NHS England

GIRFT
GETTING IT RIGHT FIRST TIME

GIRFT Neonatology: Guide to safe insulin use

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British Association of Perinatal Medicine

NPPG Neonatal & Paediatric Pharmacy Group

NEONATAL NURSES ASSOCIATION

Contents

Introduction		2
Delivery checklist		3
1.	Access control and storage	4
2.	Professional practice	6
Glossary		9
Further Information		9
Contributors		10

This document sits alongside the GIRFT and NHS England guide to laboratory handling of insulin requests in the investigation of hypoglycaemia.

This document focuses on how insulin is safely stored, accessed, prescribed and administered by neonatal services. The other guide focuses on how laboratory and pathology colleagues handle requests and report and communicate results for insulin and C-peptide measurement in the investigation of hypoglycaemia.

Click here to access the guide to laboratory handling of insulin requests.

Introduction

Intravenous, short-acting soluble insulin is most commonly used on neonatal units for managing high blood glucose levels in premature babies, and occasionally for management of high blood potassium levels. In financial year 2024-25, 58% (88/152) neonatal units in England (100% NICUs, 40% LNUs, 6% SCUs) had used intravenous insulin on at least one occasion with more than 8,000 days of insulin use (personal communication, neonatal ODN Data analysts using data from Badgernet, System C).

The purpose of this document is to set out guidance for safe access, storage, handling, prescription, administration and disposal of insulin in neonatal services. This document was informed by the results of a 2024 NHS England survey of insulin use in neonatal units. Where relevant, results from this survey are shown in parentheses throughout this document.

Delivery checklist

The following are the expected standards which should be implemented within the timeframes suggested later in this document.

1 Access control and storage of insulin in neonatal unit wards

1.1 Implement individually identifiable and auditable electronic access control to any rooms where medicines are stored.

1.2 Limit access to rooms where insulin is stored to approved individuals or roles, and review access lists at least annually.

1.3 Store insulin in a locked medicine fridge or cupboard compliant with national standards and in the minimum number of locations necessary.

1.4 After dose preparation, part-used insulin vials should be immediately returned to their locked location or non-retrievably disposed of in medicines waste bins.

2 Professional practice

2.1 Develop a local policy on access to, and handling, storage and disposal of insulin.

2.2 Develop clinical guidance on indications for use, prescribing and monitoring of insulin

2.3 All staff prescribing, preparing and/or administering insulin, and pharmacists covering neonatal units, should be appropriately trained, and should complete specific neonatal insulin training every 3 years.

2.4 Mandate two-person checking for insulin preparation and administration with at least one checker (ideally both) having completed neonatal nurse specialty training (QIS).

2.5 There should be a documented standardised approach to preparation and administration of insulin infusions, including guidance on the priming of giving sets. Neonatal units should move to using standardised fixed concentration insulin preparations according to NPPG/ BAPM national standards, with ready-to-use insulin preparations used where possible.

2.6 Neonatal units should be working towards implementing Closed Loop Administration systems.

2.7 Audit insulin use and practice in neonatal units, review relevant incident reports and regularly review progress against recommendations in this document.

2.8 To support safer use of insulin, neonatal units should have appropriate pharmacy staffing support as per NPPG/ BAPM standards and all neonatal operational delivery networks (ODNs) should have network pharmacists as recommended in GIRFT Neonatology national specialty report

1. Access control and storage of insulin in neonatal wards

1.1 Implement individually identifiable and auditable electronic access control to any rooms where medicines are stored.

Where medicines are stored on the neonatal unit within a ‘drugs room’, as opposed to Automated Dispensing Systems (ADS) across the unit, it is essential that individually identified, controlled and auditable access is in place. A closed door with individual ID swipe card access, restricted to certain staff groups is already implemented in 84% of units (90 of 107 neonatal units, NHS E 2024 survey). This should be implemented in all units within six months unless biometric access is already available.

Biometric access (fingerprint or facial recognition) is preferred but may take longer to implement (6 months to 2 years). These systems are already in use in 62% of units (NHS E 2024 survey).

In the longer term, estates and facilities should be adapted so that drug rooms are not used for multiple purposes.

Requirements for Rooms where Medicines are stored

Minimum	Locked room eg. digilock with access limited to specific staff (should already be in place).
Expected	Swipe card access. (Implementation should be completed within six months).
Ideal	Individual and auditable access using biometrics. (Implementation may take from six months to two years).

1.2 Limit access to rooms where insulin is stored to approved individuals or roles, and review access lists at least annually.

