescribing is the commonest form of medication intervention.

Routine prescribing and the transfer of old prescriptions onto new charts is a potential source of error. (Bates et al 2010)

A medication error is any preventable event that may cause or lead to inappropriate medication use or harm to a patient (FDA 2009).

‘A medication error is a failure in the treatment process that leads to or has the potential to lead to, harm to the patients’ (Aronson 2009:513).
Medication Error

Contributing factors

Role of individuals

Local context

Organisational factors

Most vulnerable in care transitions
Medication error

- Most common cause of post discharge complications accounting for 2/3 of all post operative complications (more than half are likely preventable)

- In the US, medication error accounts for 3.5 million physician office visits, an estimated one million emergency dept. visits and about 125,000 hospital admissions

- Older people are 7 times more likely than younger groups to have a hospital admission

- Of particular concern:
  1. Anti-coagulants: Main concern bleeding
  2. Diabetes agents: Main concern Hypo-glycaemia
  3. Opioids: Main concern accidental overdose, over-sedation and respiratory depression

Office of the Assistant Secretary for Health 2013
Older People

- May have inappropriate medications prescribed, contraindicated for age, wrong dose for age = Potentially inappropriate medications
- Also an issue in terms of PIM symptoms being mistaken for a new symptom and leads to a prescribing cascade.
- Older people in nursing homes can receive up to 4 times more medications than those at home.
- 27% ADEs in primary care and 42% in LTC were preventable
- 2002-2003: Healthcare expenditures related to PIM = $7.2 billion
- Updated Beer’s Criteria (AGS 2012) 3 sections-PIM, Particular diseases or syndromes and drugs with caution.
- Polypharmacy an issue for older people (Barnett et al. 2011)
Can occur in the following

- **Choosing a medicine**- irrational, inappropriate and ineffective prescribing, under prescribing and over prescribing
- **Writing the prescription**- prescription errors including illegibility
- **Manufacturing the formulation to be used**- wrong strength, contaminants or adulterants, wrong or misleading packaging
- **Dispensing the formulation to be used**- wrong drug, wrong formulation, wrong label
- **Administering or taking the drug**- wrong dose, wrong route, wrong frequency, wrong duration
- **Monitoring therapy**- failing to alter therapy when required, erroneous alteration.

Aronson 2009
Errors

- Knowledge based errors: being unaware of the interaction of warfarin and erythromycin (Warfarin toxicity)
- Rule based errors: Using a bad rule or misapplying a good rule. 9Prescribing oral tx in a patient with dysphagia (lung aspiration or failure to treat)
- Action based errors: Taking up the wrong med as similar name. Slip in attention (avoid distraction, cross check, bar codes, clear label)(being distracted writing diazepam for diltiazem- result sedation)
- Memory based lapses: giving penicillin when know allergy. (failing to specify max daily dose for PRN=risk of poisoning or unnecessary tx)
Latent factors: susceptibility to failure

- Working overtime with inadequate resources
- Poor support
- Low job security

For doctors:
- Depression and exhaustion
- More common in busy, distracted staff unfamiliar patients.
- Doctors first arrive in hospital

Aronson 2009
Medication Errors (Aronson 2009)

Errors
When actions are intended but not performed

Mistakes
Errors in planning actions

1. Knowledge-based errors
   2a. Good rules not applied or misapplied
   2b. Bad rules

2. Rule-based errors

3. Action-based errors (slips)
   3a. Technical errors

4. Memory-based errors (lapses)
Fishbone Diagram:
Key Determinants of Adverse Drug Events
# Medication error by specialty (NTMA 2013)

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Percentage</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>15%</td>
<td>2</td>
</tr>
<tr>
<td>Disability services</td>
<td>4.1%</td>
<td>7</td>
</tr>
<tr>
<td>Mental Health</td>
<td>2.8%</td>
<td>8</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>1.8%</td>
<td>8</td>
</tr>
<tr>
<td>Surgery</td>
<td>12%</td>
<td>3</td>
</tr>
</tbody>
</table>
Points

- Staff should not fear disciplinary procedures
- Encourage reporting

Points:

- Indication
- Effectiveness
- Diseases:
- Other similar drug
- Dosage
- Orders
- Period
- Economics (Aronson 2009)
6017 medication related adverse events in 2012

