

Safety in doses: improving the use of medicines in the NHS

Part one – Learning from medication incidents

Part two – Safe medication practice work programme for 2007-08

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Every day, approximately two and a half million medicines are prescribed to patients in hospitals and the community.¹ Most medicines are used safely and effectively, but sometimes errors happen that can lead to harm to patients.

By identifying areas of particular risk, NHS organisations and healthcare professionals can take action to significantly improve the safety of patients receiving and taking medicines.

¹ Department of Health. *Building a safer NHS for patients: improving medication safety*. (2004).

The prescribing, dispensing and administering of medicines involves many different healthcare professions, across all healthcare settings.

Through analysis of medication incident reports received from NHS staff, the National Patient Safety Agency (NPSA) has been able to identify areas of risk to patient safety relating to medication.

Part one of this report highlights key findings from this analysis, identifies the rate and impact of medication incidents, and describes the areas of risk.

Analysis of incident reports relating to specific areas of medication therapy has informed the development of the NPSA's safe medication practice work programme for 2007-08.

Part two presents an overview of this programme. The NPSA has worked with practitioners, patients and carers, and other organisations, to develop this work programme, which comprises five patient safety alerts. Pages 26 to 35 set out the key messages of the alerts and the actions required by the NHS.

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Message from the Chief Pharmacists



Managing medicines safely and effectively is a key objective for the NHS.

The necessity for achieving this was highlighted in the Department of Health report *Building a safer NHS for patients: improving medication safety* (2004). The report outlined what was known of the frequency, nature and causes of medication errors, and recommended models of good practice, solutions and interventions through national and local strategies.

We are delighted to introduce this joint initiative between the Department of Health in England, the Welsh Assembly Government and the NPSA. The safe medication practice work programme for 2007-08 aims to improve the safe use of medicines in the NHS and recognises the crucial role that all healthcare professionals, both clinical and non-clinical, have in delivering high quality care and services to patients.

In *Safety First*, the 2006 review of progress made in making the NHS safer, Professor Sir Liam Donaldson, Chief Medical Officer (England) said patient safety must become the first priority for all healthcare professionals.

Alongside the Department of Health's *A Vision for Pharmacy in the new NHS* (2003) and the Welsh Assembly Government's *Remedies for success – a Strategy for Pharmacy in Wales* (2002), reports such as the Audit Commission's *A spoonful of sugar – Medicines Management in NHS Hospitals* (2001) have already helped to set the agenda for redesigning pharmaceutical services for patients, to improve safety, quality and make the best use of resources.

More recently, the Healthcare Commission reviewed progress in its reports *The best medicine: the management of medicines in acute and specialist trusts* (2006) and *Talking about medicines: the management of medicines in trusts providing mental health services* (2006).

We recognise the valuable influence that pharmacy staff can have on the national patient safety agenda as they help to reduce the number of medication errors in the NHS. Often these errors occur when human factors interact with complex systems for procuring, prescribing, dispensing, administering and monitoring drugs to produce an unintended and potentially harmful outcome.

In the past, attention has usually focused on the actions of individuals who are considered to be the cause of error. However, there is increasing awareness of the importance of reducing weaknesses within healthcare systems, if the prevalence of error is to be minimised. It is for this reason that we welcome the NPSA work programme which provides detailed but practical solutions that can reduce the likelihood of system failures and thereby increase the safety of patients when medicines are procured, prescribed, dispensed, prepared, administered and monitored.

Chief pharmacists, pharmaceutical advisers and heads of pharmacy and medicines management in healthcare organisations have been identified to lead the action required to implement the safer practice recommendations listed in the five patient safety alerts that make up the safe medication work programme 2007-08. The chief pharmacist, pharmaceutical adviser or head of pharmacy and medicines management will need to be supported by the chief executive and key members of the executive clinical team in implementing these safer practice recommendations.

A suggested timeframe for implementation is noted on each of the alerts; however it is the responsibility of healthcare organisations to use local discretion in planning for all actions to be completed by 31 March 2008.

This programme of work for 2007-08 has been disseminated in this manner to assist with planning and implementation, and provide a focus for medication safety issues.

The successful implementation of these recommendations have considerable potential for reducing harm to patients from medicines, and we wish you every success with this work in the coming year.



Dr Keith Ridge, Chief Pharmaceutical Officer (England),
and Carwen Wynne-Howells, Chief Pharmaceutical Adviser
(Welsh Assembly Government)

... Tablets 500mg

... every four
... little water until

*** DO NOT EXC**

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Part one

Learning from medication incidents

Introduction

“Getting the dose right when he’s taking multiple tablets, maybe four a day and at specific times – that’s a nightmare... weaning him off medicines – requires halving and quartering [tablets]. It’s complicated... hard for someone to do independently... it’s easy to make a mistake.”

