University Hospitals of Leicester NHS
NHS Trust

Administration of injectable Drugs Policy

*Also commonly known as IV policy

(*excluding cytotoxic, epidural, PN and radiopharmaceuticals)

Approved By:	**Clinical Policy and Guideline Committee**
Date Approved:	**4 February 2025**
Trust Reference:	**B25/2010**
Version:	**V7**
Supersedes:	**V6 – April 2024**
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Name of Responsible Committee/Individual:	**Medical Director** **Medicines Optimisation Committee**
Latest Review Date	**4 February 2025 – Clinical Policy and Guideline Committee**
Next Review Date:	**February 2030**

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REVIEW DATES AND DETAILS OF CHANGES MADE DURING THE REVIEW

June 2024

- Addition of yellow care reporting scheme
- Prescribing of injectables
- Risks of Injectables
- Reference to the purchasing for safety policy which includes the risk assessment for injectables.

KEY WORDS

Intravenous (IV), injectable medicine, injection, Administration, Clear fluids

1 INTRODUCTION

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trusts Policy and Procedures for the safe preparation and administration of Injectable medication and fluids in order to :

- Reduce risk and prevent harm to patients from injectable medicines
- Educate clinical staff on good injectable practice
- Comply with NHS England (previously NPSA- National Patient Safety Agency) guidance

1.2 The main risks associated with injectable medicines have been identified by the NPSA as follows:

- Non-availability to clinical staff, at the point of use, of essential information about injectable medicines. Such information may not be included in the manufacturer's pack or in commonly available reference sources.
- Incomplete and ambiguous prescriptions which don't include complete details of the solution to be used to dilute the injectable medicine (diluent), final volume, final concentration or intended rate of administration.
- Presentations of injectable medicines that may require complex calculation, dilution and handling procedures before the medicine can be administered
- Selection of the wrong medicine or diluent.
- Use of a medicine or diluent or infusion after its expiry time and date.
- Calculation errors made during prescription, preparation, administration of the medicine, leading to administration of the wrong dose and/or at the wrong concentration or rate.
- Incompatibility between diluent, infusion, other medicines and administration devices.
- Administration to the wrong patient.
- Administration by the wrong route
- Unsafe handling or poor non touch technique leading to contamination of the injection and harm to or infection of the patient.
- Health and safety risks to the operator or environment.
- Variable levels of knowledge, training & competence amongst healthcare practitioners

1.3 Medications are only given by an injectable form where it is positively indicated, for example (not a definitive list):

a) For therapeutic control and medication titration
b) A rapid therapeutic action is required
c) When there is a clinical need for sustained plasma concentration
d) Patients whose gastrointestinal tract has to be rested e.g. patients with nonfunctioning or inadequately functioning gastrointestinal tracts, or following gastrointestinal surgery
e) When a medication cannot be taken orally or by another alternative route
f) When the medication is not available in an oral formulation.
g) Administration of an IV Medication / Media for a clinical investigationprocedure

1.4 Injectable medications should be changed as soon as possible to an oral / alternative route. This is due to the possible risks associated with injectable medication administration. The risks are Infection, Infiltration, Air embolism, Extravasation and Medication administration errors. Adhering to this policy will help to reduce these risks.

1.5 Wherever possible ready-made injections, infusions/ mini bags or syringes should be used.

1.6 The principles of aseptic non touch technique (ANTT) and five moments of hand hygiene

are embedded within the preparation and administration procedures for injectable medicines.

Registered health care staff only need to wear gloves and aprons to administer Intravenous medications, Subcutaneous medications and intramuscular medications for the following:

- When in contact with blood/body fluid, non-intact skin, or mucous membranes.
- Cytotoxic/Cytostatic medications
- If you have a skin condition that requires protection. If you do have any concerns with skin integrity, please visit Occupational Health. There should also be yearly assessment in-line with your appraisal to assess skin integrity.
- Appropriate PPE must be worn when in contact with any patients with known or suspected infection or colonisation.

1.7 This policy and procedures apply to all registered health care staff (including Doctors, Registered Nurses, Registered Children's Nurses, Registered Midwives, Scientific Staff, Radiographers, Operating Department Practitioners (ODPs) working in the University Hospitals of Leicester NHS Trust who are competent and able to undertake this role (including bank, agency,and locum and those operating under an honorary contract).This is not an exhaustive list.

2. POLICY SCOPE

2.1 This policy and procedures apply to all adult, babies, children, and young people.

2.2 This policy applies to the administration of all injectable medicines unless otherwise stated.

2.3 This policy must be used in conjunction with the UHL approved Patient Group Directives (PGD) and Medusa (online medicine monographs), both of which can be accessed via UHL Connect. For Neonates, local monographs are on Badger net.

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2.4 This policy **does not cover** the following:

a) IV administration of Cytotoxic Medications (please see LNR Cytotoxic Policy, available onthe East Midlands Clinical Senate web site link below)
East Midlands Expert Advisory Group Systemic Anti-Cancer Therapy (SACT) Policy

b) Epidural Medication Administration (please search Policy and Guideline library with the term Epidural for relevant policies)

c) Administration of Parenteral Nutrition (please see Policy for the administration of Parenteral Nutrition via a central venous catheter in adults B22/2015, C28/2018 and Parenteral Nutrition Neonatal Guideline C28/2019)

d) Preparation of IV medications within the aseptic unit of the Pharmacy department (please see Pharmacy specific policies and guidelines for further information). A list of all products prepared aseptically within the organisation is included in appendix 9. The aseptic lab can be contacted on extn 16405. Opening hours are 9-5.30pm Monday to Friday. Items should be requested via the clinical pharmacy or dispensary teams.

e) Administration of Radiopharmaceuticals (please see specific protocols within Nuclear Medicine department)

f) This policy excludes medications being administered within an Operating Theatre – please refer to the Leicestershire Medicines Code Chapter 15 – Medicines in OperatingTheatres

2.5 UHL is a teaching hospital and provides placements for pre-registration training for students such as Medicine, Nursing, Midwifery, Paramedic, ODPs, Radiography and Pharmacy. Nursing and midwifery Pre-registration nursing and midwifery students can prepare and administer IV medications **under direct supervision of a registered practitioner (see section 5.2.7)**

3. DEFINITIONS

3.1 Routes of administration:

Injectable medicines can be given via a variety of methods outlined below. The choice may depend on the pharmaceutical properties of the drug, clinical condition of the patient, desired therapeutic outcome and the type of venous access the patient has

3.1.1 IV bolus:

This method is used when a rapid response or high serum concentration is required. The drug and diluent are injected directly into the bloodstream via a peripheral cannula or a central venous catheter.