Top 5 medication adverse events

- Medication on admission/discharge/transfer incorrect...: 21.8%
- Incorrect dosage: 14.6%
- Missed Medication: 14%
- Other: 11.3%
- Incorrect medication: 9.4%
<table>
<thead>
<tr>
<th>EVENT TYPE</th>
<th>NUMBER</th>
<th>% OF TOTAL EVENTS (N = 519)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong drug</td>
<td>158</td>
<td>30.4%</td>
</tr>
<tr>
<td>Drug omission</td>
<td>150</td>
<td>28.9</td>
</tr>
<tr>
<td>Prescription/refill delay</td>
<td>57</td>
<td>11.0</td>
</tr>
<tr>
<td>Wrong dose/underdosage</td>
<td>35</td>
<td>6.7</td>
</tr>
<tr>
<td>Extra dose</td>
<td>30</td>
<td>5.8</td>
</tr>
</tbody>
</table>
Prescription errors

- Up to 20 percent of prescriptions can be illegible or doubtful (Munoz et al. 2001)
- Can also involve omission of medication details.
- ‘...defined as a defect in the process of prescribing that results in an unintentional reduction in the probability of treatment being delivered in a timely and effective manner or increases the risk of harm from the medication’ (Bates et al. 2010)
Prescription errors

- Cross sectional observational study
- Random patient selection of 2 wards in a 210 bed general hospital
- Chart review by doctor, clinical pharmacist and a nurse.
- Areas of observation a) basic patient information, allergies, b) detail of medication administration c) examined prescriptions to see if medication could be administered without the potential to create a medication error.
- Also needed consensus from two team members that the medication details and signature were present and legible.
100 records (Bates et al. 2010)

- 946 individual prescriptions
- Consultants and non consultants

**Omission Findings:**

<table>
<thead>
<tr>
<th>Detail omitted</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s name</td>
<td>7</td>
</tr>
<tr>
<td>Patient’s hospital number</td>
<td>8</td>
</tr>
<tr>
<td>Patient’s weight</td>
<td>91</td>
</tr>
<tr>
<td>Patient’s allergy status</td>
<td>83</td>
</tr>
<tr>
<td>Medication dosage</td>
<td>5</td>
</tr>
<tr>
<td>Medication frequency</td>
<td>11</td>
</tr>
<tr>
<td>Route of administration of medication</td>
<td>13</td>
</tr>
<tr>
<td>Medication start date</td>
<td>8</td>
</tr>
<tr>
<td>Prescribing doctor’s signature</td>
<td>2</td>
</tr>
</tbody>
</table>
Findings

- 5% - drug had been altered from original prescription
- Identity of the prescriber - not discernable in 84% cases
- Generic form of medication - 33% records
- In some prescriptions, individual details were omitted
- Deemed that 27% of individual prescriptions had the potential to cause error - omission or illegibility of medication administration details or the prescriber’s name.
Medication Error in hospital discharge summaries

- 966 handwritten & 842 electronic summaries
- 12.1% of handwritten and 13.3% of electronic summaries had medication errors
- Many related to cardiovascular drugs
- Omission of a medication was the commonest error
- Error rates in all of the 13,566 individual medications were similar by doctor level (intern, resident, registrar)
- Reasons: heavy workload, interruption during the discharge summary creation, writing discharge medications up during ward rounds, pressure to send to the pharmacy, lack of doctor wellbeing and perception that the pharmacist would check the script.

(Callen et al 2010)
Medication errors-reporting

- 286 nurses
- 19.5 medication errors in the previous 3 months
- 1.3 reported
- Lack of sufficient workforce, lack of standardised documentation, lack of supervision.
- Most common- inappropriate time of administration
- Some reasons: Insignificant, fear of a manager, unaware of definition of medication error.
- Anonymous reporting

Joolaee et al 2011
Medication errors-reporting

- 56 healthcare professionals completed a survey
- Nurses and pharmacists more likely to report, but also more likely to believe they would be blamed and criticised.
- Nurses identified they could be subject to disciplinary action, while doctors and pharmacists saw this only as a pathway if the medication error was serious.
- Need to have an efficient reporting as identify systems failures and point to necessary staff training.

(Sarvadikar et al 2010)
Medication errors per specialty (NTMA 2013)
Medication reconciliation is the process of creating and maintaining the most accurate list possible of all medications a person is taking – including drug name, dosage, frequency and route – in order to identify any discrepancies and to ensure any changes are documented and communicated, thus resulting in a complete list of medications. (HIQA 2014:5)
Medication reconciliation

- Retrospective cohort study of a random sample of adults admitted to general medicine, cardiology or general surgery
- N=205
- 27 did not have any medications listed on admission
- 178 who had medications listed, 41>/= 1 discrepancy which were of high risk
- Discharge: 196 had >/= 1 medication change (1102 differences for 205 patients)
- Less than half were alerted to medication change
- 12% were given written information
Steps in Medication Reconciliation Process

- **Collecting**: This involves the collection of the medication history and other relevant information.
- **Checking**: This is the process of ensuring that the medicines, doses, frequency and routes, etc. that are prescribed for a patient or service user are correct.
- **Communicating**: This is the final step in the process where any changes that have been made to a patient or service user’s prescription are documented,

- Dated and communicated to the person to whom the patient’s or service user’s care is being transferred.
Stage 1
Person transferred from community residential care setting to acute hospital

Stage 2
Person admitted to acute hospital from community residential care setting

Stage 3
Person discharged from acute hospital to community residential care setting

Stage 4
Person transferred back to community residential care setting from acute hospital
Example of the transfer of a person from a community residential care setting (CRCS) to an acute hospital (AH) and discharge back to the community care setting (CRCS).