*Carer at NPSA workshop,
March 2006*

Each hospital in England and Wales administers about 7,000 medicine doses each day, and this activity can take up a substantial amount of nurses’ time.¹

Most medicines are used safely and help people to get better or stay well. But, occasionally, errors happen which can lead to harm.

The following summary describes key learning from analysis of almost 60,000 medication incidents reported by NHS staff to the NPSA’s National Reporting and Learning System (NRLS) between January 2005 and June 2006.²

The NRLS is a voluntary system and will be subject to bias and incompleteness of information. Reported incidents alone cannot tell the whole story about risks to patients. For this reason, the NPSA also analysed data from defence and litigation organisations, as well as recent research, in order to understand more about what goes wrong and why.

This analysis has helped identify those areas that require action by the NHS to improve patient safety (see ‘Priorities for action’ on page 18).

Analysis of incidents involving particular medicines has resulted in the development of the safe medication practice work programme, as detailed in part two of this report.

- 1 The Audit Commission, in *A Spoonful of Sugar – Medicines Management in NHS Hospitals* (2001), estimates that 40 per cent of nurses’ time is spent administering medicines.
- 2 The report does not include information on *unpreventable* adverse drug reactions collected via the ‘yellow card’ scheme by the Medicines and Healthcare products Regulatory Agency (MHRA).

Number and location of medication incidents

Medication incidents were the second most common type of incident reported by NHS staff to the NPSA's NRLS, after patient accidents, between January 2005 and June 2006.

For some groups of patients (children) and in some settings (general practice), medication was the most commonly reported type of incident.

Between January 2005 and June 2006, NHS staff reported 59,802 medication safety incidents to the NRLS (this represents 8.3 per cent of all incidents reported). Just over 80 per cent of these incidents occurred in acute, general and community hospitals. Only 4.9 per cent (2,949) of these medication incidents occurred in primary care settings.

Reporting was variable across organisations – one quarter of all organisations (largely primary care) reported no medication incidents during a six month period.

Outcomes of medication incidents

Most reported medication incidents (83.1 per cent) resulted in no harm to patients.

Degree of harm to patients from medication incidents reported to the NRLS

Degree of harm	Number	Per cent
No harm	49,714	83.1
Low harm	7,552	12.6
Moderate harm	2,391	4.0
Severe harm	54	0.1
Death	38	0.1

Source: medication incidents reported to the NRLS between January 2005 and June 2006.

The small number of incidents (92) that were confirmed as resulting in death or severe harm to the patient were reviewed in more detail. The types of medicines associated with these incidents include opioids, anticoagulants, anaesthetic medicines, insulin, antibiotics, chemotherapy, antipsychotics and infusion fluids.

Over half the reported medication incidents confirmed as resulting in severe harm or death related to medicines that are administered by injection (58 per cent, 53/92 incidents).

Even reports of incidents that resulted in no harm to the patient are worth reviewing in detail as they can provide learning opportunities. These incidents include ‘near-misses’ – serious incidents that occurred, but did not result in harm to the patient.

Reports indicate that the same medication incident can lead to different outcomes for different patients, for example:

“Patient given the antibiotic amoxicillin when patient was allergic to penicillin.” Outcome: no harm

“GP on call administered amoxicillin tablet to patient. Short time later patient collapsed in cardiac arrest. Ambulance called, CPR protocol followed and eventually stopped. Patient stated that they had told GP they are allergic to penicillin.” Outcome: death

Anonymised extracts from incidents reported to the NRLS

Data from voluntary reporting will never give the full picture of risks to patients. However, research can illustrate the extent of harm medication incidents cause to patients.

Recent studies suggest that 6.5 per cent of hospital admissions may be related to harm from medicines,¹ and around seven per cent of inpatients may suffer harm from medicines, much of which is preventable.²

1 Pirmohamed M et al. Adverse drug reactions as cause of admission to hospital: prospective analysis of 18,820 patients. *BMJ*. 2004; 329: 15-19

2 Wiffen P et al. Adverse drug reactions in hospital inpatients. A systematic review of prospective and retrospective studies. *Bandolier Extra*, June 1-16, 2002

Types of medication incidents

The majority of medication incidents reported to the NPSA between January 2005 and June 2006 related to administration of medicines (59.3 per cent), followed by incidents related to preparation and dispensing (17.8 per cent) and prescribing (15.7 per cent).

The most common types of medication incidents reported to the NPSA were wrong dose, strength or frequency; omitted medicine; and wrong medicine. Together these accounted for over half (57.3 per cent) of all medication incidents reported.

Wrong dose, strength or frequency

Calculating the right dose or rate of a medicine is complex, and it is easy to make mistakes in busy clinical settings.

The wrong dose, strength or frequency of medicine accounted for over a quarter (28.7 per cent) of all medication incident reports received. These made up 38 per cent (35/92) of the medication incidents confirmed as resulting in severe harm or death.

