# Recommendations to improve the safe use of insulin in secondary care in Northern Ireland

**December 2005**

**Northern Ireland Medicines Governance Team**

# Introduction

These recommendations are aimed at improving patient safety related to the use of insulin in secondary care.

From April to December 2004, 199 medication incidents involving the use of insulin were reported in eight Northern Ireland hospitals. There has also been a high profile Coroner's case involving an overdose of insulin.

To inform the development of these recommendations, the Northern Ireland Medicines Governance Team carried out a Failure Mode Effect Analysis (FMEA) on the different processes that occur in the use of insulin - prescribing, dispensing and administration.

FMEA dissects a given process to identify possible or likely errors ('Failure Modes'), and gauge what their effect will be, even before they take place. A quantitative evaluation of the criticality of each failure mode is calculated by multiplying three components – occurrence, severity and detection. These component values are determined from reference scales on the basis of known or estimated data for each failure mode. The most critical steps in the process are thus identified, which is helpful when deciding and prioritising where actions should be taken. Solutions should ultimately eliminate the possibility or reduce frequency of errors, and improve their detection before they occur.

The FMEA identified key areas of risk in the use of insulin that have the potential to cause major patient harm. These recommendations were subsequently developed to address these specific areas of risk.

Giving insulin to the wrong patient has the potential to cause serious harm. If the receiving patient is not diabetic, there is a strong possibility that their blood glucose will not be monitored and thus the chances of detecting the incident before serious harm occurs are significantly reduced. Although some of these recommendations will reduce the potential for a wrong patient incident, this type of incident is not restricted to insulin or medication use. It is important that it is addressed as part of a wider initiative in preventing wrong patient incidents throughout all areas of healthcare. The National Patient Safety Agency issued a document 'Right patient - right care' in December 2004 and aim to issue a Patient Safety Alert, targeted at acute services, on ensuring correct patient identity during 2005.

CREST has recently produced guidance on the emergency management of hyperkalaemia in adults, including the safe use of insulin. Regional guidance should be developed for the treatment of hyperkalaemia in neonatal and paediatric patients.

The recommendations are presented in four sections, based on the processes involved in the use of insulin - namely prescribing, administering, dispensing and monitoring.

# Prescribing recommendations

## Prescribing of insulin

Variability in insulin prescribing practice within and between Trusts may lead to confusion. This variability may be problematic for staff on rotation through Northern Ireland hospitals. For example, there is varied practice in the use of sliding scales for insulin in both the route used and the dosing schedules.

**Recommendation 1**
The role of insulin sliding scales in secondary care is unclear. Regional guidance on when, or if, a sliding scale is appropriate should be produced. This regional guidance would indicate the range of doses for a variety of clinical indications when a sliding scale might be appropriate, such as peri-operatively, and specify the route of administration.

- **For action by:** CREST

**Recommendation 2**
Where intravenous insulin infusions are advocated to maintain tight glycaemic control, such as in critically ill patients, a regional prescribing consensus should be developed for all indications.

- **For action by:** CREST

**Recommendation 3**
An audit of compliance with the CREST guideline for the treatment of hyperkalaemia in adults should be carried out.

- **For action by:** HPSS Trusts, RMAG

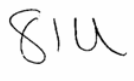
**Recommendation 4**
A standard prescription and monitoring chart for insulin should be developed for use across Northern Ireland (see also recommendation 40).

- **For action by:** CREST

## Adherence to prescribing guidance

**Incident 1**

Eight units of insulin were prescribed. 'International units' was inappropriately abbreviated to 'iu' and the dose was misinterpreted as '81 units' of insulin.



**Recommendation 5**
The standard of prescribing in general, and specifically in relation to insulin, should be audited regularly. This audit should consider adherence to guidance in Use and Control of Medicines (DHSSPS), 2004 and include legibility, use of inappropriate abbreviations, 'trailing zeros, and clear decimal points.

- **For action by:** HPSS Trusts, RMAG

**Recommendation 6**
Implementation of a regionally validated electronic prescribing system will address many of the issues associated with prescribing of insulin and other medicines.

- **For action by:** DHSSPS

**Recommendation 7**
Awareness of prescribing guidance and the rationale behind this should be improved.

- **For action by**: HPSS Trusts, Medicines Governance team, QUB, UU

## Strength of insulin

There is only one licensed strength of insulin (100units/ml) that should be used in the HPSS without formal risk assessment.

**Recommendation 8**
All staff should receive training on the strength of insulin.

- **For action by:** HPSS Trusts, QUB, UU

**Recommendation 9**
Use of unlicensed strengths of insulin must be approved at the highest level and used only with additional risk management measures in place.

- **For action by:** HPSS Trusts

**Recommendation 10**
Training on all aspects of prescribing in diabetes care, including use of intravenous insulin, should be provided. This training should be both at induction and as part of in-service training. Training must also be provided on the use of insulin in hyperkalaemia.

