WHO Third Global Patient Safety Challenge

Medication Without Harm

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Reducing Medication Errors National Summit, 18th April 2018, De Vere West One Conference Centre, London
WHO Third Global Patient Safety Challenge

- Medication-related harm
- Goal of the Safety Challenge
- Key domains/ action areas
- Tools for change

Routledge’s Ritten Rules
1. “Medicines are not smarties”
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Sir Liam Donaldson
Medication errors can occur at any stage

Prescribing

- Decide if prescription indicated?
- Discuss choice with patient, whenever possible
- Check reference source(s) & write prescription for appropriate dose/route/duration

Healthcare Professional (e.g. Pharmacist)
Healthcare Professional (e.g. Doctor)
Healthcare Professional (e.g. Nurse)

Monitoring

Administration

- Select/ prepare/ dispense correct medicine at appropriate dose
- Administer correct dose of medicine by correct route to correct patient

Storage, preparation & dispensing

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3477336/
Medication errors contribute 9% of the world’s total avoidable cost due to suboptimal medicine use.

A total of 0.7% of global total health expenditure or $42 billion worldwide, can be avoided if medication errors are avoided.
Misprescribing occurs when either the wrong medication is prescribed or the wrong dose, route, frequency or duration of administration is chosen.

Over-prescribing occurs when a medication is prescribed whose risk of harm exceeds its likely benefit.

Under-prescribing occurs when a medication is not prescribed whose likely benefit greatly exceeds the risk of harm.


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Goal of the Challenge
Reduce the level of severe, avoidable harm related to medications by 50% over 5 years, globally.

1. Adverse events that are not reactions to the medicines
   2 + 3 = all ADRs

2. ADRs (not from medication errors)

3. ADRs from medication errors

4. Medication errors that cause harm that are not ADRs

5. Medication errors that don’t cause adverse events

3 + 4 + 5 = all medication errors

Table 2. Most Commonly Prescribed Potentially Inappropriate Medications (PIMs) as per STOPP Criteria

<table>
<thead>
<tr>
<th>STOPP Criteria PIMs</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proton pump inhibitors for uncomplicated peptic ulcer disease at full therapeutic dosage for &gt;8 wk</td>
<td>128</td>
</tr>
<tr>
<td>Aspirin with no history of coronary, cerebral, or peripheral vascular symptoms or occlusive arterial events</td>
<td>66</td>
</tr>
<tr>
<td>Benzodiazepines in patients who have had ≥1 fall in the past 3 mo</td>
<td>56</td>
</tr>
<tr>
<td>Duplicate drug class prescriptions</td>
<td>56</td>
</tr>
<tr>
<td>Long-term (&gt;1 mo), long-acting benzodiazepines or benzodiazepines with long-acting metabolites</td>
<td>48</td>
</tr>
<tr>
<td>Loop diuretic as first-line monotherapy for hypertension</td>
<td>24</td>
</tr>
<tr>
<td>Long-term use of nonsteroidal anti-inflammatory drugs (&gt;3 mo) for relief of mild joint pain in osteoarthritis</td>
<td>19</td>
</tr>
<tr>
<td>Long-term opiates in those with recurrent falls (≥1 fall in past 3 mo)</td>
<td>18</td>
</tr>
<tr>
<td>Neuroleptic drugs in those with recurrent falls (≥1 fall in past 3 mo)</td>
<td>16</td>
</tr>
<tr>
<td>Long-term opiates in those with recurrent falls (≥1 fall in past 3 mo)</td>
<td>14</td>
</tr>
</tbody>
</table>


Goal of the Challenge

- The Challenge aims to make improvements at each stage of the medication process, including prescribing, dispensing, administering, monitoring & use.

- To gain worldwide commitment & action to reduce severe, avoidable medication-related harm... specifically by addressing harm resulting from errors or unsafe practices due to weaknesses in health systems.


http://www.who.int/patientsafety/medication-safety/en/
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Key action areas

- Transitions of Care
- Polypharmacy
- High-risk situations

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Medication Safety in High-risk situations

- Medication factors
  - High-risk (high-alert) medications
  - Reducing risk from high-risk (high-alert) medications

- Individual factors
  - Healthcare professionals
  - Patients
  - Reducing risk due to individual factors

- Environmental (systems) factors
  - Reducing risk from environmental (systems) factors

- Further resources & Glossary
Medication Safety in Polypharmacy

• Medication-related harm in polypharmacy

• International initiatives in polypharmacy

• Integrating medication safety in polypharmacy

• Appendices
  • Global prevalence
  • Guidelines available globally
  • Case studies
  • Indicators for benchmarking and monitoring
  • Glossary
Medication Safety in Transitions of Care

• Why consider medication safety in transitions of care?