“Patient usually takes 20mg of methotrexate (a potent immunosuppressant) in the form of 8 x 2.5mg tablets. Tablets dispensed from the chemist were 10mg, and the patient took usual eight tablet dose. Therefore 80mg of methotrexate taken.” Outcome: no harm

Anonymised extract from incident reported to the NRLS

Omitted medicine

Omitted medicines accounted for 17.1 per cent of the medication incidents reported to the NPSA from all settings. In hospital settings and in patient’s own homes, omitted medicines were the second most common reported type of medication incident. These incidents include missing a medicine from an intended medicine regime entirely, or missing one or more doses of medicine.

Omitted medicines are not always recognised as a serious error, but incident reports include examples of deaths and severe harm to patients occurring when vital medication, for instance to treat epilepsy or to prevent strokes, is forgotten.

“The anticoagulant warfarin was omitted from the discharge prescription of a patient with a history of deep vein thrombosis and pulmonary embolism. The patient was subsequently re-admitted to the medical unit with a blood clot in their lung.”

Anonymised extract from incident reported to the NRLS

Analysis of reported medication incidents has highlighted problems with the availability of medicines at the point at which they are needed. This can lead to medicines being omitted. Healthcare organisations should review the medicines supply chain to ensure that vital medicines are available when they are needed.

“A patient taking regular carbamazepine to control seizures was admitted to hospital. During the inpatient stay, the supply of carbamazepine ran out. This was not identified by the pharmacy technician who organised for the medicine supplies on the ward. The patient was without medication for three days and, as a result, had a generalised seizure of several minutes duration followed by disorientation.”

Anonymised extract from incident reported to the NRLS

Wrong medicine

“It is very easy to pick the wrong medicines or wrong dose off the computer screen – some of the drugs have very similar names.”

General Practitioner

Incidents involving prescribing, dispensing or administering the wrong medicine accounted for 11.5 per cent of all medication incidents reported to the NRLS during the period analysed.

Incidents relating to wrong medicine was the most common type of medication incident reported from community pharmacies (33.2 per cent).

Reports of incidents relating to the wrong medicine are often associated with medicines whose names look alike or sound alike. In general practice, incident reports commonly described the confusion of medicines with similar names, suggesting mis-selection from a list (for example, on a computer screen). Picking errors in pharmacies are often a result of medicines having similar names and packaging.

“Patient telephoned into the diabetes centre stating that insulin received from pharmacy is clear and is usually cloudy. Patient was advised to read out exactly what was printed on the dispensed insulin cartridges. Novorapid® penfill had been dispensed instead of Novomix 30® penfill.”

Anonymised extract from incident reported to the NRLS

Wrong patient

At any stage in the medication process, medicines intended for one patient can be given to another in error; often due to incorrect patient identification.

Across all settings analysed in depth, almost five per cent of reported medication incidents related to mismatching between patients and medicines.

“A 50mg dose of slow acting morphine sulphate tablets used as a strong analgesic prescribed for one patient was administered to another patient in error.”

Anonymised extract from incident reported to the NRLS

Wrong formulation

Errors can occur when medicines are prepared in the wrong form. Of the medication incidents analysed, 2.4 per cent involved the right medicine being given in the wrong form.

“A 500mg dose of the antibiotic clarithromycin was administered to a patient as an IV bolus injection instead of diluted in 250ml of sodium chloride 0.9% infusion. The patient complained of severe irritation in arm above the site of injection and became sweaty.”

Anonymised extract from incident reported to the NRLS

Wrong route

Wrong route incidents reported involved, for example, medicines intended to be given orally, mistakenly being given by injection. Wrong route incidents with particular potential for severe harm involved the prescription or administration of a medicine by a different route to its licensed use.

Almost 2.1 per cent of medication incidents reported from hospital settings were wrong route errors. Of these incidents, almost one in five led to some harm.

“A patient was prescribed omeprazole to be given via a nasogastric line. The dose was prepared in a syringe which was inadvertently connected to the central (intravenous) line. The patient became bradycardic and hypotensive but was easily resuscitated and recovered without immediate ill effect.”

Anonymised extract from incident reported to the NRLS

Patients at risk of medication incidents

In the analysis of medication incidents reported to the NRLS between January 2005 and June 2006, patients who are allergic to certain medicines, and children, were shown to be potentially more vulnerable to patient safety incidents than other groups of patients. Subsequently, further in-depth analysis of samples of incidents involving these groups of patients was carried out.

Patients who are allergic

Incidents of patients being prescribed, dispensed or administered a medicine to which they are known to be allergic accounted for 3.2 per cent of all reported medication incidents in hospitals, but almost one-third of these resulted in some harm to the patient.