Slow IV Bolus Injection

The majority of drugs that are given by slow IV bolus need to be injected over a period of severalminutes. If no specific information is available regarding the injection time, it is recommendedthat a slow bolus is given over no more than 5 minutes.

Rapid IV Bolus Injection

A very small number of drugs need to be given as a rapid intravenous bolus e.g., adenosine, and some radiological contrast injections. In these cases, the rapid injection should be followed by a rapid flush of a recommended flush solution that is compatible with the drug.

Please refer to product literature and / or the electronic injectable medicines guide, Medusa, available on the Trust Intranet, and use the recommended injection time.

IV factor concentrates via butterfly (Bleeding Disorder Service only)

Within the Bleeding Disorder Service, it is standard practise to train individuals to treat themselves at home through a 21g-25g butterfly needle intravenously. The clinical team also treat through a butterfly when the patient attends hospital.

This applies to children and adults; the butterfly is inserted into the vein to allow the delivery of various clotting factors for prophylaxis and treatment.

The butterfly is then removed once the clotting factor has been given. The clotting factor products all come with their own administration kit when delivered to patients at home. Within UHL staff use the butterfly needles that the organisation has recommended.

3.1.2 IV infusion:

Intermittent Intravenous Infusion

This refers to an infusion which is usually administered over a period of typically between 10 minutes and 2 hours but can be longer as a one-off or repeated at specific time intervals. It is used as an alternative to bolus administration for regular dosing, and when slow administration orgreater dilution is required to avoid toxicity.

Continuous IV Infusion

This is an infusion intended to be given, over a longer period, at a constant or variable rate. A continuous infusion is used where a consistent or controlled therapeutic response is required. It may also be used to permit greater dilution, than is usually possible with an intermittent infusion, and in order to avoid toxicity. Volumes are variable and range from 50mL to 1000mL.

3.1.3 Intramuscular Route

Intramuscular injection is a less efficient method of parenteral administration than the intravenousroute because:

- It has a slower onset of action (as the proportion of drug that enters the circulation quickly is less than with intravenous drugs)
- The proportion of drug that is absorbed is unreliable and often incomplete

For some agents this will be a disadvantage e.g., antibiotics, but for others these characteristicsare advantageous e.g., those which require a delayed onset of absorption, e.g., depot injections,vaccines.

The intramuscular route is easily accessible, particularly in situations where IV administration is not practical due to lack of access or in an uncooperative patient.

Intra-muscular injections should be avoided, where possible, in patients treated with anticoagulant therapy (warfarin, Direct Oral Anticoagulants- such as apixaban, unfractionated and low molecular weight heparin etc). Where an intra-muscular injection is used in such patientsthere must be valid clinical reasons why no other route can be used.

Intramuscular injections should not be administered to those with thrombocytopenia or other bleeding disorders without specialist advice which should be sought from the Haematology Team.

Intramuscular injection may be the only option for drugs that cannot be formulated for intravenous administration.

3.1.4 Subcutaneous route

The subcutaneous route of administration is used for drugs which require a slower rate of absorption than achieved intravenously. It also has the benefit of being a less painful site for injection.

It is the favoured route to administer maintenance insulin therapy and for symptom management in palliative care. It can be used to administer stat doses and is additionally suitable for administration of larger volume solutions by continuous infusion.

Suitable sites for injection include the lateral aspects of the upper arms and thighs, the abdomenin the umbilical region, the back and the lower loins. The preferred injection site may be defined within the technical product information.

Rotation of sites can decrease the likelihood of irritation and ensure improved absorption. It is good practice to document the site of administration on the patient's administration chart to facilitate this.

Subcutaneous cannulas can be left insitu, if there is a clinical need and the VIP (**Visual Infusion Phlebitis score)** is zero. (EPIC guidelines 2014).

Central Vascular Access Device (CVAD) is defined as a device inserted via the internal jugular or subclavian veins which terminates in the Superior Vena Cava (SVC) /Right Atrial Junction (RAJ) Venous Access from the femoral veins will terminate in the Inferior Vena Cava. (IVC)

Midline Catheters (MID) are peripheral vascular access devices used for medium to long term access. They are usually 20cm in length and placed in an upper arm using the basilic, brachial or cephalic veins with the tip ending below the level of the axillary line

Peripherally Inserted Central Catheter (PICC) is defined as a device that is inserted into a peripheral vein, typically placed in the upper arm using the basilic, brachial or cephalic veins, advanced, with the tip terminating in the Superior Vena Cava (SVC) /Right Atrial Junction (RAJ)

Peripheral Vascular Access Device (PVAD) is defined as a small, flexible tube placed into a peripheral vein to administer medication or fluids usually in situ for 3-5 days.

Port-a-Cath - Totally Implanted Vascular Access Device (TVAD/ PORT) defined as a long term vascular access device which is placed via the Internal Jugular, or Subclavian Veins. The port hub is implanted into the chest wall and accessed via Hubber/Grippper needle into the port hub)

(Reference: Vascular Access in Adults & Children Policy and Procedures B13/2010)

ANTT – Aseptic Non Touch Technique

Leicester Clinical Assessment Tool (LCAT): an assessment tool which provides the theoretical background for a skill.

Open systems: the practice of emptying injectable medicines into a gallipot or other container tothen be withdrawn multiple times into a syringe prior to use.

Medusa: Monographs online which describe the most appropriate method of preparation and administration of medicines by the intravenous route with the exception of cytotoxic medicines. There are some monographs on intramuscular and intraocular administration. Monographs must be used directly from the web pages. If copies are printed to assist preparation these must be discarded immediately after use and not stored in an area.

Mixing of medicines: This is the combining of two or more medicinal products together, for the purpose of administering them, to meet the needs of an individual patient. This technically produces an 'unlicensed' product. The Medicines Healthcare products Regulatory Agency (MHRA) has put into place changes to medicines regulations to enable the mixing of injectable medicines prior to administration in clinical practice.

Patient Group Directions: A written direction relating to the supply and administration of a description or class of prescription only medicine or a written direction relating to the administration ofa description or class of prescription only medicine, and which in the case of either is signed by a doctor and by a pharmacist; and relates to the supply and administration, or to administration, to persons (subject to any exclusions which may be set out in the Direction).