• What has been done to improve medication safety in transitions of care?

• What needs to be done?

• Conclusions and Glossary
Early priority actions

- Ask countries and key stakeholders to make strong commitments, prioritize and take early action, and effectively manage three key areas to protect patients from harm, namely:
  - high-risk situations
  - polypharmacy
  - transitions of care

Developmental programmes

- Ask countries to convene experts, health professionals and leaders, stakeholders and patients to design targeted programmes of change
- Take action to improve safety in each of the four domains of the Challenge framework:
  - patients and the public
  - medicines
  - health care professionals
  - systems and practices of medication

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## Some high-risk (high-alert) medications

<table>
<thead>
<tr>
<th>Therapeutic Group</th>
<th>Some examples from the group</th>
<th>Some Serious ADEs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anti-infectives</strong></td>
<td>o Aminoglycosides (e.g. gentamicin) &amp; amphotericin</td>
<td>Renal &amp; oto-toxicity</td>
</tr>
<tr>
<td></td>
<td>o <strong>Allergy to antibiotics</strong></td>
<td>Allergic (e.g. anaphylaxis)</td>
</tr>
<tr>
<td><strong>Potassium &amp; other salts/electrolytes for injection</strong></td>
<td>o Potassium, magnesium &amp; calcium salts &amp; hypertonic sodium chloride</td>
<td>Electrolyte disturbances</td>
</tr>
<tr>
<td><strong>Insulins</strong></td>
<td>o Soluble insulins</td>
<td>Hypoglycaemia</td>
</tr>
<tr>
<td><strong>Narcotics (e.g. opioids) &amp; sedatives</strong></td>
<td>o Opioids (e.g. morphine, diamorphine), benzodiazepines &amp; propofol</td>
<td>Sedation and respiratory depression</td>
</tr>
<tr>
<td><strong>Cancer chemotherapy &amp; immunosuppressives</strong></td>
<td>o Etoposide, vincristine &amp; <strong>methotrexate</strong></td>
<td>Haematological toxicity</td>
</tr>
<tr>
<td><strong>Heparins &amp; oral anticoagulants</strong></td>
<td>o Heparins</td>
<td>Haemorrhage</td>
</tr>
<tr>
<td></td>
<td>o Vitamin K antagonists (e.g. warfarin) &amp; New direct-acting Oral Anticoagulants [NOACs/ DOACs] (e.g. apixaban, dabigatran edoxoban &amp; rivaroxaban)</td>
<td>Haemorrhage</td>
</tr>
</tbody>
</table>

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Case Study 1. Penicillin allergy

Allergy to penicillin recorded in 7 places, including prescription chart, doctor’s notes, and on bright red allergy band she was wearing.

Doctor speaks to nursing home. Is told they didn’t know what the reaction was, so concludes that any reaction couldn’t have been severe.

Doctor prescribes Augmentin (amoxicillin & clavulanate potassium) IV, and patient has a massive anaphylactic reaction.

Attempts to save her life ended prematurely because another doctor thought she did not want to be resuscitated.

61 year-old female admitted from nursing home with severe chest infection

Harm

1. Communication failures
2. Critical circumstances
3. Complacency
4. Corner-cutting
5. Callowness (inexperience)
6. Courage of convictions
7. Commitment to excellence

Case Study 2. Methotrexate

April 6th 2000
General Practitioner “A” changes dose regimen from 17.5 mg once weekly to 10mg once daily

April 6th 2000
Locum pharmacist, working alone dispenses 30 tablets of methotrexate 10mg to be taken daily

April 12th 2000
GP “B” checking requests for repeat prescription spots the error and attaches a note to check the request, which is not acted upon

April 18-20th 2000
Patient has sore throat and groin, is treated with ibuprofen in hospital but 2 attempts to measure full blood count are unsuccessful

April 30th 2000
Patient dies: gastrointestinal haemorrhage, pancytopenia, methotrexate toxicity

19 critical circumstances

Adult female with rheumatoid arthritis unresponsive to penicillamine, prescribed methotrexate

http://www.blacktriangle.org/methotrexate-toxicity.pdf
Towards the safer use of oral methotrexate

**Stage:** Patient returns to hospital specialist for review, blood tests and discussion of treatment

**Purpose:** Reassessment of appropriateness and success of treatment

**What went wrong:** Lack of monitoring

5 deaths

**Stage:** Prescription generated with current dosage instructions and maximum of 12 weeks’ therapy

**Purpose:** Accuracy of prescribing with maximum recommended period between testing

**What went wrong:** Prescribing error (incorrect drug, strength, dose, frequency)

12 deaths, 16 serious harm

Monitoring methotrexate

- All GPs admitted they repeated methotrexate (MTX) prescriptions, but only 77% monitored these.