Patients who received a medicine to which they are known to be allergic accounted for around five per cent (5/92) of reported medication incidents that resulted in severe harm or death.

In hospitals, reports of patients being given a medicine to which they are allergic most commonly involved antibiotics (mostly penicillins), opioids and non-steroidal anti-inflammatory agents.

“The clinical notes of a patient showed a record of penicillin allergy, but amoxicillin had been prescribed in the past. From these old prescriptions, it was assumed that amoxicillin would be safe and it was prescribed again. The patient died later that day as a result of the anaphylactic reaction.”

Anonymised extract from incident reported to the NRLS

Children

Children aged up to four years were involved in 10.1 per cent (2,081) of medication incident reports where age was stated.¹ This is higher than would be expected given the proportion of bed days they account for.

Recurring themes in medication incidents involving children include errors in calculating doses; ten-fold dose errors; problems with injectable medicines and the use of specific medicines such as gentamicin; and children being treated in non-paediatric areas.

It is important that action is taken to reduce risk to children, for instance by using dedicated medicines on paediatric wards or using software to help calculate doses for children based on body weight.

¹ Only 38.8 per cent of medication incidents reported between January 2005 and June 2006 indicated the age of the patient.

“A baby weighing 825g was prescribed a daily dose of 16.4mg of a glycopeptides antibiotic. The dose should be 8mg/kg, equivalent to 6.6mg for this baby. The error was discovered and rectified by the pharmacist before any doses were given.”

Anonymised extract from incident reported to the NRLS

Patients moving across care settings

A recurrent risk is when patients are transferred between care teams and settings.

In particular, poor communication at the interface between inpatient settings and the community can often result in patient safety incidents. For example, incomplete or incorrect medication history on admission to hospital, incorrect or incomplete discharge medicines, failure to communicate changes in medication regime, or lack of monitoring or follow-up on discharge from hospital, can all result in patient safety incidents.

“Patient discharged from ward with two vials of insulin but no insulin syringes to give it. Patient usually uses an insulin cartridge administration device but this was not sent with the cartridges. As patient is not familiar with using a vial and syringes (obtained from ward) senior cover had to be called to administer medication.”

Anonymised extract from incident reported to the NRLS

Patients cared for outside of normal processes

Another underlying theme identified from analysis of medication incident reports is medicines being prescribed, dispensed or administered outside of normal processes. These include doses due at night time or outside the normal ward round.

Other ‘outside normal processes’ issues relate to children being treated in non-specialist adult areas and in the community; medication needs (for instance, monitoring diuretics or lithium) of mental health patients seen in general settings; and patients receiving pain relief and other medication out of hours.

“It was identified at 08.15 that intravenous meropenem had not been given at the prescribed time of 04.00.”

Anonymised extract from incident reported to the NRLS

Priorities for action

Evidence in this report has been used to identify seven priority areas for action by healthcare staff and organisations.

Three of these areas are general, relating to better information on risk, implementing NPSA guidance, and improving staff training. The remaining four actions relate to risks which together accounted for two-thirds of all reported incidents and litigation claims. Taking action in these areas will have a real impact on making medication practice safer.

Healthcare commissioners in strategic health authorities, primary care trusts and local health boards are in an ideal position to prompt action and monitor progress on medication safety issues.

1 Increase reporting and learning from medication incidents

Healthcare staff and organisations should:

- ensure there is an organisational commitment at Board level to improving patient safety, including through the safer use of medicines;
- ensure the senior pharmacist in the organisation takes the lead on improving the safety of medicines, and is supported by the chief executive, medical director and nursing director;
- increase their reporting of medication incidents to identify risks and changes to products and systems;
- ensure a quality assurance process is in place where a healthcare professional reviews the incident reports for completeness and accuracy;
- ensure there is a multidisciplinary group that meets to review and learn from medication incidents;
- provide regular feedback to healthcare staff of case studies, summary data and progress on actions to improve medication systems;
- produce an annual report summarising learning from incident reports, audits and other sources, and highlight actions taken to make medication practice safer.

2 Implement NPSA safe medication practice recommendations

Analysis of incident data and other evidence has informed the safe medication practice programme set out in part two of this report. NHS organisations should ensure they follow this national guidance.

3 Improve staff skills and competences

Healthcare workers should ensure they have the required work competences to use medicines safely.

In this programme of work (part two), the NPSA has developed work competences for anticoagulant therapy, the use of injectable medicines, and paediatric infusions. A range of other work competences for the safe use of medicines can be found on the Skills for Health website (www.skillsforhealth.org.uk).

4 Minimise dosing errors

Healthcare organisations should:

- undertake an analysis of dosing incidents to identify the risks most frequently associated with dosing errors locally;
- ensure that staff have easy access to essential information to assist with medicine dosing, such as national and local medicines information and therapeutic protocols.
- review local medicine-related policies to identify whether they provide the necessary guidance to minimise risks.
- provide help for staff in the form of dosage charts and calculators, dose checking software in infusion pumps and syringe drivers, and ready-to-use products, where appropriate, to avoid complex dose calculations.