Four stages for Medication Reconciliation:

1. Stage 1: Person transferred from CRCS to AH
   - Goal: The complete, correct and up-to-date medication list is provided for 100% of people transferred.

2. Stage 2: Person admitted to AH from CRCS
   - Goal: 100% of people admitted from a CRCS have the best possible pre-admission medication checklist collected, checked, communicated and prescribed (or held or discontinued) within 24 hours of admission.

3. Stage 3: Person discharged from AH to CRCS
   - Goal: The complete and correct discharge medication list including communication of all changes to pre-admission medication is provided for 100% of people at the time of discharge. A copy of the discharge medication communication is filed in the AH healthcare record for 100% of patients.

4. Stage 4: Person transferred back to CRCS from AH
   - Goal: The complete and correct medication prescription list is received from the AH and transferred to the CRCS medication record/chart for 100% of patients within 24 hours of discharge from the AH.

Three steps in Medication Reconciliation:

1. Collect
   - Determine the person's medication list

2. Check
   - Ensure that the person's medication list is up-to-date, complete and correct
   - Check that the medicines, doses, routes and frequency etc that are prescribed for the person are correct
   - Check that the medicines, doses, routes, frequencies etc prescribed for the person are correct. Ensure all FAML medicines are accounted for.

3. Communicate
   - Provide the person’s medication list to the acute hospital
   - Document and date any discrepancies between the person’s prescription and the FAML and communicate any changes to the service where care is being transferred
   - Ensure the discharge prescription, including the correct and complete list of continuing medication and communication of in-hospital changes to medication, is provided to the service where the person’s care is being transferred
   - Document and date any discrepancies between the person’s prescription and the FAML and communicate the changes to the service where the person’s care is being transferred.
Learning points

- Service review of organisation’s own requirements
- Policy
- Explicit timeframe for MR completion (ie within 24 hours of patient’s entry to service)
- Staff education
- Review intervals
- Service user and/or family involvement and verified by a second reliable source (medication record, GP, pharmacy)
- Give both verbal and written information about medications and any changes.
- Inter-disciplinary direct regular communication
- ‘Close the Loop’: transferring service should speak to the receiving service to ensure documents are in order, complete and understood.
- Advance notification for unusual medications.
Learning Points

- **Transfer**: Use of a checklist for MR transition points.
- **Use of preprinted service or ward specific forms**

### 5. Items to consider for inclusion on a checklist to facilitate MR

<table>
<thead>
<tr>
<th>Patient demographics and characteristics</th>
<th>Other information required</th>
</tr>
</thead>
<tbody>
<tr>
<td>- name</td>
<td>- list of pages from medication record to include on transfer (see below)</td>
</tr>
<tr>
<td>- date of birth</td>
<td>- ensure all pages being sent as part of the transfer are numbered – i.e. page 1 of 4 etc.</td>
</tr>
<tr>
<td>- address</td>
<td>- contact name and number of the prescriber</td>
</tr>
<tr>
<td>- allergy status</td>
<td>- contact names and numbers for relevant acute hospital (ward), nursing home, community pharmacy, GP.</td>
</tr>
<tr>
<td>- note of swallowing difficulties, if any, and if liquid or crushed medicines are required</td>
<td></td>
</tr>
<tr>
<td>- date and time of transfer</td>
<td></td>
</tr>
<tr>
<td>- person completing checklist (signature)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Record of communication</th>
<th>Pages from medication record to photocopy, number and send with patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>- note of call made to receiving service to confirm they received the MR information sent</td>
<td>- current regular medication list</td>
</tr>
<tr>
<td>- time that MR was completed, and name and signature of person who completed it</td>
<td>- PRN medication (as required) list</td>
</tr>
<tr>
<td>- note of two sources of verification used for the MR process (i.e. patient/carer, medication record from residential setting, community pharmacy, GP, other)</td>
<td>- administration record of regular and PRN medications up to point of transfer</td>
</tr>
<tr>
<td>- record of queries raised during MR process and resolution of</td>
<td>- three/six-monthly medications and when last administered</td>
</tr>
</tbody>
</table>

- include oxygen prescription and rate/nebulisers
- include nutritional supplements
- include anticoagulant dose and target international normalised ratio (INR)