

Recognising human factors and strategies for preventing errors



Having **identified adverse drug events or near misses** in your organisation, what can you do to prevent the same incidents happening again?

Identifying causes and contributing factors

Hospitals commonly use serious event analysis (including root cause analysis) methodology to identify causes of and contributing factors to significant adverse events. Does your organisation review significant adverse drug events?

For more information on serious event analysis see:

- the Health Quality & Safety Commission's guide, **Root Cause Analysis for Clinical Incidents** (for hospitals)
- the NHS's guidance on **significant event audit** (for general practice)
- the Institute for Safe Medication Practices' **Root Cause Analysis Workbook for Community/Ambulatory Pharmacy**
- NHS Education for Scotland's guidance on **enhanced significant event analysis**.

Considering the causal factors of no or low harm events and near misses can also lead to system change. A team approach, on a ward or in a surgery, asking why an event happened is important. Analysis of the main and underlying reasons and contributory factors can lead to strategies that could stop the same thing happening again.

Health is a complex system and it is important to recognise human and organisational factors and systems-based causes of errors rather than focusing only on the individuals involved.

Recognising human factors

Considering human factors is vital in event analysis and should be recognised when considering options for preventing errors and harm. Human factors encompass a range of things that can influence people and their behaviour such as environmental, organisational and job factors, and individual characteristics. Some common human factors that can increase risk are:

- mental workload – stress, reliance on vigilance and memory, seeing what you expect to see and having to calculate complex dosage of medicines. If complex dose calculations are needed, consider using a pre-calculated list. If available, stock premixed supplies on the ward for high-risk medicines like heparin and potassium chloride



- distractions – peripheral noise levels or interruptions. Some nurses wear a tabard or apron that says ‘do not disturb/interrupt’ when they do their medicine administration rounds. Setting out distinct areas, for example, using a coloured mat when doing a final medicine check, alerts other staff not to interrupt



- physical environment – poor lighting, clutter and storage of medicines. Review the lighting in your medicine room – if it is poor, medicines and instructions can be misread. Look at your medicine trolley or room and ask how easy would it be to take the wrong packet or ampoule by mistake or return an ampoule or blister of tablets to the wrong packet. Consider designating one area of your medicine room to high-risk medicines to highlight that extra care and attention are needed when selecting or preparing these medicines



- design – devices and products. Medicines with look-alike packaging are common and this makes picking the wrong medicine more likely. For example, the Humalog® insulins or heparin products. There are also sound-alike medicines, which can make taking verbal orders for medicines harder. For example, azithromycin and azathioprine. How many of the medicines you use have look-alike packaging? How aware are you of sound-alike medicines?



- teamwork – how teams function and communicate can contribute to errors occurring. Multiple patient handovers, hierarchy and cultures that discourage challenge can all contribute to errors being made. Using briefings and debriefings can help teams develop a shared understanding of a patient or planned procedure. Communication tools like SBAR (situation, background, assessment, recommendation) can help make conversations succinct, and clarify information and expectations of actions required.