5 Ensure medicines are not omitted

Healthcare staff should report all serious omissions or delays of medicines, and these should be periodically audited and the results used to inform system improvements.

Medicine storage and medication supply chains should also be reviewed.

6 Ensure the correct medicines are given to the correct patients

Healthcare organisations should:

- review incident reports concerning wrong medicine and wrong patient selection, focus safer practice initiatives on medicines that are most frequently reported to be mis-selected, and audit practice in checking patient's identity;
- develop 'purchasing for safety' policies for medicines and seek to purchase products designed in such a way to promote safer practice;
- use segregated storage, alert labelling and double-checking systems in medicine policies and procedures to help minimise mis-selection;
- consider implementing auto-identification technology.

7 Document patients' medicine allergy status

Healthcare organisations should:

- audit the frequency of incidents involving medicine allergy and the extent to which allergy status is documented;
- ensure all electronic prescribing and dispensing systems include a record of the patients' medicine allergy status;
- consider the use of an allergy wristband to alert healthcare staff to the allergy status of the patient;
- develop local systems to alert staff to products containing penicillin.



Part two

Safe medication practice work programme for 2007-08

Strategies for the medication practice work programme

Healthcare professionals such as general practitioners, pharmacists, hospital clinicians, nurses, allied health professionals and procurement managers are required to help change practice to improve patient safety.

The NPSA has developed a safe medication practice work programme for 2007-08, consisting of five patient safety alerts.

The alerts are supported by information for patients, risk assessment tools, guidelines, multidisciplinary standards, operating procedures, posters, work competences, e-learning modules and audit tools. These will help healthcare organisations to successfully implement and evaluate the effectiveness of the safer practice recommendations.

The individual alerts set out here will not necessarily all apply to all healthcare settings.

The NPSA will send all pharmacy service leads in England and Wales packs containing hard copies of each full patient safety alert, supporting materials and a version written in plain English for patients and the general public. Electronic copies of these materials, together with additional information, are available at www.npsa.nhs.uk/health/alerts

The safe medication practice work programme incorporates five overarching strategies that can be implemented to minimise risk:

1 Rationalise product ranges and use products with safer designs

The range of high-risk products should be rationalised wherever possible. In some of the patient safety alerts, medicines and medical device products designed with inherent safety features have been identified.

It is recommended that a 'purchasing for safety' policy is adopted to promote the procurement of products with inherent safety features.

There are also recommendations concerning the labelling and storage of medication products in clinical areas.

2 Providing patients with better information and improving communication

In the patient safety alert on how to make anticoagulant therapy safer, it is recommended that patients receive appropriate verbal and written communications at specific times during their therapy.

The NPSA and the British Society for Haematology have revised written patient-held materials. This information includes advice for patients about how they can make their therapy safer if they share information about their dose, test results, clinic appointments and details about any newly started or discontinued medicines with all the healthcare professionals with whom they have contact. In addition, there is separate information for patients requiring dental treatment.

3 Policies and procedures

It is essential that up-to-date and clearly written policies and procedures covering medication practice reflect local circumstances and describe safe practice that all practitioners can be expected to achieve.

The NPSA has developed a range of materials that can help NHS organisations develop policies and procedures that meet local requirements.

4 Training and assessment of work competences

Healthcare organisations are responsible for ensuring that staff working in an area of medication practice have received adequate training, have knowledge of, and agree to follow, medication policies and procedures, and have the necessary work competences to undertake their duties safely.

The NPSA has developed training materials and draft work competences that healthcare organisations can adapt to meet local needs.

5 Annual medicines management audit programme

Healthcare organisations are expected to review the safety of various aspects of their medication systems each year.

The NPSA, working with other stakeholders, has developed a number of risk assessment, audit and safety indicator tools, which can be used by healthcare organisations.

These, together with an analysis of local patient safety incidents, will enable organisations to annually track progress and focus further actions where necessary. This information should be used as part of the commissioning and performance management data that is shared with external organisations.

Timetable

Patient safety alert number	Title	SABS* deadline (actions underway)	SABS* deadline (actions completed)
18	Actions that can make anticoagulant therapy safer	2 July 2007	31 March 2008
19	Promoting safer measurement and administration of liquid medicines via oral and other enteral routes	2 July 2007	30 September 2007 – use of oral/enteral syringes
			31 March 2008 – use of enteral devices incompatible with intravenous syringes
20	Promoting safer use of injectable medicines	2 July 2007	31 March 2008
21	Safer practice with epidural injections and infusions	2 July 2007	31 December 2007
22	Reducing the risk of hyponatraemia when administering intravenous infusions to children	2 July 2007	30 September 2007
* Safety Alert Broadcast System (this does not apply in Wales but progress will be monitored by Regional Offices of the Welsh Assembly Government).			