- **For action by:** HPSS Trusts, NICPPET, QUB, UU

# Dispensing recommendations

The FMEA identified key areas of risk as the failure of the clinical and final dispensing checks. Such dispensing incidents are often caused by distractions and interruptions and, therefore efforts should be made to reduce these problems as much as possible in hospital pharmacy departments. The separation of dispensing roles whenever possible can reduce risk and increase the chance of detecting these dispensing incidents.

## Supply

**Recommendation 11**
Guidelines / standard operating procedures (SOPs) should be developed to ensure that all stock requisitions for insulin are appropriately screened for legibility and clarity.

- **For action by:** Trust Pharmacy Managers

**Recommendation 12**
The current system of supply to wards / departments does not support single patient use. The NHS Pharmaceutical Quality Assurance Committee document; 'Multiple use of injections' 3rd edition November 2004 states:

'Each container of an injection licensed for multiple use should be reserved for a single patient and adequate systems put in place to ensure this occurs.'

In light of this, each insulin vial, pen or device must be labelled with the patient details when dispensing the item.

- **For action by:** Trust Pharmacy Managers

## Clinical check fails

A study in one acute Trust showed that comparison of the Kardex with the discharge prescription during the clinical check detected unintentional discrepancies that would otherwise go unnoticed and be dispensed. It was also shown that if this comparison and check was carried out by the ward pharmacist further discrepancies were detected.

**Recommendation 13**
All discharge prescriptions should be clinically checked against the original Kardex. Clinical checking of discharge prescriptions must include direct comparison with the Kardex and where possible be carried out by the ward pharmacist. This is necessary to verify that the medication, strength and dose ordered match that ordered on the Kardex.

- **For action by:** Trust Pharmacy Managers

**Recommendation 14**
Induction and training programmes for pharmacists should assess or include training on how to complete a clinical check of prescriptions. A competency-based programme should be introduced to ensure staff can accurately clinically check discharge prescriptions. There should be regular revalidation of staff who carry out this process to maintain high standards.

- **For action by:** Trust Pharmacy Managers, QUB

**Recommendation 15**
Interruptions or distractions can contribute to dispensing and checking incidents. A designated area for clinical checking equipped with adequate resources (reference sources, telephone etc.) should be identified in all pharmacy departments. This may not be immediately practical and other interim measures should be taken to reduce interruptions. Staff must be made aware that the clinical checker must only be interrupted in extreme circumstances.

- **For action by:** Trust Pharmacy Managers, QUB

**Recommendation 16**
An obvious record must be placed on a prescription to confirm that a pharmacist has clinically checked a prescription. This should include the signature (and page/bleep number if appropriate) of the checking pharmacist. This will provide an audit trail and will aid communication if there is a query regarding the discharge prescription.

- **For action by:** Trust Pharmacy Managers

**Recommendation 17**
The clinical check must be complete and signed by a pharmacist before the labelling and dispensing process begins.

- **For action by:** Trust Pharmacy Managers

## Final check fails

**Recommendation 18**
Ideally there should be separation of roles throughout the dispensing process where possible i.e. a different person clinically checking, labelling / dispensing and final checking. Where this is not possible (e.g. on call) a process of time separation between tasks should be recommended to reduce errors.

- **For action by:** Trust Pharmacy Managers

**Recommendation 19**
Induction and training programmes for pharmacists and accredited checking technicians, should include information on how to carry out the final check of prescriptions / stock requisitions. A competency-based programme should be introduced to ensure pharmacists and technicians can accurately carry out a final check. There should be regular revalidation of these programmes to maintain high standards.

- **For action by:** Trust Pharmacy Managers, QUB

**Recommendation 20**
Staff carrying out the final check of discharge prescriptions or stock requisitions, should not be interrupted until they have completed the check. This should be inherent in SOPs to reduce checking errors due to distractions. The workflow process should be designed to minimise interruptions for the final checker.

- **For action by:** Trust Pharmacy Managers, QUB

# Administration recommendations

The steps involved in the preparation and administration of insulin present vital opportunities for the detection of prescribing and dispensing incidents before they reach a patient. However, there is also the potential for errors to occur within the preparation and administration steps themselves.

## Administration rate

**Recommendation 21**
All relevant staff should receive training in the use of an infusion device before using it. All other staff must be aware that they must not handle or in anyway interfere with an infusion device in use.

- **For action by:** HPSS Trusts

**Recommendation 22**
The management of infusion devices in Trusts should be in accordance with the NPSA Safer practice notice 01, endorsed by DHSSPS and Controls Assurance Standard for Medical Devices and Equipment Management.

- **For action by**: HPSS Trusts

## Second checking

**Incident 2**

Two patients, patient A and patient B were due to receive a dose of insulin. It was practice on this ward that all doses of insulin received a second check. Two practitioners prepared and checked the correct dose of insulin for patient A. One practitioner then administered the dose prepared for patient A to patient B.

**Recommendation 23**
A second practitioner should perform an independent second check of insulin doses. This second check must:

- include all aspects of administration of insulin irrespective of the route or method of administration;
- be conducted from preparation through to actual administration of the prepared dose to the correct patient and documentation of administration; and
- include the use of any infusion devices and calculations where applicable.