4. ROLES AND RESPONSIBILITIES

4.1 The executive director responsible for oversight and implementation of this policy is the Chief Nurse.

4.2 CMG Heads of Nursing are responsible for :

- Ensuring that necessary measures are in place to support the safe implementation of this policy within their CMG
- Investigating and addressing concerns of practice against this policy

4.3 Matrons and departmental managers are responsible for:

- Ensuring all staff accountable to them are aware and adhere to this policy

4.4 Line Managers are responsible for:

- Identifying and supporting the appropriate staff to attend the necessary training and complete the assessment of competence in practice
- Verifying the competence of staff in the administration of injectable medicines every three years through the appraisal process.
- Maintaining a record via HELM of staff who are competent in the preparation and administration of injectable medicines ensuring that numbers of staff trained meet service need
- Policy implementation and the monitoring of standards

4.5 Chief Pharmacist

- The Chief Pharmacist holds ultimate responsibility for the adequate resourcing of the aseptic unit to ensure it meets Quality Assurance of Aseptic Preparation Services (QAAPS) Guide standards.

- The Chief Pharmacist has overall responsibility for ensuring that effective governance arrangements are in place across the Trust for all injectable medicines.

4.6 Prescribers:

- Prescribing of any injectable medicines must be prescribed in accordance to that stated within Leicestershire Medicines Code Prescribing Chapter 2 E1/2016.
- Non Medical prescribers must prescribe in accordance with the Non Medical Prescribing Policy (B18/2004) prescribing within their area of competence.
- Prescribers must ensure that the medication is suitable for the injectable route and that the patient has appropriate access available.
- The use of injectable route should be subject to a regular review and switched to oral, or another suitable alternative route, made as soon as clinically appropriate.
- In addition to basic prescribing requirement as in chapter 2 the following information must be added to the prescription if not readily available from medusa or within a protocol:

  - ✓ Name and volume of diluent and / or infusion fluid
  - ✓ Concentration or total quantity of medicine in final infusion container
  - ✓ Date for review of treatment (unless a stat dose is prescribed)
  - ✓ Type of rate control device / infusion pump to be used to administer the medicine

Where two or more prescription charts are in use it is essential that they are cross-referenced so practitioners are aware of all prescribed medicines. These may include (but are not limited to):

- Cytotoxic medication prescription
- Patient controlled analgesia prescription
- Heparin prescription chart
- Aminophylline prescription chart
- Parenteral nutrition prescription

4.7 All registered healthcare professionals

- Are personally responsible and professionally accountable in ensuring that they receive adequate training in the safe use and observation of any medical device used in the delivery of intravenous therapy (Department of Health MHRA (2010) Gateway ref 14330: Mixing of medicines prior to administration in clinical practice: medical and non-medical prescribing)

- It is the responsibility of the healthcare professional to ensure that any IV access and injectabletherapy is appropriately prescribed for the patient and that the therapy is administered correctlyand monitored accordingly.

5. POLICY STATEMENTS

5.1 The following gives general principles and advice for the safe preparation and labellingof injectable medicines. For detailed step guides please see appendices

Procurement of injectables are subject to a risk assessment (see Pharmacy Purchasing for safety Policy) C30/2017

- Injectable vials and ampoules must be used for single use (see Multiple dose vial policy B42/2008)
- Ready-to-administer or ready-to-use products e.g. prefilled syringes, should be used where available. Many dilutions and preparations may require calculations. All calculations must be a 2 person check undertaken independently.
- Prepare and administer injectable medicines for each patient individually. Preparing medicines for multiple patients together is a high risk practice and must be avoided.
- Prepare the injectable in an area which is clean, uncluttered and free from interruptions asmuch as possible.
- Gather all medicines and equipment together and assemble in line with the *ANTT (Aseptic Non Touch Technique) guideline* and use the least number of aseptic manipulations

5.2 Authorised Staff - Preparation and Administration

5.2.1 All staff who undertake injectable medication preparation and administration must be authorised by their line manager and carry out this activity as an integral part of the key responsibilities within their role and not considered outside their scope of professional practice.

5.2.2 Staff who may undertake this role will normally be on a statutory register (e.g. Nursing and Midwifery Council (NMC), General Medical Council (GMC) Health and Care Professionals Council HcPC and the practice of preparation and administering IV medications considered 'within normal scope of practice'. These include (not a definitive list) Doctors, Registered Nurses, Registered Children's Nurses, Registered Midwives, Scientific Staff, Radiographers, Operating Department Practitioners (ODPs)

5.2.3 Staff who have access to a voluntary register or a Self Regulatory Body (e.g. Perfusionists) can prepare and administer injectable medications subject to the following requirements:

- The preparation and administration of medicines has been identified as an integral part of thekey responsibilities within their role by the appraisal process with their line manager
- Have the role approved and documented by the appropriate Clinical Management Group (CMG) for expanding / out of scope roles (for more advice please contact your CMGEducation and Practice Development Lead or equivalent)

- Register on the voluntary register

5.2.4 All authorised staff must have undertaken appropriate education and training (see section 7) which must be identified through the appraisal process and be included in their Personal Development Plan (PDP). Registered health care staff must complete their UHL specific IV training and LCAT assessment. Further advice can be sought from the CMG Education and Practice Development Teams.

5.2.5 Staff moving between units/ specialities remain competent to administer injectable fluids and medications within their area of competence

5.2.6 Student nurses, Midwives and ODPs

- Student nurses can undertake the administration of medications via the IM and S/C routes. They can be involved in the preparation and administration of intravenous medicines, to include bolus doses, infusions, both with and without pumps (including the setting up of the pump) and syringe drivers ***under the direct supervision*** of a Registered Practitioner

- This would only be undertaken in clinical practice following the provision of evidence of completion of the relevant theoretical component / module within their course (to be agreed with the Universities in what form this will be evidenced)

- Where the student is involved in the preparation and administration of an IM, S/C, IV medication with a Registered Nurse they must **not** act as the Independent checker. The medication must be independently checked by two Registered Practitioners

5.2.7 Unregistered professionals (i.e. Healthcare assistants, Clinical aides) may administer a single 0.9% prefilled, labelled sodium chloride flush immediately after peripheral cannulation to adult and paediatric patients. There is no requirement to prescribe or document the administration of a flush after cannulation when using as this product is deemed a medical device rather than a POM. The flushing of the cannula will become part of the cannulation procedure. If a prefilled and labelled sodium chloride flush is not available and a 0.9% Saline flush must be drawn up from an ampoule, this will need prescribing and signed after administration, and will require an independent check. Completion of the cannulation competency is required for any staff who cannulate.

5.2.8 Any learner (i.e. Medical, Nursing, AHP) who as part of the formal requirements of their course, can cannulate, may only administer a pre-filled and labelled sodium chloride flush to patients under supervision of a Registered practitioner, who is competent in the skill of cannulation.

5.3 Second Check (also called two-person or independent checking)

5.3.1 All injectables within adult areas will need an independent check except for the following:

- Prophylactic doses of Low Molecular Weight Heparins (enoxaparin or dalteparin)
- Checks of all alterations/ titrations in the critical care units / high dependency units due to the sheer number of titrations. The Intravenous (IV) Drug Administration in Adult Intensive Care Units (ICU) UHL Guideline (Trust ref number C18/2017) must be followed.