A suggested timeframe for implementation is noted on each of the alerts; however, it is the responsibility of healthcare organisations to use local discretion in planning for **all actions to be completed by 31 March 2008**.

Reviewing costs and effectiveness

The recommended actions in the patient safety alerts are low cost to implement.

Costs are dependent on current local practice, but can be predicted and incorporated into annual business plans if necessary. There are some associated costs, particularly for the purchasing of safer products.

The safe medication practice work programme is intended to be implemented and evaluated over a 12-month period. This allows local organisations to reduce the risks in some prioritised areas of practice and evaluate the effectiveness of these initiatives over time.

Details of patient safety alerts

Top-level actions for each of the patient safety alerts are included on the following pages.

Full versions of the patient safety alerts with more background and technical details are available on the NPSA website, together with the supporting materials, including templates for policies and procedures, training materials, information for patients, and risk assessment, audit and safety tools (www.npsa.nhs.uk/health/alerts).

The NPSA is recommending that all healthcare organisations take the following action:

- 1** Ensure all staff caring for patients on anticoagulant therapy have the necessary work competences. Any gaps in competence must be addressed through training to ensure that all staff undertake their duties safely.
- 2** Review and, where necessary, update written procedures and clinical protocols for anticoagulant services to ensure they reflect safe practice, and that staff are trained in these procedures.
- 3** Audit anticoagulant services using British Society for Haematology and NPSA safety indicators as part of the annual medicines management audit programme. The audit results should inform local actions to improve the safe use of anticoagulants, and should be communicated to clinical governance, and drugs and therapeutics committees (or equivalent). Commissioners and external organisations should use this information as part of the commissioning and performance management process.
- 4** Ensure that patients prescribed anticoagulants receive appropriate verbal and written information at the start of therapy, at hospital discharge, on the first anticoagulant clinic appointment and when necessary throughout the course of their treatment. The British Society for Haematology and the NPSA have updated the patient-held information (yellow) booklet.
- 5** Promote safe practice amongst prescribers and pharmacists to check that patients' blood clotting (International Normalised Ratio, INR) is being monitored regularly and that the INR level is safe before issuing or dispensing repeat prescriptions for oral anticoagulants.
- 6** Promote safe practice for prescribers co-prescribing one or more clinically significant interacting medicines for patients already on oral anticoagulants to make arrangements for additional INR blood tests and to inform the anticoagulant service that an interacting medicine has been prescribed. Ensure that those dispensing clinically significant interacting medicines for these patients check that these additional safety precautions have been taken.
- 7** Ensure that dental practitioners manage patients on anticoagulants according to evidenced-based therapeutic guidelines. In most cases, dental treatment should proceed as normal and oral anticoagulant treatment should not be stopped or the dosage decreased inappropriately.
- 8** Amend local policies to standardise the range of anticoagulant products used, incorporating characteristics identified by patients as promoting safer use.
- 9** Promote the use of written safe practice procedures for the use of anticoagulants in care homes. It is safe practice for all dose changes to be confirmed in writing by the prescriber. A risk assessment should be undertaken on the use of Monitored Dosage Systems for anticoagulants for individual patients. The general use of Monitored Dosage Systems for anticoagulants should be minimised as dosage changes using these systems are more difficult.

Patient safety alert 19: promoting safer measurement and administration of liquid medicines via oral and other enteral routes


National Patient Safety Agency

Patient safety alert

19



Alert

28 March 2007

Promoting safer measurement and administration of liquid medicines via oral and other enteral routes

The National Patient Safety Agency (NPSA) is advising healthcare organisations on how the design of medical devices and the methods used to measure and administer oral liquid medicines* can improve patient safety.

A review of data from the NPSA's National Reporting and Learning System (NRLS) shows 22 patient safety incidents involving intravenous administration of oral liquid medicines between 1 January 2005 and 31 May 2006. Incorrect intravenous administration of oral liquid medicines has resulted in three reported deaths between 2001 and 2004,¹ and there are reports of four incidents of harm or near misses between 1997 and 2004.² This risk has been recognised in the Department of Health report *Building a safer NHS for patients: Improving medication safety*³ and in other publications worldwide.^{4,5,6}

Action for the NHS and the independent sector

1 Design, supply and use of oral/enteral syringes

- only use labelled oral/enteral syringes that cannot be connected to intravenous catheters or ports to measure and administer oral liquid medicines;
- do not use intravenous syringes to measure and administer oral liquid medicines;
- make sure stocks of oral/enteral syringes are available in all clinical areas that may need to measure and administer oral liquid medicines in a syringe;
- when patients or carers need to administer oral liquid medicines with a syringe, supply them with oral or enteral syringes.