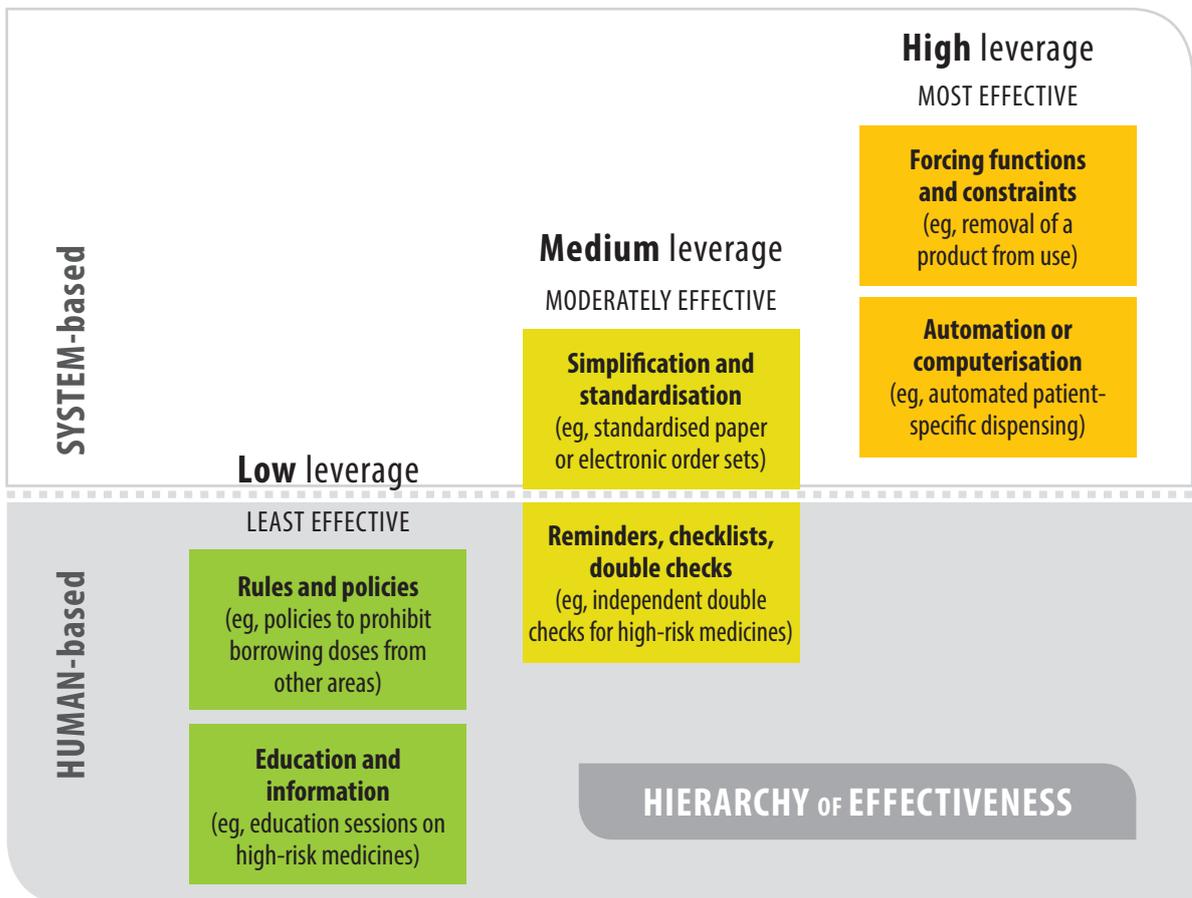


Strategies for preventing errors

Error prevention strategies should be varied and focus on a mix of human and organisational factor principles and system issues. The figure on the next page illustrates the hierarchy of effectiveness for error prevention strategies developed by experts in system safety.

High leverage strategies that ‘design out’ hazards are most effective because they can eliminate errors and associated harm. They do not rely on individual attention and vigilance. Such strategies include:

- forcing functions – for example, not stocking or locking away potassium chloride concentrated injection to prevent inadvertent bolus administration
- automation – for example, the electronic prescription service which auto-populates a community pharmacy dispensing system, preventing misinterpretation of handwritten prescriptions or picking errors from drop-down boxes
- computerisation – for example, electronic prescribing and administration systems which can incorporate dose checking strategies to reduce the potential for prescribing an overdose or checks (that cannot be overridden) to prevent a medicine being prescribed to a patient who has a documented allergy to that medicine.



Medium leverage strategies do not eliminate hazards but reduce the likelihood of errors occurring. They are relatively easy and quick to implement but need constant updating and reinforcement to maintain people’s knowledge and the currency of the process or product. It can be hard to establish and maintain good practice with these strategies as they are highly dependent on the behaviour of the people using the system. They include:

- standardisation – for example, standardising the concentrations of high-risk infusion medicines used in a hospital to reduce the risk of calculation, preparation or administration errors
- independent double checking – for example, a second person independently checking the dose calculation should identify if a calculation error has been made
- checklists – for example, the surgical safety checklist, which reduces perioperative harm when correctly used. The checklist must be used as a tool for effective communication not an act of ticking boxes to prevent harm. Checklists could be used for many procedures but are only effective if used correctly
- warnings, alerts and alarms – for example, alerts on electronic prescribing and administration systems which warn prescribers when interacting medicines are prescribed together. Alert fatigue is a recognised issue with electronic systems, when too many alerts are triggered and prescribers then ignore the alerts
- patient counselling – for example, having the patient or their whānau or carer check what has been dispensed during counselling.

Low leverage strategies are relatively easy and often quick to implement but need constant updating and reinforcement to maintain knowledge and currency. Just because they are low leverage does not mean they are unimportant or unnecessary. They are more effective when combined with other medium or high leverage strategies. They include:

- education and training – for example, annual training on intravenous infusion safety will ensure the competency of nurses who administer intravenous medication but will not in itself prevent incidents associated with human factors, wrong product selection, etc
- guidelines, protocols, policies and procedures – for example, a protocol for the management of anticoagulants including unfractionated heparin and warfarin will help prescribers and administrators manage these medicines. A protocol is of no benefit if no-one reads it. It is important to ensure it is easy to locate and use. A protocol will not prevent all types of incidents
- information documents – for example, reference information on medicines should be available at the point of prescribing and administration to help prevent incidents.

The goal of prevention strategies should be to redesign the medication management process to make it harder for errors to reach the patient. A prevention strategy can include all three types but always choose the strategies that will have a higher impact on preventing medication errors whenever possible.

Always consider what effect changing one part of the system will have on other parts of the system and the individual working in the system.

Reference sources:

American Pharmacists Association. 2013. Leveraging error reduction strategies. ISMP error alert.
URL: www.pharmacist.com/leveraging-errorreduction-strategies.

Institute for Safe Medication Practices Canada. 2014. Alert: wrong route incidents with epinephrine. April 16: 14(4).

Patient Safety First. 2010. Implementing human factors in healthcare. URL: www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/Intervention-support/Human+Factors+How-to+Guide+v1.2.pdf.