This requirement for a second check of insulin doses should be included in Use and Control of Medicines.

- **For action by:** HPSS Trusts, DHSSPS, QUB, UU

**Recommendation 24**
Specific guidance should be given on which practitioners can perform a second check and that one of the practitioners should be a registered nurse.

- **For action by**: HPSS Trusts

**Recommendation 25**
The participation of a patient or carer in the checking process should be clarified, specifically whether a patient or carer is permitted to act as a second check and if so, under what circumstances this may occur within defined safety controls. A statement to clarify the participation of a patient or carer in the administration process should be included in Use and Control of Medicines.

- **For action by:** HPSS Trusts, DHSSPS

**Recommendation 26**
The success of a second check in preventing administration incidents relies on the check being performed independently, thoroughly and completely. All staff performing a second check should receive training in how to conduct a second check.

- **For action by:** HPSS Trusts, QUB, UU

## Incorrect device

**Incident 3**

A 10 unit dose of insulin was prescribed, which is 0.1ml in volume. There were no insulin syringes 'to hand' and a 1ml syringe was used to measure the dose. A 1ml volume (100units) was measured in error.

**Recommendation 27**
Sufficient supplies of insulin syringes should be stored and located alongside vials of insulin, for example in the fridge or medicine trolley.

- **For action by:** HPSS Trusts

**Recommendation 28**
All wards and clinical areas where medicine administration occurs should maintain a stock of insulin syringes, irrespective of whether or not they routinely hold stocks of insulin.

- **For action by:** HPSS Trusts

**Recommendation 29**
All staff involved in the administration of insulin should receive training in the use of an insulin syringe. They should also receive training in the dangers of using any other type of syringe to administer insulin.

- **For action by:** HPSS Trusts, QUB, UU

**Recommendation 30**
The product specification for the contract purchase of insulin syringes must require them to be obviously different from any other type of syringes.

- **For action by:** RSS

**Recommendation 31**
Non-stock orders for insulin syringes should not be made or processed, to prevent the uncontrolled use of insulin syringes that have not been evaluated against the regionally agreed tender specification.

- **For action by:** HPSS Trusts, RSS

## Incorrect dose

**Recommendation 32**
All staff involved in the administration of insulin should receive be educated in the strength of licensed soluble insulin (100units/ml).

- **For action by**: HPSS Trusts, QUB, UU

**Recommendation 33**
All staff involved in the administration of insulin should receive practical training in how to draw up a dose from a vial correctly using an insulin syringe.

- **For action by:** HPSS Trusts, QUB, UU

**Recommendation 34**
All staff involved in the administration of insulin should receive practical training in how to prepare a dose correctly using an injection device, for example, pre-filled injection pen.

- **For action by:** HPSS Trusts, QUB, UU

## Misinterpretation of Kardex administration record

**Recommendation 35**
The regional Kardex template should be implemented in all acute Trusts to aid clarity and interpretation of the administration record.

- **For action by:** HPSS Trusts

## Cross infection

**Recommendation 36**
Insulin vials and pens should be single-patient use only in accordance with 'Multiple use of Injections' (NHS Pharmaceutical Quality Assurance Committee, 3rd edition, November 2004).

- **For action by:** HPSS Trusts and Regional QC Pharmacists Network

**Recommendation 37**
A system of labelling ward stocks of insulin in hospitals should be in place to enable single patient use only on hospital wards and departments.

- **For action by:** HPSS Trusts

## Monitoring recommendations

While a lack of monitoring may in itself be an incident, effective monitoring may also be a means of detecting an incident and minimising further harm to a patient. Monitoring requirements should be developed in such a way that they clearly indicate the monitoring required for a particular insulin regimen or clinical indication. Monitoring requirements for insulin need to be specified at time of prescribing.

**Recommendation 40**
Regional insulin monitoring guidelines should be developed. They should specify the frequency of monitoring and the action to be taken on receipt of results. A toolkit should also be developed to assist implementation of these monitoring guidelines. This toolkit could include

- Posters to publicise the information.
- Templates indicating monitoring required. The template format should allow for documentation of insulin prescribing and administration, monitoring requirements, monitoring results and subsequent action.
- Action to be taken to remove existing monitoring charts from circulation.
- Training requirements.

- **For action by:** CREST

**Recommendation 41**
Action taken as a result of monitoring results should be clearly documented in the patient notes, which may include the use of a template for documentation of insulin regimen as detailed in recommendation 40.

- **For action by:** HPSS Trusts

**Recommendation 42**
Review of the CREST guideline for the treatment of hyperkalaemia in adults should include guidance on the action to be taken depending on different results obtained from monitoring.

- **For action by:** CREST

**Recommendation 43**
Guidance should be provided on how to perform monitoring of blood glucose and the calibration of glucometers.

- **For action by:** CREST, QUB, UU

**Recommendation 44**
An audit of monitoring should be conducted regularly to identify compliance and areas for improvement.
**For action by:** HPSS Trusts, RMAG