2 Design, supply and use of enteral feeding systems

- enteral feeding systems should not contain ports that can be connected to intravenous syringes or that have end connectors that can be connected to intravenous or other parenteral lines;
- enteral feeding systems should be labelled to indicate the route of administration;
- three-way taps and syringe tip adaptors should not be used in enteral feeding systems because connection design safeguards can be bypassed.

* The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

¹ The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

² The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

³ The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

⁴ The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

⁵ The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

⁶ The term 'oral/enteral medicine' will cover intragastric administration of liquid oral medicines. Flushing water with oral syringe should not be used.

For response to:

- All NHS and independent sector organisations in England and Wales
- The Chief Pharmaceutical Officer
- The Chief Nurse
- The Chief Medical Officer
- The Chief Executive
- The Chief Financial Officer
- The Chief Information Officer
- The Chief Legal Officer
- The Chief Operations Officer
- The Chief Quality Officer
- The Chief Safety Officer
- The Chief Training Officer
- The Chief Compliance Officer
- The Chief Risk Officer
- The Chief Sustainability Officer
- The Chief People Officer
- The Chief Procurement Officer
- The Chief Estates Officer
- The Chief Security Officer
- The Chief Communications Officer
- The Chief Marketing Officer
- The Chief Public Affairs Officer
- The Chief External Relations Officer
- The Chief Customer Services Officer
- The Chief Information Security Officer
- The Chief Information Systems Officer
- The Chief Information Technology Officer
- The Chief Information Management Officer
- The Chief Information Governance Officer
- The Chief Information Protection Officer
- The Chief Information Security Officer
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- The Chief Information Technology Officer
- The Chief Information Management Officer
- The Chief Information Governance Officer
- The Chief Information Protection Officer

The NPSA is advising the NHS on how the design of medical devices and the methods used to measure and administer oral liquid medicines can improve patient safety.

The term 'oral liquid medicine' is used to mean liquid medicine, including soluble tablets once dissolved, feeds or flushes to be administered by oral and other enteral routes, including rectal administration. Flushes include water, sodium chloride 0.9% and air.

The NPSA is recommending that all healthcare organisations take the following action:

1 Design, supply and use of oral/enteral syringes:

- only use labelled oral/enteral syringes that cannot be connected to intravenous catheters or ports to measure and administer oral liquid medicines;
- do not use intravenous syringes to measure and administer oral liquid medicines;
- make sure stocks of oral/enteral syringes are available in all clinical areas that may need to measure and administer oral liquid medicines in a syringe;
- when patients or carers need to administer oral liquid medicines with a syringe, ensure that they are supplied with oral or enteral syringes.

2 Design, supply and use of enteral feeding systems:

- enteral feeding systems should not contain ports that can be connected to intravenous syringes or that have end connectors that can be connected to intravenous or other parenteral lines;
- enteral feeding systems should be labelled to indicate the route of administration;
- three-way taps and syringe tip adaptors should not be used in enteral feeding systems because connection design safeguards can be bypassed.

3 Organisational procedures, training and audit:

- medicines and enteral feeding policies and procedures should identify and manage the risk of administering oral liquid medicines by the wrong route;
- the procedures should be part of the organisation's training and competency assessment programmes;
- annual medicines management audits should include a review of the measurement and administration of oral liquid medicines to ensure compliance with local policies and procedures.

Patient safety alert 20: promoting safer use of injectable medicines

National Patient Safety Agency
NPSA

Patient safety alert
20

Alert

28 March 2007

Promoting safer use of injectable medicines

The National Patient Safety Agency (NPSA) received around 800 reports a month to its National Reporting and Learning System (NRLS) relating to injectable medicines between January 2005 and June 2006. This represents approximately 24 per cent of the total number of medication incidents. The majority of these resulted in no or low harm to patients. However, there were 25 incidents of death and 28 of serious harm reported between January 2005 and June 2006.

Research evidence indicates that the incidence of errors in prescribing, preparing and administering injectable medicines is higher than for other forms of medicine.^{1,2} In one study, at least one error occurred in 49 per cent of intravenous medicine doses prepared and administered on hospital wards; one per cent were judged to be potentially severe errors, and 29 per cent potentially moderate errors.³ (more details about this study are included in the background section on page 6).

Using data from the NRLS and other evidence,⁴ the NPSA has identified a number of latent system risks and is making recommendations that can make the use of injectable medicines safer.