- Of those who did monitor, 59% were aware of local guidelines and only 48% were aware of national guidelines.

- A total of 27% of GPs were monitoring and prescribing MTX but not aware of any guidelines.

- Among this number, 38% did not feel they needed further education.

Case Study 3: Anticoagulants


A pharmacy technician had mistakenly stocked the cabinet with vials containing a dose 1,000 times stronger than intended.

Nurses remove heparin solution from computerised cabinet to flush cannula.

Administer doses to six infants, three of whom die, probably from internal bleeding.

Six premature babies in intensive care unit for newborn in USA.

“Lookalike” situations

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Tools for change

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Tools to improve medication safety in low- and middle-income countries

- Establish a multi-disciplinary Medicines & Therapeutics committee
- Emphasize the role of clinical pharmacy
- Develop policies & procedures of medication management
- Enhance compliance with policies & procedures via continuing education and performance monitoring
- Improve the conditions of medication storage
- Develop error reporting systems
- Build & support a “no blame” culture
<table>
<thead>
<tr>
<th>Key Strategies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure Mode Effects Analysis (FMEA) and self-assessments</td>
<td>Proactively identify risks and how they can be minimised. <a href="https://www.ismp.org/resources/your-high-alert-medication-list-relatively-useless-without-associated-risk-reduction">https://www.ismp.org/resources/your-high-alert-medication-list-relatively-useless-without-associated-risk-reduction</a></td>
</tr>
<tr>
<td>Forcing functions and Fail-Safes</td>
<td>Build in safeguards to prevent or respond to failure.</td>
</tr>
<tr>
<td>Limit access or use</td>
<td>Use constraints (e.g. restriction of access or requirement for special conditions or authorisation).</td>
</tr>
<tr>
<td>Maximise access to information</td>
<td>Use active means to provide necessary information when critical tasks are being performed.</td>
</tr>
<tr>
<td>Constraints and barriers</td>
<td>Use special equipment or environmental conditions to prevent hazard from reaching target.</td>
</tr>
<tr>
<td>Standardise</td>
<td>Create clinically sound, uniform models of care or products to reduce variation and complexity.</td>
</tr>
<tr>
<td>Simplify</td>
<td>Reduce number of steps, handoffs (handovers) without eliminating crucial redundancies.</td>
</tr>
<tr>
<td>Centralise error-prone processes</td>
<td>Transfer to external site to reduce distraction of staff with expertise, with appropriate quality control checks.</td>
</tr>
</tbody>
</table>
Prescriptions (paper or electronic) issued in any healthcare setting should be standardised and redesigned to record information on which drugs or drug classes to avoid to reduce the risk of drug allergy.

Ensure that drug allergy status is documented separately from adverse drug reactions and that it is clearly visible to all healthcare professionals who are prescribing drug.

Check a person's drug allergy status and confirm it with them (or their family members or carers as appropriate) before prescribing, dispensing or administering any drug.

Update the person's medical records or inform their GP if there is a change in drug allergy status.

https://www.nice.org.uk/guidance/cg183/chapter/1-Recommendations#documenting-and-sharing-information-with-other-healthcare-professionals-2
- Nationally agreed prescription writing standards
- E-learning programme
- Supplementary charts
Flexible protocol for starting treatment with warfarin and predicting its maintenance dose