- The titration of oxytocin infusions by midwives. See The guideline augmentation of labour (131/2005- Induction and Augmentation of Labour Obstetric guideline)

5.3.2 Registered health care staff who undertake injectable medication checking must be authorised by their line manager and carry out this activity as an integral part of the key responsibilities within their role and not considered outside their scope of professional practice.

5.3.3 The role of the second (independent) checker is to make sure that:

- The correct medication has been selected
- The medication and all diluent / flushes are correct and in date
- The medication has been correctly prepared as per prescription and Medusa monograph (if available) considering the route of administration
- The correct dose / rate of administration has been calculated and undertakeany calculations independently to verify
- The correct medication is administered to the correct patient at the bedside however there is no requirement for the independent checker to remain at the bedside for the duration of the administration

The second checker is not required to go to the bedside for

- The administration of Intramuscular or Subcutaneous medicines where no pump is involved, except for Insulin where a second check is required.

- The administration of IV fluids with no additional medicines added.

- The checking procedure can be found in Appendix 1

5.3.4 The staff member second checking the injectable medication has equal accountability for their practice to that of the person administering the injectable medication.

5.3.5 Staff able to undertake the role of checker should be made aware of their responsibilities at local induction by their line manager or delegated deputy

5.3.6 Patient identification checks must always consist of three independent points of identification actively: name, date of birth and address. The ID check should require active statement of the points of ID rather than confirmation. Refer to the Wristband policy (2011)

5.3.7 Scanning of the patients' wristband using a device (ie Ipad) should be completed where possible to facilitate the positive patient ID check. Patient identification checks must also occur after scanning.

5.3.8 **For Children's areas**, all injectable medicines require an independent check and require the independent checker to go to the bedside

5.3.9 When a pre-filled 0.9% saline syringe is used for flushing or for cannulation, this does not require an independent check and does not require to be prescribed as this is a medical

device. If the pre-filled saline is not available, and an ampoule of 0.9% saline is used, this must have an independent check and be prescribed.

5.4 Pre-preparing IV Medications

5.4.1 In UHL pre-preparing injectable medications in advance of their administration is not permitted **except** in the following exceptional situations:

a) Paediatric Cardiac arrest medications drawn up at the beginning of a shift and calculated based on the specific weight of a patient (to ensure patient safety in critically ill paediatric patients)

b) Medications pre-prepared for patients requiring retrieval and transportation

c) Critically ill patients where the risk of pre-preparing intravenous medication is less than the risk of a rapid life threatening deterioration

d) An already established infusion

e) Medications which are required by their product manufacturing data sheet to be pre prepared e.g. some chemotherapy treatments

5.4.2 All clinical areas requiring such preparation must ensure that these have been formally risk assessed and documented through their CMG Quality & Safety arrangements. Convenience of pre-preparing injectable medications because of staffing issues, shift change over and ward routine are not sufficient reason to allow for pre- preparation of injectable medications.

5.4.3 Any medications that are pre-prepared in these exceptional situations must be checked by two authorised practitioners, labelled with the name of the medications, the dose, the time prepared.

5.4.4 In very few clinical situations medications (i.e. retrievals and paediatric cardiac arrest medications or established infusions) the pre-prepared medications will need to be transferred to another member of staff. This formal transfer requires the relevant clinical staff that have drawn up or mixed the medicine to formally hand over the medications to the staff that will be responsible for its custody and potentially its administration. This requires documentation which must be completed in the clinical notes, which must meet the professional standards regarding documentation.

5.5 Stability, Compatibility and Mixing Medicines

5.5.1 All injectable medicines prepared in clinical areas must always be administered ***immediately*** after preparation. They must not be stored before use. The duration of administration of any infusion should not exceed 24hours.

5.5.2 Mixing medicines is the combination of two or more medicinal products together for the purpose of administration to meet the individual patient need. It does not include the reconstitution or dilution. Mixing may take place in the same container (syringe or bag) or maybe within the administration line.

5.5.3 The addition of a medicine to another should be avoided where possible and only when considered to be essential to meet the patient's needs.

5.5.4 Additions should never be made to the following infusions and these infusions should alwaysbe infused separately:

- Parenteral nutrition solutions
- Sodium bicarbonate infusions
- Phosphate preparations
- Blood components
- Plasma substitutes e.g. artificial volume expanders such as starches and gelatins

5.5.5 Where 'mixing' is indicated, the prescription should indicate the medicines which are to be mixed.

5.5.6 Where multiple drugs are being administered through the same lumen or Y-site connector, the compatibility of the medicines with each other and the fluids used must be checked.

5.5.7 All medicines which have been mixed must be checked for signs of incompatibility, for example cloudiness, change in colour, haze or formation of precipitate.

5.5.8 The monographs in Medusa provide information on compatibility. If unsure, please seek advice from the clinical ward pharmacist or Medicines Information on extn 16491

5.6 Open systems

5.6.1 The Medicines and Health Regulatory Agency (MHRA) alert NHS/PSA/D/2016/008 stipulatesthat the use of open systems is not acceptable and that injectable medicines must be drawn directly from their original ampoule or container into syringes, and then either administered immediately or, if they are not for immediate use, the syringe is labelled and checked before later use.

5.6.2 The use of open systems such as gallipots is not allowed in UHL.

5.6.3 The only exemptions to the above are embolization procedures involving embolic agents that need to be mixed and prepared openly during a procedure

5.7 Administering IV Medications where a loading dose is required

5.7.1 There have been incidents where the rate has not been reduced following an initial loading dose. Loading doses should always be prescribed as STAT doses.

5.7.2 Loading doses and maintenance doses must be made up in separate syringes / bags to avoid high doses continuing beyond that prescribed.

5.8 Potassium

5.8.1 Potassium ampoules are only kept in specific authorised areas and in these areas are stored in Controlled Drug cupboards. Areas which have been authorised to keep the ampoules will have them listed on the Controlled Drug stock list. See Potassium Solutions for Intravenous Administration Including Guideline for Hypokalaemia policy (B1/2018).

5.8.2 When potassium is removed to be prepared for administration it must be placed in a red tray separate from all other medicines.

5.9 Administering IV Medications in Special Circumstances

5.9.1 **IV Atropine or Adrenaline (epinephrine) in an emergency:** in certain circumstances those professional groups referred to in this policy may be required to administer intravenous Atropine or Adrenaline (epinephrine) without a prescription for the purpose of saving life.