Action for the NHS and the independent sector

The NPSA is recommending that all NHS and independent sector organisations in England and Wales take the following steps:

- 1 Undertake a risk assessment of injectable medicine procedures and products in all clinical areas to identify high risks, and develop an action plan to minimise them.
- 2 Ensure there are up-to-date protocols and procedures for prescribing, preparing and administering injectable medicines in all clinical areas.
- 3 Ensure essential technical information on injectable medicines is available and accessible to healthcare staff in clinical areas at the point of use.
- 4 Implement a 'purchasing for safety' policy to promote procurement of injectable medicines with inherent safety features.
- 5 Provide training for, and supervision of, all healthcare staff involved in prescribing, administering and monitoring injectable medicines.
- 6 As part of the annual medicines management audit programme, healthcare organisations should include an audit of medication practice with injectable medicines.

<p>For immediate use</p> <ul style="list-style-type: none"> • All NHS and independent sector organisations in England and Wales. • The chief executive/managing director/medical director/acting director and clinical governance feedback manager. 	<p>Who to contact for more information</p> <ul style="list-style-type: none"> • Clinical governance leads and risk managers • Medical staff • Pharmacy lead • Radiographers • Operating theatre practitioners • All medicines • Patient advice and liaison services staff in England • Procurement managers 	<p>The NPSA has identified</p> <ul style="list-style-type: none"> • Chief executives of acute trusts, primary care organisations, mental health trusts, ambulance trusts, local health boards in England and Wales • Chief medical officers and clinical governance leads of hospitals with medicines (England) and regional acute trusts • Healthcare Commission • Healthcare Inspectorates • Business Services Centre (Wales)
<p>Independent Healthcare Advisory Services</p> <ul style="list-style-type: none"> • Medicines and Healthcare products Regulatory Agency • Medicines and Health Agency • Health Technology Assessment • NHS Direct • Relevant patient organisations and community health councils in Great Britain • Independent Healthcare Forum • Commission for Social Care Inspection 		

Research evidence indicates that the incidence of errors in prescribing, preparing and administering injectable medicines is higher than for other forms of medicine.

In one study, at least one error occurred in 49 per cent of intravenous medicine doses prepared and administered on hospital wards; one per cent were judged to be potentially severe errors; and 29 per cent potentially moderate errors.

The NPSA has identified a number of latent system risks and is recommending that all healthcare organisations take the following action:

- 1** Undertake a risk assessment of injectable medicine procedures and products in all clinical areas to identify risks and develop an action plan to minimise them.
- 2** Ensure there are up-to-date protocols and procedures for prescribing, preparing and administering injectable medicines in all clinical areas.
- 3** Ensure essential technical information on injectable medicines is available and accessible to healthcare staff in clinical areas at the point of use.
- 4** Implement a 'purchasing for safety' policy to promote procurement of injectable medicine products with inherent safety features.
- 5** Provide training for, and supervision of, all healthcare staff involved in prescribing, administering and monitoring injectable medicines.
- 6** As part of the annual medicines management audit programme, healthcare organisations should include an audit of medication practice with injectable medicines.

The NPSA is recommending that all healthcare organisations take the following action:

- 1** Clearly label infusion bags and syringes for epidural therapy (whether purchased commercially, manufactured by the hospital pharmacy or prepared in clinical areas) with **'For Epidural Use Only'** in a large font. Make judicious use of colour and design to differentiate these products from those for administration by intravenous and other routes.
- 2** Minimise the likelihood of confusion between different types and strengths of epidural injections and infusions:
 - rationalise the range of epidural injections and infusions available, and introduce procedures for preparing and administering these products. Undertake an annual audit to ensure epidural practices adhere to the agreed range of products and procedures;
 - maximise the use of ready-to-administer epidural infusions to help reduce the need for complex calculations and preparation.
- 3** Reduce the risk of the wrong medicine being selected by storing epidural infusions in separate cupboards or refrigerators from those holding intravenous and other types of infusions.
- 4** Use clearly labelled epidural administration sets and catheters that distinguish them from those used for intravenous and other routes.
- 5** Use infusion pumps and syringe driver devices for epidural infusions that are easily distinguishable from those used for intravenous and other types of infusion.
- 6** Ensure all staff involved in epidural therapy have received adequate training, and have the necessary work competences to undertake their duties safely.

The NPSA is recommending that all healthcare organisations take the following action:

- 1** Remove sodium chloride 0.18% with glucose 4% intravenous infusions from stock and general use in areas that treat children. Suitable alternatives must be available. Restrict availability of these intravenous infusions to critical care and specialist wards such as renal, liver and cardiac units.
- 2** Produce and disseminate clinical guidelines for the fluid management of paediatric patients. They should give clear recommendations for fluid selection, and clinical and laboratory monitoring.
- 3** Provide adequate training and supervision for all staff involved in the prescribing, administering and monitoring of intravenous infusions for children.
- 4** Reinforce safer practice by reviewing and improving the design of existing intravenous fluid prescriptions and fluid balance charts for children.
- 5** Promote the reporting of hospital-acquired hyponatraemia incidents via local risk management reporting systems. Implement an audit programme to ensure NPSA recommendations and local procedures are being adhered to.

Further details

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