<table>
<thead>
<tr>
<th>Warfarin Day</th>
<th>International Normalised Ratio Preferable (Measured 9 to 10 am)</th>
<th>Warfarin Dose Preferable given at 5 - 6 pm (milligrams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt; 1.4</td>
<td>10.0</td>
</tr>
<tr>
<td>2</td>
<td>&lt; 1.8&lt;br&gt;1.8&lt;br&gt;1.8&lt;br&gt;1.8&lt;br&gt;1.8</td>
<td>10.0&lt;br&gt;1.0&lt;br&gt;0.5</td>
</tr>
<tr>
<td>3</td>
<td>&lt; 2.0&lt;br&gt;2.0 - 2.1&lt;br&gt;2.2 - 2.3&lt;br&gt;2.4 - 2.5&lt;br&gt;2.6 - 2.7&lt;br&gt;2.8 - 2.9&lt;br&gt;3.0 - 3.1&lt;br&gt;3.2 - 3.3&lt;br&gt;3.4&lt;br&gt;3.5&lt;br&gt;3.6 - 4.0&lt;br&gt;4.0 - 4.0&lt;br&gt;4.1 - 4.5&lt;br&gt;4.2 - 4.5&lt;br&gt;4.3 - 4.5&lt;br&gt;4.6 - 4.5&lt;br&gt;4.7 - 4.5&lt;br&gt;4.8 - 4.5&lt;br&gt;4.9 - 4.5&lt;br&gt;5.0 - 4.5&lt;br&gt;5.1 - 4.5&lt;br&gt;5.2 - 4.5&lt;br&gt;5.3 - 4.5&lt;br&gt;5.4 - 4.5&lt;br&gt;5.5 - 4.5&lt;br&gt;5.6 - 4.5&lt;br&gt;5.7 - 4.5&lt;br&gt;5.8 - 4.5&lt;br&gt;5.9 - 4.5&lt;br&gt;6.0 - 4.5&lt;br&gt;6.1 - 4.5&lt;br&gt;6.2 - 4.5&lt;br&gt;6.3 - 4.5&lt;br&gt;6.4 - 4.5&lt;br&gt;6.5 - 4.5&lt;br&gt;6.6 - 4.5&lt;br&gt;6.7 - 4.5&lt;br&gt;6.8 - 4.5&lt;br&gt;6.9 - 4.5&lt;br&gt;7.0 - 4.5&lt;br&gt;7.1 - 4.5&lt;br&gt;7.2 - 4.5&lt;br&gt;7.3 - 4.5&lt;br&gt;7.4 - 4.5&lt;br&gt;7.5 - 4.5&lt;br&gt;7.6 - 4.5&lt;br&gt;7.7 - 4.5&lt;br&gt;7.8 - 4.5&lt;br&gt;7.9 - 4.5&lt;br&gt;8.0 - 4.5&lt;br&gt;8.1 - 4.5&lt;br&gt;8.2 - 4.5&lt;br&gt;8.3 - 4.5&lt;br&gt;8.4 - 4.5&lt;br&gt;8.5 - 4.5&lt;br&gt;8.6 - 4.5&lt;br&gt;8.7 - 4.5&lt;br&gt;8.8 - 4.5&lt;br&gt;8.9 - 4.5&lt;br&gt;9.0 - 4.5&lt;br&gt;9.1 - 4.5&lt;br&gt;9.2 - 4.5&lt;br&gt;9.3 - 4.5&lt;br&gt;9.4 - 4.5&lt;br&gt;9.5 - 4.5&lt;br&gt;9.6 - 4.5&lt;br&gt;9.7 - 4.5&lt;br&gt;9.8 - 4.5&lt;br&gt;9.9 - 4.5&lt;br&gt;10.0 - 4.5</td>
<td>10.0&lt;br&gt;5.0&lt;br&gt;4.0&lt;br&gt;3.5&lt;br&gt;3.0&lt;br&gt;2.5&lt;br&gt;2.0&lt;br&gt;1.5&lt;br&gt;1.0&lt;br&gt;0.5&lt;br&gt;0</td>
</tr>
</tbody>
</table>

- After 4 days, 67/100 patients had achieved a therapeutic level of Prothrombin time (PT) ratio
- 9 exceeded the therapeutic range & 24 remained sub-therapeutic
- None had bled due to excessive anticoagulation
- After ten days, observed dose within 1 mg of that predicted in 65/86 patients (76%)


Deaths associated with medication errors
0.003%
Phillips DP et al 1998

Deaths associated with medicine-related admission
0.15%
Pirmohamed M et al 2004

No. serious errors as % total prescription items
0.02%
Avery AJ et al 2012

No. errors as % total prescription items
4.9%
Avery AJ et al 2012

Number of medicine-related admissions as % of total
6.5%
Pirmohamed M et al 2004

Validated medication group-specific prescribing safety indicators

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Prescribing indicators in secondary care

• eDelphi repeated in 2015–16:
  ○ 128 indicators (including all original 80) for the adult inpatient setting


• Paediatric eDelphi conducted in 2015
  ○ 40 indicators for the inpatient setting


Slide courtesy of Sarah Pontefract, University of Birmingham
### High- and extreme-risk anticoagulant prescribing indicators