(a) To administer **Adrenaline** these individuals should have successfully completed an appropriate immediate or advanced life support course where it states that such medications can be administered

(b) To administer **Atropine** individuals should have successfully completed an appropriate advanced life support course where it states such medications can be administered

(Please see the Cardiopulmonary Resuscitation Policy E4/2015)

5.9.2 **Directly into a vein:** Intravenous medication must only be administered directly into a vein in exceptional circumstances by:

a) Doctors in an emergency in the absence of a cannula

b) Midwives administering IV ergometrine

c) Diagnostic radiographers.

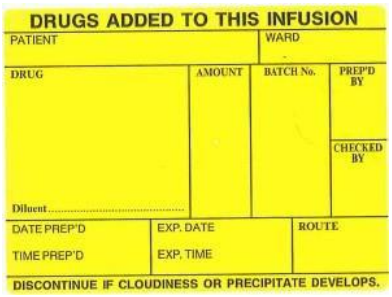
5.10 Labelling

5.10.1 Additive Labels

All IV fluid bags to which a medication has been added must be labelled using the yellow IV additive labels (opposite)

All relevant details must be completed, all units apart from mg and mls must be written in full e.g. micrograms not mcg

This label is available within the main Pharmacy departments at UHL


DRUGS ADDED TO THIS INFUSION
PATIENT
WARD
DRUG
AMOUNT
BATCH No.
PREP'D BY
CHECKED BY
Diluent.....
DATE PREP'D
EXP. DATE
ROUTE
TIME PREP'D
EXP. TIME
DISCONTINUE IF CLOUDINESS OR PRECIPITATE DEVELOPS.

5.10.2 Syringe Labels

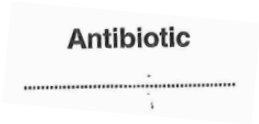
All syringes which have been drawn up for IV administration must be labelled to identify the contents of the syringe during preparation as outlined in the appropriate IV procedure.

The only exception to these labelling requirements is for syringes intended for immediate bolus (push) administration, where preparation and administration is one uninterrupted process, and

the unlabelledproduct does not leave the hands of the person who prepared it. In this case only one unlabelled medicine must be handled at one time.

If preparing two injections for administration at the same time then the syringes must be appropriately labelled. No operator should be in possession of more than one unlabelled syringe at any one time.

As a minimum the following four syringe labels must be used in all clinical areas:

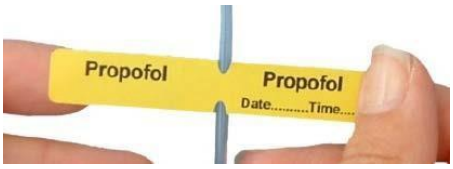
1	White pre-printed with Sodium Chloride 0.9% (Henley product code: SLS1487)	
2	White pre-printed with Antibiotic, with room to write on which antibiotic (Henley product code: SLS14103)	
3	Peach pre-printed with Anti-Emetic, with room to write on which anti-emetic (Henley product code: SLSC13)	
4	Blue blank label for all other medications, with room to write on which medication (Henley product code: SLS718) This label also comes without the mg/ml if preferred (Henley product code: SLS719) Either is acceptable within UHL	

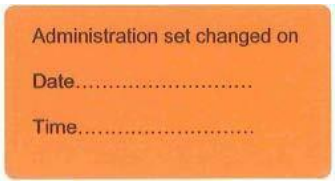
The labels can be ordered from the non-catalogue section on the Cedar system,the supplier code is 100071. The supplier is:

Henleys Medical Supplies Ltd.
Brownfields,
Welwyn Garden City,
Hertfordshire, AL7 1AN

Phone: - 01707 333164
Fax: - 01707 334795
Email: - enquiries@henleysmed.com
Website:- www.henleysmed.com

Henle's have a huge range of pre-printed labels available, all of which can be used in UHL. Clinicalareas that already use labels above and beyond the minimum listed above may continue to do so. All IV administration lines

Must be labelled with the medication that is being administered through it (These are also available from Henleys Medical supplies Ltd as detailed in 6.5.2 and can be ordered pre-printed or blank)	

Plus an orange administration set label detailing when the set was changed. These are available from the LRI print room ordered as 'Orange IV Line Labels'	

5.11 Administration sets and lines

Administration sets must be changed every 72 hours unless

- The administration set has become disconnected and has not immediately been reconnected using ANTT.
- When a central venous access device is replaced
- After 24 hours of administration of IV Parenteral Nutrition

See Appendix 10 for use of giving sets in adult ITU areas

5.12 Devices to administer an infusion (with or without additional medication)

Infusions can be administered and their dose regulated to the patient either:

- **Manually by gravity flow**; (e.g. roller clamp) or
- **Electronically** (e.g. volumetric infusion and syringe pumps)

i. **Syringe pumps** – used to administer drugs/infusions in small or medium volumes 0.1-500.0mls/hr. Syringe pumps have better short term accuracy than volumetric pumps and therefore typically more superior when delivering drug rates below 5ml/hr. Syringe pumps are used extensively where small volumes of highly concentrated drugs are required at low flow rates. Staff must be aware of the disadvantage of start-up delay/mechanical backlash when using a syringe pump and take actions to overcome this

ii. **volumetric pumps** – used to administer drugs/infusions in small, medium or large volumes, rates 0.1 – 999mls/hr however are not generally used todeliver drug rates less than 5mls/hr. Volumetric pumps should be used for large volume/high risk infusions and/or infusions requiring accurate monitoring. These pumps should not be used where short term accuracy is required (syringe pumps should be used instead)

a) **Administration by gravity flow** (see appendix11.)

- Gravity flow with rate control by roller clamp may be used to regulate simple low-risk infusions
- Regular monitoring and documentation of the infusion rate of the prescribed infusions isnecessary
- The frequency of flow rate monitoring depends on patient's clinical requirements
- The practitioner should demonstrate knowledge and competency related to gravity flow,including: indications for use and ability to calculate flow rate

b) **Electronic infusion device**

- The healthcare professional MUST be able to demonstrate knowledge and competencywhich has been assessed relative to electronic infusion device(s) being used
- The healthcare professional is responsible for monitoring the patient and is accountable for the use of the electronic flow control infusion device
- Manufacturers' guidelines should be adhered to in the use of electronic infusion devices.
- A separate infusion device should be used for each infusion running simultaneously e.g. do not use the pump you have been using for maintenance fluid even if it is stopped for administration of a paracetamol infusion, have a second pump at the bedside for use.

An infusion device must be used for all other infusions which cannot be given using gravity flow especially when administering:

- infusions to neonates and children
- high risk medicines

An appropriate electronic infusion device should be selected, considering the volume being infused and the access device. The volume to be infused should be set on the electronic device.