The list of staff with access to these rooms should be reviewed regularly, at a minimum once annually. 11% of units (NHS E 2024 survey) have records of staff who have accessed insulin.

1.3 Store insulin in a locked medicine fridge or cupboard compliant with national standards and in the minimum number of locations necessary.

National standards (RPS Handling of Medicines and HBN 14-02) require that insulin is stored in locked medicine fridges or cupboards. Where digilocks are in use, these should be changed at least once every 6 months and a record maintained of when the access codes were changed. Where this is not already in place this should be implemented immediately.

Neonatal units should be moving towards automated access to insulin using cabinets and fridges with individualised drawers for different medicines. Implementation may take from six months to two years.

Access to open drawers of automated medicine cabinets can be linked to a prescription within the Electronic Prescribing and Medicines Administration system (EPMA). This system also allows for analysis of access data by specific drug, for example reviewing insulin use trends every three months. This approach is already implemented in six of the units surveyed (NHS E 2024 survey) but may take several years to implement in other centres.

Insulin is not considered a controlled drug as it does not meet the definitions under Misuse of Drugs Act 1971, however the access control systems described above would bring practice closer to controlled drug security without a legal change.

Requirements for fridges/cupboards where insulin is stored

Minimum	Locked fridge or cupboard in accordance with national standards with specific staff granted access (should already be in place).
Expected	Automated drawer that holds insulin with digital access by individual staff. This may take from six months to two years to implement.
Ideal	Automated drawer or dispensing integrated to a prescription in an Electronic Prescribing and Medicines Administration system. This may take several years to implement in some units.

1.4 After dose preparation, part-used insulin vials should be returned to their locked location or non-retrievably disposed of in medicines waste bins.

Insulin storage and use is made more complicated by having multi-use vials, meaning full and part-used vials may be in use in the neonatal unit. It is essential that part-used vials are regarded in the same way as full vials with storage and access held at the same level. This should be implemented within six months.

2. Professional practice

2.1 Develop local policy on access to, and handling, storage and disposal of insulin.

Trusts should have local policies to ensure access to, and handling, storage and disposal of insulin are securely and safely managed in their neonatal units. Implement within 6 months if not already in place.

2.2 Develop clinical guidance on indications for use, prescription and monitoring of insulin

Local or regional clinical guidance should specify the short-acting soluble insulin to be used, the indications for use and set out a clear starting dose. Where Variable Rate Insulin Infusions (VRII)- also known as sliding scales- are being used to treat hyperglycaemia, the process for modifying the initial dose and associated blood glucose monitoring should also be included in the clinical guidance. Implement within 6 months if not already in place.

Example clinical guidance >

2.3 All staff prescribing, preparing and/or administering insulin, and pharmacists covering neonatal units, should be appropriately trained, and should complete the specific neonatal insulin training every 3 years.

Staff prescribing, preparing and administering insulin and pharmacists covering the neonatal unit should have received training to support safe practice. Repeat training is recommended on a 3-yearly basis. E-learning training resources for these competencies is being developed to support this.

2.4 Mandate two-person checking for insulin preparation and administration with at least one checker (ideally both) having completed neonatal nurse specialty training (QIS).

If not already in place, local hospital policy should be updated immediately to mandate an independent second checker for insulin preparation and administration (correct patient, dose, medication, time and route) on the neonatal unit. At least one (ideally both) checkers should hold the Neonatal Nurse QIS qualification. The same checks apply to any subsequent dose changes.

2.5 There should be a documented standardised approach to preparation and administration of insulin infusions, including guidance on the priming of giving sets. Neonatal units should move to using standardised fixed concentration insulin preparations according to NPPG/ BAPM national standards, with ready-to-use insulin preparations used where possible.

Due to insulin loss, as a result of adsorption, giving sets must be primed prior to administration. An example of a standardised process is given in the MEDUSA injectable Medicines Guide.

All units should be moving towards using standardised fixed concentration insulin preparations (not weight-based concentration) based on NPPG/ BAPM national standards.

NPPG Standardising IV infusion concentrations >

Neonatal units should be working towards sourcing and using ready-to-use preparations as a best practice standard. This is not currently common practice and may take several years to implement.