<table>
<thead>
<tr>
<th>Low-molecular-weight heparin</th>
<th>prescribed without the patient's weight being used to calculate the treatment dose (risk of subtherapeutic or supratherapeutic dosing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-molecular-weight heparin prescribed at a dose exceeding the maximum as stated in the product literature (risk of bleeding increased)</td>
<td></td>
</tr>
<tr>
<td>Low-molecular-weight heparin prescribed to a patient with renal impairment without dose adjustment (increased risk of bleeding)</td>
<td></td>
</tr>
<tr>
<td><strong>Warfarin</strong> prescribed to a patient with a concurrent bleeding disorder (increased risk of bleeding)</td>
<td></td>
</tr>
<tr>
<td>Warfarin prescribed concomitantly with a nonsteroidal anti-inflammatory drug (increased risk bleeding)</td>
<td></td>
</tr>
</tbody>
</table>

### High- and extreme-risk methotrexate prescribing indicators

<table>
<thead>
<tr>
<th>Methotrexate</th>
<th>prescribed to a patient with a clinically significant drop in white cell count or platelet count (risk of bone marrow suppression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methotrexate prescribed to a patient with abnormal liver function tests (risk of liver toxicity)</td>
<td></td>
</tr>
<tr>
<td>Methotrexate prescribed concomitantly with trimethoprim (increased risk of haematological toxicity)</td>
<td></td>
</tr>
<tr>
<td>Oral methotrexate prescribed to a patient with an inappropriate frequency (increased risk of toxicity)</td>
<td></td>
</tr>
</tbody>
</table>

Investigating Medication Prescribing Accuracy for Critical Error Types (iMPACT)

- Implementation of Computerised Physician Order Entry (CPOE) with Computerised decision support (CDS) was associated with clinically important reductions in the rate of high-risk prescribing errors.
- Given the pre-post design, these findings however need to be interpreted with caution.
- The occurrence of errors was found to be highly dependent on the level of restriction of CDS presented to the prescriber, with the effect that different configurations of the same CPOE system can produce very different results.

5 MOMENTS FOR MEDICATION SAFETY

Stay S.A.F.E.R!

1. Starting a medication
   - KNOW: What is the medication for?
   - CHECK: Why do I need it?
   - ASK: What are the risks and side effects?

2. Adding a medication
   - KNOW: Do I need another medication and why?
   - CHECK: Am I able to manage the medication schedule?
   - ASK: Does this medication interact with my other medications, including traditional and complementary medications?

3. Following a medication
   - KNOW: How should I store my medications?
   - CHECK: What if I miss my medication?
   - ASK: How do I know if my medications are working?

4. Ending a medication
   - KNOW: When should I stop taking each medication?
   - CHECK: Which of my medications can't be stopped abruptly?
   - ASK: What do I need to know when ending or changing medication?

5. Reviewing a medication
   - KNOW: How often should I review my medications?
   - CHECK: Am I taking medications I no longer need?
   - ASK: What do I do if I have an unwanted effect from a medication?
Part A: Teachers’ guide designed to introduce patient safety concepts to educators. It relates to building capacity for patient safety education, programme planning and design of the courses.

Part B: All-inclusive, ready-to-teach, topic-based patient safety courses that can be used as a whole, or on a per topic basis. There are 11 patient safety topics, each designed to feature a variety of ideas and methods for patient safety learning.

http://www.who.int/patientsafety/education/mp_curriculum_guide/en/
The success of the Challenge will depend upon...

- High prioritization of medication safety within health care systems, achieving widespread buy-in by stakeholders

- A shift to the mainstream of care-provision activities and taking concrete action to prevent harm

- Creating a social movement with the involvement of all stakeholders
Case Study 4. A beta blocker

GP prescribes a beta blocker

Patient develops bronchospasm hours later and dies at home after taking first tablet

GP deletes all mention of patient’s history of asthma in notes and on practice computer system

GP Acquitted of manslaughter but convicted of attempting to pervert the course of justice

30 year-old woman with asthma consults GP because of palpitations

Harm

Ferner RE. Medication errors that have led to manslaughter charges. BMJ 2000; 321: 1212-1216
Integrating patient safety...... goes beyond establishing a reporting system for medical error (though this is important)

It involves changing the culture so that there is an ethos of reporting, anticipating and combating risks, of learning from things that go wrong, and of moving away from an approach based on blame and retribution

If something serious happened, would the culture of your organisation be to cover it up or learn from it?

“There is no easy way to make hospitals safer; it requires hard work and the willingness to change age-old cultural patterns.”

“Without that commitment, it just won’t work.”

Pronovost Peter J. Safe patients, smart hospitals: how one doctor’s checklist can help us change healthcare from the inside out. Peter Pronovost and Eric Vohr. Plume, New York 2010
Diolch yn fawr
Thank you very much

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