5.13 Interruptions to infusions

- Best practice is to discard interrupted infusions and to record volume administered and remaining dose required. The maximum time an infusion can be paused is an hour as it should be clear whether the infusion would need to be restarted within this time

- Exceptions to this are time critical medication (refer to Prevention of Omitted Medicines guideline B45/2020) where the patient would be at clinical risk if there was a delay in restarting the medication i.e. critical care areas; neo-natal areas

- If disconnection is unavoidable use ANTT for both disconnection and reconnection; and ensure any administration sets or extension lines are clamped before disconnection and a sterile 'bung' is placed at the patient end of the administration set. The administration set must be replaced if the reconnection is not immediate.

- If it is not necessary to disconnect between infusions leave the administration set in situ, but clamped off.

5.14 Complications:

Infusions must be monitored to ensure safe administration of prescribed treatment.

Ask the patient/carer to report promptly any redness, local inflammation or soreness at the injection site or discomfort of any sort.

For complications of extravasation please see appendix 10

5.15 Incident reporting:

An incident form using Datix (LFPSE) must be completed for all incidents involving injectable medicines at any stage of the process – preparing, administering, and monitoring. These are monitored as for other medication incidents with themes identified and reported to the Medicines Optimisation Committee. This wrong route Never Events

5.16 Yellow card reporting

The Yellow Card Scheme is a voluntary reporting scheme for suspected adverse drug reactions (ADR) run by the UK medicines regulator Medicines and Healthcare Products Regulatory Agency (MHRA). An ADR is an unwanted or harmful reaction that occurs after administration of the drug. Examples include known side effects or unknown ones such as allergic reaction to penicillin. If an ADR is life threatening or prolongs hospitalisation or leads to hospitalisation, it should always be reported. Reporting of ADRs can be done through number of ways such as online, via paper forms or via the Yellow Card app. For further information, please see the Yellow Card website. Patient consent is not required for reporting but it is advisable to inform the patient that an ADR they have experienced has been reported. There are also e-learning modules for nurses available

5:17 This policy is supported by the following procedures which must be used in conjunction with this policy

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4	BABIES, CHILDREN AND YOUNG PEOPLE: Procedure for the Preparation and Administration of Bolus and Infusion medication via a central Line in Babies, Children and Young People *(under 18 yrs)*	37
5	BABIES, CHILDREN AND YOUNG PEOPLE: Procedure for the Preparation and Administration of Intravenous infusion via a central line in Babies, Children and Young People *(under 18 yrs)*	43
6	BABIES, CHILDREN AND YOUNG PEOPLE: Procedure for the Preparation and Administration of Bolus Intravenous medication via a peripheral line in Babies, Children and Young People (under 18 yrs)	51
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- Peripheral Cannula UHL Guideline (B33/2010)
- ITAPS : Intravenous (IV) Drug Administration in Adult Intensive Care Units (ICU UHL Guideline (C18/2007)

6 EDUCATION AND TRAINING REQUIREMENTS

6.1 All staff who undertake IV Medication preparation and administration must:

- Complete the Trust competency-based training and assessment programme run by the Clinical Skills Unit (CSU) and booked through HELM or complete eLearning if there is limited access to the face-to-face sessions.
- To be able to prepare and administer IV medications to babies, children and young people staff must attend the Children's IV Study Day currently run by the Children's Hospital Education Team. They can be contacted on 0116 258 7684
- For Perfusionists and Radiographers the attendance of a professionally recognised approved IV programme is also accepted e.g. The College of Radiographers Imaging Academy
- Have completed a period of supervised practice, the time span of which will be agreed by the assessor but ideally to be completed within 3 months.
- Have evidence of assessment and competency signed by an LCAT or other appropriate assessor (see section 7.4)
- Accept responsibility for updating knowledge and skills and provide evidence every three years of this as agreed with line manager as part of the appraisal process or other competency refresher programmes within the Trust

6.2 Staff new to the Trust and / or who have been trained elsewhere must:

- Provide evidence accepted by their line manager of the training and assessment of competence they have successfully completed. If the member of staff does not have any evidence of successful completion, then they may need to undertake the UHL training or complete the UHL IV e-learning. This must be discussed with their line manager and the Clinical Skills Unit
- Read the relevant Trust policies and undertake additional local training relating to equipment and documentation as required
- Undertake a one-off practical assessment by an LCAT or other appropriate assessor within own Ward/Unit/Department, incorporating IV bolus, infusion, and syringe driver/infusion pump

6.3 There may be exceptional circumstances where further individuals require training relating to IV medication preparation and administration within a particular speciality. This must be discussed and actioned with the Line Manager.

6.4 To be able to assess the knowledge and competencies of others in IV Medication preparation and administration the assessor must:

- Be confident and competent in performing the skill and practice the skill regularly
- Have a sound knowledge of current policies and procedures
- Ideally be identified by the line manager as an LCAT assessor (Contact the CSU on 0116 252 3251 for LCAT training) and have completed or be working towards a relevant mentor/assessor course
- Further advice can be sought from the CMG Education and Practice Development Lead.

6.5 Temporary staffing - This section concerns healthcare professional staff recruited via the central staff bank or via local arrangement

- Staff recruited via the central staff bank will have qualifications checked as part of that recruitment process and e.roster will make clear if they are IV trained or not

- Agency staff with certificate evidence of attending a practical course in the administration of IV therapy alone will be acceptable

- Staff recruited locally by the CMG are required to present evidence of their IV competence which will be recorded and kept at department level

- Agency staff who are new to UHL and will be administering IV medication will have a single observed administration to verify competence by an IV competent member of UHL staff, which will need to be recorded in the comments section of the green temporary staffing booklet, and noted as:

  'IV administration observed and is satisfactory' (This statement should be signed by the RN/HCP)

- The single observed administration should be undertaken each time the agency Registered Nurse or AHP (Allied Healthcare professional) works in a new area

7. PROCESS FOR MONITORING COMPLIANCE

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements
Injectable Medication Errors	Medicines Safety Officer	DATIX – incident reporting	Quarterly	• Medicines Optimisation Committee • CMG Heads of Nursing
Staff trained	Education leads	HELM	Monthly	Escalation to Heads of Nursing

8 EQUALITY IMPACT ASSESSMENT

8.1 The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.

8.2 As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

9 SUPPORTING REFERENCES, EVIDENCE BASE AND RELATED POLICIES

References

- **The Royal Marsden Manual of Clinical Nursing Procedures** available online
- **Canadian Agency for Drugs and Technologies in Health (2012),** Filtered needles for withdrawing medication from glass ampoules: A review of the cost-effectiveness and incidence of complications 2010
- Department of Health MHRA (2010) Gateway ref 14330: Mixing of medicines prior to administration in clinical practice: medical and non-medical prescribing.
- RCN (2010) Standards for Infusion Therapy
- EPIC Guidelines (2014) National Evidence-Based Guidelines for Preventing Healthcare- Associated Infections in NHS Hospitals in England. Journal of Hospital Infection 8651 s1- s70

