Building a Safer NHS for Patient. Improving Medication Safety

Laura Murianni, Cinzia Marano

National Observatory on Health in the Italian Regions, Università Cattolica, Roma, Italy

Correspondence to: Laura Murianni, National Observatory on Health in the Italian Regions, Università Cattolica del Sacro Cuore,Largo F. Vito,1,00186 Roma, Italy. E-mail: c.marano@rm.unicatt.it

I believe in our proverbs.There is one that says "Everything that happens once can never happen again, but everything that happens twice will surely happen a third time"

(Paulo Coelho, The Alchemist)

Medication errors occur in all health care systems and in all health care settings. If the errors are identified through an active management and effective reporting system they can be removed before they can cause harm to patients.

In order to reduce the risk it is important to understand the causes of medication errors.

The NHS Report aims to provide a guide to current knowledge of the frequency, nature and causes of errors, the risk factors inherent in current medication processes and helping the NHS organizations and health professionals in achieving a reduction in serious medication errors.

In July 2001 the UK Government established the National Patient Safety Agency (NPSA, http://www.npsa.nhs.uk) which, in 2004, implemented a national reporting and learning system to enable the NHS to report all type of adverse incidents including those involving medicines.

The NPSA core purpose is to improve patient safety and to accomplish this task; it looks at the identification of patterns and trends in avoidable adverse events so that the NHS can entrust practice and management to reduce the risk of recurrence.

Before the establishment of the NPSA, there had been no attempt to establish a unified mechanism for reporting and analyzing medication errors. Despite the many published studies there is no clear definition for medication errors and thus they do not distinguish between errors and adverse drug reactions. The Report defines and highlights the differences between medical errors and drug reactions.

An adverse drug reaction (ADR) has been defined by the World Health Organization (WHO) as: "Any response to a drug which is noxious, unintended and occurs at doses used for prophylaxis, diagnosis or therapy"[1]. Drug reactions can be divided into two groups, the first one (Type A) which includes the reactions that can be predicted from knowledge of the drug's effects on the body and the second group (Type B) for the reactions which are unpredictable and unusual that occur in particular individuals.

There are several definitions for medication errors; the NPSA has adopted the terminology of the US National Coordinating Council for Medication Error Reporting and Prevention: "A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of a health professional, patient or consumer." (http://www.nccmerp.org).

Medication errors occur when both human and system factors interact in a chain of events. Attention is usually focused on the action of the single individual which is considered to be the cause of error, but latent conditions within an organization should be considered as important causes of errors. Latent conditions reflect the structure of the organization, its resources, management and processes which, either alone or in combination with active failure, can result in error.

It becomes quite clear that in medication errors there are two main factors: the person approach and the system approach.

The first one focuses on the errors made by individuals and the reaction to this kind of error could be to name, blame and or shame; such a tendency does not encourage a culture of reporting and learning from the errors.

The system approach accepts that humans are fallible and therefore errors can be expected to occur and focuses on the conditions, under which individuals work and how those conditions can predispose them to make errors.

Errors occur when a planned action fails to achieve the desired outcome and the Report highlights the description of two basic types of error:

1. slips and lapses, the action does not go according to plan;
2. mistakes, the plan itself is inadequate to achieve the objectives.

The report also identifies the medication process and a series of errors that can occur during the process. The main types of errors are prescribing, dispensing and administration errors.

Many studies have used varying definition of prescribing error but there is no generally accepted definition of what constitutes a prescribing error. The report highlights the most common definition in UK as being "A clinical meaningful prescribing error occurs when, as a result of a prescribing decision or prescription writing process, there is an unintentional significant reduction in the probability of treatment being timely and effective or an increase in the risk of harm when compared with generally accepted practice".

Prescribing errors may be caused by the lack of knowledge about the patient, drug or both. Errors in prescription writing may be due to poor communications, inaccurate transcription, or unsigned or illegible prescriptions. Errors may result from the actions of one person, systems factors, or a combination of the two.

Lack of drug knowledge can lead to the prescribing of drugs that are contraindicated or combinations that may cause harmful drug interactions. Most medicines are available in formulations that correspond to their usual dose, but for some potent medicines prescribed for adults and many medicines for children, the dose, volume or rate of administration needs to be calculated. The calculation can be complex and is a major source of prescribing errors.

Many dispensing errors are due to drug name confusion, failure to clarify an ambiguous or badly written prescription, similar packaging or lack of a control check by a second person. It is possible to reduce this risk using a formal dispensary to check systems and procedures, or by giving appropriate training. It may also be necessary to assess a person's competency to dispense and check prescriptions, as well as checking medicines with the patients and providing them with the opportunity to ask questions about their medicines.

To reduce prescribing errors it is also necessary to ensure safe administration of medicines (Figure 1) which means appropriate training for all staff involved in the handling of medication, clear drug administration procedures, double checking by a second person in defined situations, storing all medicine

Figure 1. The five RIGHTS

Source: Building a Safer NHS for Patient. Improving Medication Safety. Department of Health (2003)

safely and in such a way that the risk of drug selection errors is minimized and utilizing information technology to support prescribing, dispensing and medicine administration.

The NHS Report analyses in detail risk reduction within specific patient groups, with specific groups of medicines as well as thorough organizational and environmental strategies.

The most serious harm occurs in people with allergies, seriously ill patients and children.