Requirements for preparation, priming and administration of insulin

Minimum	Unit-level standardised approach to preparation and administration of insulin, including the priming of giving sets, in line with MEDUSA monograph (should already be in place)
Expected	Standardised fixed concentration insulin in use (implement within two years.)
Ideal	Ready-to-use standardised fixed concentration insulin (implementation 2 to 5 years)

2.6 Neonatal units should be working towards implementing Closed Loop Administration systems.

A few trusts have implemented Closed Loop Administration (NHS E 2024 survey). This is ideal for safety, standardisation and documentation integrity. Implementing this for insulin will include an Electronic Prescribing and Medicines Administration (EPMA) and Barcode Medication Administration (BCMA). Electronic prescribing systems can also be linked to smart pumps. Introducing these approaches may take 2-5 years in some units, but any actions that can be taken sooner to close the loop should be introduced in a timely fashion.

Full Closed Loop Administration

- Insulin prescribed on EPMA only by competent practitioner.
- Insulin can only be prescribed in line with EPMA embedded guidelines with formalised processes in place to permit and document reasons for deviations
- Trained nursing staff can only access insulin if there is a valid prescription for a specific patient.
- Pre-made insulin syringes at the defined concentration will be available with a QR or bar code.
- Confirmation of insulin formulation and administration to the patient will be confirmed by two nurses (minimum one QIS) through QR code scanning of the product.
- EPMA system will interact with bi-directional IV Smart Pump to record input of insulin into the patient.

2.7 Audit insulin use and practice in neonatal units, review relevant incident reports and regularly review progress against recommendations in this document.

Neonatal units should be able to cohort incident reports that relate to insulin, and these incidents should be regularly reviewed, alongside auditing of:

- clinical use
- 2-person administration
- storage arrangements and
- progress against the recommendations in this document.

This should be implemented within six months.

2.8 To support safer use of insulin, neonatal units should have appropriate pharmacy staffing support as per NPPG/ BAPM standards and all neonatal operational delivery networks (ODNs) should have network pharmacists as recommended in GIRFT Neonatology national specialty report

Standards of medicine prescribing and administration practice are known to increase with the presence of a specialist pharmacist, and services must meet the NPPG /BAPM Pharmacy Staffing Standards. Some units will already meet the NPPG / BAPM staffing standards, others may only need minor changes, and some more significant change. This should be implemented within 6 months to 2 years.

Neonatal Operational Delivery Network (ODN) pharmacists can support network-wide implementation of safe insulin use and audit practice. Networks should work towards developing substantive ODN pharmacy roles as recommended in the GIRFT Neonatology specialty report. This should be implemented within 6 months to 2 years

Glossary

BAPM	British Association of Perinatal Medicine	LNU	Local Neonatal Unit
BCMA	Barcode Medication Administration	MEDUSA	Injectable Medicines Guide
BNF	British National Formulary	NICU	Neonatal Intensive Care Unit
CLA	Closed loop administration	NPPG	Neonatal and Paediatric Pharmacy Group
EPMA	Electronic Prescribing and Medicines Administration	ODN	Operational Delivery Network
		SCU	Special Care Unit
		VRII	Variable Rate Insulin Infusion

Further Information

Recommended document	Author	Overview
Guide to laboratory handling of insulin requests in the investigation of hypoglycaemia	GIRFT and NHS England	Guidance on laboratory and pathology requests, reporting and communication of results for insulin and C-peptide measurement in the investigation of hypoglycaemia.
Neonatology national specialty report	GIRFT	National specialty report with 26 recommendations on networks, transport services, patient pathways, outcomes for premature infants and reducing medication errors.
In development: E-learning pack	E-learning for health	E-learning package in development for insulin competencies. A link will be added in a future iteration of this guide.
Position statement	BNF / MEDUSA	Medusa provides NHS guidance for safe preparation and administration of injectable medicines and providing a reference source for organisation developing local policy.
Health Building Note 14-02- Medicines storage in clinical areas	NHS England	Health Building Note (HBN) 14-02 provides best practice guidance on storage facilities for medicines (including controlled drugs) in clinical areas.
Professional guidance on the safe and secure handling of medicines	RPS	Guidance outlining governance principles for safe medicine handling across healthcare settings, covering procurement, storage, disposal and controlled drugs.
Standardising IV infusions	NPPG, RCPCH, PCCS, BAPM	National framework proposing standardised intravenous infusion concentrations for neonates and children, enhancing safety, consistency, and clinical practice across UK healthcare settings.
Pharmacy staffing standards	NPPG	Guidance for healthcare professionals on safe medicine handling, covering storage,

		administration, disposal, and governance to ensure patient safety.
Neonatal Nurse QIS	NHS E	These standards provide a unified framework for neonatal qualified in specialty (QIS) education for neonatal nurses across England.

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