9.1 Policies

- Leicestershire Medicines Code (available via UHL Connect)
- LNR Cytotoxic Policy
- UHL IV Monographs (Medusa) (available via UHL Connect)
- Parenteral Nutrition via Central Venous Catheter UHL Policy (B22/2015)
- Patient ID Band UHL Policy (B43/2007)
- Patient Group Directions UHL Policy (for supply of medicines to patients) (B43/2005)
- Latex Allergy in Patients and Staff UHL Policy (B29/2005)
- UHL Waste Management Policy (A15/2002)
- Non Medical Prescribing Policy B18/2004
- Pharmacy Purchasing for Safety Policy (C30/2017)
- UHL Infection Prevention & Control Policies (available via UHL Connect) UHL Health and Safety Policy (A17/2002)
- Control of Substances Hazardous to Health (COSHH) UHL Policy (B10/2002)
- Personal Protective Equipment at Work UHL Policy(B9/2004)
- Cardiopulmonary Resuscitation Policy UHL LLR Alliance LPT (E4/2015)
- The Assessment of Administration of Medicines by Nurses, Midwives and Nursing Associates Policy and Procedure (B13/2009)
- Policy and Procedures for the Management of Controlled Drugs (CDs) on Wards, Departments and Theatres (B16/2009)
- Administration of Medicines and Intravenous Fluids via a Cardiopulmonary Bypass Circuit within theClinical Perfusion Team for Adult Cardiac Surgery Policy (B16/2016)

10 PROCESS FOR VERSION CONTROL, DOCUMENT ARCHIVING AND REVIEW

10.1 This document will be uploaded onto SharePoint and available for access by staff through INsite. It will be stored and archived through this system.

10.2 This policy will be reviewed every 3 years by the Senior Nurse in Medicines Management

Procedure for Checking injectable medications prior to administration –
The role of the Second (Independent) Checker

University Hospitals of Leicester NHS
NHS Trust

Appendix 1
Preparation and Administration of IV Medications Policy

1. Introduction

1.1 All injectable medicines (with the exceptions outlined below) must be double checked by two authorised staff, one of which must be trained in the preparation and administration of IV medications. The staff member who will be administering the injectable medication must check that the correct patient receives the medication, checking the patient name, date of birth and hospital S number and that the patient has no allergies to the medicines.

1.2 The role of the independent checker is to make sure that:

a) The correct medication has been selected
b) The medication and all diluents / flushes are in date
c) The medication has been correctly prepared as per prescription and Medusa monographwhere available
d) The correct dose / rate of administration have been calculated and undertake any calculations independently to verify
e) The correct medication is administered to the correct patient

1.3 Where there is a second person checking the injectable medication that individual has equal accountability for their practice to that of the person administering the injectable medication

1.4 A second person is not required to

a) Witness the administration at the bedside of a subcutaneous or intramuscular injection except for insulin or where a pump is used.

b) check all alterations/ titrations in the critical care units due to the sheer number of titrations The Protocol for the checking of IV drug administration within adult intensive care units(ICU) (Trust ref number C18/2017) must be followed

c) The titration of oxytocin infusions by midwives. See The Induction and augmentation of labour (C3/2020)

2. Checking Procedure

Procedure for Checking Injectable medications prior to administration - Role of the Independent Checker		
No	**Check**	**Actions**
1	**Patient**	Confirm the patient has a patent cannula or other suitable access for IV administration
2	**Prescription**	Check that there is a valid prescription / Patient Group Direction and consult the prescription to ascertain the following: a) The whole prescription is legible. b) Medication has not been given. c) Allergies and contraindications are documented d) Signed and dated by the authorised prescriber
3	**Medication**	a) Check the products selected against the prescription b) Check the expiry date c) Know the therapeutic uses of the medicine to be administered, its normal dosage, general side effects, precautions and contra-indications, method and duration of administration and appropriateness to patients plan of care d) Be aware if additional care or monitoring is required e.g. cardiac monitoring for concentrated potassium solutions (see IV monographs (Medusa)
4	**Dose**	Correct dose selected against the prescription using the IV monographs or BNF, considering patients weight where appropriate
5	**Calculations**	a) Some medication administrations can require complex calculations to ensure that the correct volume or quantity of medication is administered b) The independent checker must undertake the calculation independently from the person preparing the medication in order to minimise the risk of error c) The use of calculators to determine the volume or quantity of medication should not act as a substitute for arithmetical knowledge and skill
6	**Diluents/Preparation**	a) Confirm that the correct solution and correct volume of diluent have been used if appropriate b) Confirm that the correct infusion equipment has been appropriately selected
7	**Solution Integrity**	Check the solution has no leaks, particles, discolouration, precipitation, or other potential contamination

8	**Label**	Check the appropriate label has been used: a) Yellow IV label for additives - Where possible the label should include the patients name, medication name, dose, route, date, and time reconstituted, expiry date of reconstituted infusion, batch number, signature of administrator and checker b) Labels attached to syringes to identify contents e.g. flush, antibiotic, heparin
9	**Patient**	a) Cross check the medication against the prescription b) Check the patients details either verbally or using the patient ID band against the prescription chart c) Cross check allergy status
10	**Route and Rate**	a) Check that any infusion rate settings on infusion devices are correct and all lines are labelled. Line label corresponds to the medicine on the infusion label b) Confirm that the correct IV access has been selected, which is appropriate to the concentration of the solution c) Independent checker to sign the prescription chart d) Check and document any subsequent alteration/titration of the infusion rate

ADULTS

Procedure for the Preparation and Administration of Bolus Intravenous Medications

University Hospitals of Leicester NHS
NHS Trust

Appendix 2 Preparation and Administration of Bolus IV Medications Policy in Adults

1. Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust procedure for the preparation and administration of bolus intravenous medication with the aim to provide safe and effective care and prevent micro-organism contamination of the line.

1.2 This procedure uses the principles of aseptic non-touch technique and protecting the key parts.

1.3 All IV medication preparation should occur in the clean treatment room or within an area dedicated to preparation of medications.

1.4 All substances for injection that are reconstituted within the ward / department / unit must be drawn up immediately prior to administration by the practitioner who will administer the medication.

2. Scope

This procedure applies to all Health Professionals authorised and competent to prepare and administerIV medications as per sections 3 and 4 of the main policy.