In the first case, patients may have been prescribed drugs to which they have a pre-existing allergy. The most common reaction, for these problems, is anaphylaxis. If it is severe, it could be fatal. The Committee for the Safety of Medicine's Report [2] lists every drug which could give an anaphylactic reaction. The problem is that the patient's allergy history is not accessible with manual prescribing systems making it necessary to have an electronic prescribing system. For example, the nomenclature of penicillin can be confusing as many products have names that do not immediately suggest that they contain penicillin.

In the second case, the complexity of the problem is due to the wrong route. It is a frequent administration error highlighted by many researchers and studies in both the US and Europe [3].

The third case occurs because a high percentage of medicines, prescribed for children, is only available in the adult dose form. Often there are so many manipulations to the dose preparation that ideally they should be prepared in the pharmacy, paying attention to the different ways of expressing doses (e.g. 10 mg/kg/day or 10 mg/kg/dose).[4,5]

Then there are particular medicines and practices which involve errors. They are drugs used in the practice of anaesthetics [6,7], oral anticoagulants, cytoxic chemotherapy, intravenous infusions, methotrexate treatment, opiate analgesics and potassium chloride.

Generally, the problems are caused by incorrect labelling (code, colour, uncompleted writing, etc.), by changing of stores or manufacturer's original packaging, unused ampoules being returned to the wrong pack, an interaction with a wide variety of other medicines or the wrong administration of the drugs (wrong route or wrong dose).

The risk of errors can be reduced by formalising procedures and regulating the use of colour coding in the labelling of medicines.

Simplification of dosing calculations would reduce the potential for calculation error.

There are multiple reports both from the United States and the United Kingdom of fatal errors.

Medication could be made safer through improved information management and technologies, in particular through the introduction of a national electronic care record, electronic prescribing, bar coding technology and robotic dispensing [8,9]. An increase in essential clinic information, including medicines, is essential when treating a patient. This would reduce the risk of medication errors (Box 1). This can be achieved by improving labelling and packaging as well as the interface between health care settings which are the cause of many problems.

Above all, there is a lack of the skills needed for safe medication, because of inadequate under-graduate programmes. More recently, the Audit Commission report [10] raised concerns that junior doctors working in NHS hospitals do not receive adequate training in prescribing.

If we think that the estimated direct cost of medication errors in NHS hospitals may be £200-400 million per year, excluding the unknown cost of errors in primary and community care, as well as indirect costs such as those arising from litigation, the potential savings from reducing serious medication errors are substantial.

Box 1. Potential benefits of computerised prescribing

1. All prescriptions include the drug name, dose, route and frequency (system prompts prescriber for these data elements)
2. Prescriptions are legible and the prescriber is always identifiable
3. Information about the patient is available to the prescriber at the time of prescribing
4. Information about the drug is available to the prescriber at the time of prescribing
5. Prescribers are alerted to anomalous dose and frequency selection
6. Prescriptions are checked for allergies, drug-drug interactions, drug-laboratory interactions, contraindications or cautions in the patient, and the prescriber alerted.
7. All relevant data about the patient and their drug regimen are available centrally
8. Adverse effects can be documented and reported, audit and pharmacovigilance are facilitated
9. Adverse drug events may be detected by capturing the use of antidotes such as vitamin K (warfarin overdose) or glucagon (insulin overdose), allowing review of events which led to their use.
10. Relevant prescribing guidelines can be built into the prescribing system, helping achieve optimal treatment

Source: Building a Safer NHS for Patient. Improving Medication Safety. Department of Health (2003)

It is getting to be essential to have, for each NHS organisation, an internal system to report and monitor the safety of medication use. In fact the NPSA is launching a work programme in all organisations delivering NHS care [11].

The next step is to embed safe practice into everyday clinical behaviour.

The range of work which could be done to improve patient safety is vast – from designing safer hospitals to tackling medication errors

(Tara Lamont - NPSA Head of Prioritisation) *[12]*

References

1) World Health Organization. International drug monitoring – the role of the hospital. A WHO report. Drug Intelligence and Clinical Pharmacy 1970;4:101-10.

2) CSM West Midlands Centre for Adverse Drug Reaction Reporting. 2002.

3) Phillips J, Beam S, Brinker A, Holquist C, Honig P, et al. Retrospective analysis of mortalities associated with medication errors. Am J Health-Syst Pharm 2001;58:1835-1841.

4) Ross LM, Wallace J, Paton JY. Medication errors in a paediatric teaching hospital in the UK: five years operational experience. Arch Dis Child 2000;83:492-497.

5) Royal College of Paediatrics and Child Health, Neonatal and Paediatric Pharmacists Group. Medicines for Children, 2nd Ed. London: RCPCH Publications Limited, 2003.

6) Currie M, Mackay P. The 'wrong drug' problem in anaesthesia: An analysis of 2000 incident reports. Anaesth Intens Care 1993;21:596-601.

7) Medical Defence Union 2002.

8) Department of Health. Delivering the NHS Plan: next steps on investment, next steps on reform. Cm 5503. London: Department of Health, 2002.

9) Department of Health. Delivering 21st Century IT Support for the NHS: National Strategic Programme. London: Department of Health, 2002.

10) A Spoonful of Sugar. Medicines management in NHS hospitals. Londo, 2001. www.audit-commission.gov.uk.

11) Department of Health. An Organisation with a Memory: Report of an expert group on learning from adverse events in the NHS chaired by the Chief Medical Officer. London. London: The Stationery office, 2000.

12) National Patient Safety Agency. Annual Review 2004/5, 12 Oct. 2005. www.npsa.nhs.uk.