3. Equipment required for this procedure

a) Supply of sterile syringes. Blunt fill filter needle or blue/ green safety needle and sterile blind hub (ifrequired)

b) Needlefree hub (if changing)

c) 2% chlorhexidine gluconate in 70% alcohol wipe for cleaning tops of vials / hubs / access ports

d) Medication and diluent.

e) Clean gloves, plastic apron and goggles if appropriate

f) Compatible fluid to flush cannula (5-10mls)

g) Prescription Chart.

h) Syringe and line labels

i) Medusa Monograph to check doses and method of administration, and if any monitoring is required before or after administration.

j) Aseptic field to prepare and carry medication – in this case a large plastic tray or trolley

k) Sharps bin (to be taken to patients' side)

4. Key Parts for this procedure

Syringe tip, needle, needlefree hub, top of vial, blind end hub

ADULTS: Procedure for the Preparation and Administration of Bolus Intravenous Medications	
No	**Action**
1	Explain and discuss the procedure with the patient Ensure they have a patent cannula or other suitable IV access
2	Check that there is a valid prescription / Patient Group Direction (or equivalent for Imaging) and ascertain the following: • correct medication which is suitable to be given as a bolus • correct dose, units written in full e.g. micrograms not mcg • allergies and contraindications are documented • signed and dated by the authorised prescriber • date and time of administration • route and method of administration • the whole prescription is legible • medication has not been given, utilising previous history chart. If on eMeds, check STAT tab
3	Two authorised staff, one of whom is IV competent, must check the preparation and patient prescription prior to the administration of the intravenous medication. (independent checker to follow the checking procedure as detailed in Appendix One of the IV Policy). Refer to the IV monographs to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Further advice can be sought from Medicine Information Department, Pharmacist, BNF, Medicines Management web pages on INsite **Both staff must independently undertake any medication calculations**
4	Clean hands, as per UHL hand hygiene policy (INsite Document No 23813) Check hands for any visibly broken skin and cover with a waterproof dressing Clean all sides of a large plastic tray / trolley with Clinell wipes, starting on the inside and then the outside, the tray / trolley will be the aseptic field for the procedure Clean hands
5	Assemble appropriate equipment. Check packages are intact and equipment is all in date. Assemble all medication required, check the name of the medication, dose against the prescription chart including expiry dates. Place in the tray.
6	Refer to the IV monographs to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Check the recommended rate of administration Further advice can be sought from Medicines Information Department, Pharmacist, BNF, Medicines Management web pages on UHL Connect **Both staff must independently undertake any medication calculations**
7	Clean hands and then pick-up and open the syringes, attach the needles straight onto the syringe's tips and loosen sheaths always protecting the key parts. Arrange in an orderly manner in the tray so syringe tips remain sterile once the needles have been removed. Open other equipment ensuring they are placed in the tray protecting key parts.
8	Open one of the Chlorhexidine 2% and Alcohol 70% wipes using this to wipe the top of the medication vial then open the vials of flush and diluent and place them outside of the tray on a clean surface. A pre-filled saline syringe needs to remain in the packaging until it is required.

ADULTS: Procedure for the Preparation and Administration of Bolus Intravenous Medications	
No	**Action**
9	If required draw up the required amount of diluent • Use a blunt fill filter needle for drawing up all solutions except for emulsions, or if it is difficult to draw the solution up through the filter in which case a green/ blue safety needle should be used • If drawing up from a glass ampoule the filter needle must be changed before injection the solution for reconstitution as the filter will trap and glass particles and re-infusion of glass particles must be avoided • ***Coring occurs when small fragments of rubber sheer off when the needle punctures the vial top. Any solutions drawn up through a rubber vial top should be closely observed for signs that the vial top may have 'cored'. Any indication that coring has occurred should be reported to Health and safety and the cored vial and syringe/ needle retained for later collection. A Datix incident form must be completed***
10	Where a diluent is required to reconstitute the medication, add it into the vial of medication and gently rotate the vial to mix or follow manufacturer's instructions
11	Draw up all the fluid from the medication vial and replace any unwanted amount of medication or fluids back into the vial
12	Check the final solution has no particles, discolouration, precipitation, or other potential contamination, retain all vials until after the administration is complete in case of reactions and batch numbers are required.
13	Check and draw up an appropriate flush as indicated in IV monographs file. Use a pre-filled and labelled saline flush if available.
14	Label all syringes with their contents, including the flush (unless using a prefilled and pre-labelled saline flush) using pre-printed labels
15	Using an aseptic non-touch technique all needles should be removed without re-sheathing prior to leaving the preparation area and disposed of into a sharps bin. Key parts can be protected by carefully placing the syringes back into the syringe packaging or using a blind end hub
16	Take the prepared medication to the patient's bedside and re-explain the procedure if necessary
17	One registered professional must check the patient's identity against the prescription chart. If the patient is unable to verbally confirm their identity use the patients ID band Check if the patient has a red ID band which indicates that the patient has an allergy
18	If another intravenous infusion is in progress, check for medication or fluid incompatibilities and consider stopping the infusion temporarily **NB: 3-way taps must never be used on central or peripheral lines in general ward areas**.
19	If the infusion needs to be disconnected protect the open line with a sterile blind end hub **Ensure the correct IV administration line is used for the administration**

ADULTS: Procedure for the Preparation and Administration of Bolus Intravenous Medications	
No	**Action**
20	Remove the bandage completely and check the cannula site throughout administration of medication or fluids for signs of redness, swelling, leakage and / or pain. Document observations on the cannula care pathway (appendix six of the IV Policy)
21	The intravenous medication must be administered into a 'closed system' via a needlefree hub. The top cap of the cannula must never be used except in an emergency.
22	Clean hands Hold the end of the line firmly and using a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the hub for at least 10-15 seconds and then using an alternative place on the wipe scrub the sides for at least 10-15 seconds wait for the hub to dry for at least 30 seconds. To prevent contamination of the hub you must continue to hold the end of the line firmly. Remove the wipe and place back onto the aseptic field ensuring you do not contaminate the keyparts of the other equipment.
23	Gently inject the appropriate flush compatible with the medication to be given
24	Inject the medication smoothly in the direction of flow at the specified rate Observe patient through the administration for positive / adverse effects
25	If administering more than one medication or fluid the cannula must be flushed between medications with a compatible flush
26	On completion of medication administration flush the line with a compatible flush
27	Record the administration of the IV medication and flush on the patient's prescription chart, both staff must sign. Document the phlebitis score
28	If intravenous fluids were stopped temporarily, recommence the infusion. If fluids have been stopped for more than 30 minutes this must be recorded on the fluid balance chart
29	Replace the bandage / dressing as appropriate around the cannula site
30	Ensure the patient is comfortable, has the call bell within reach, remove gloves and clean hands before leaving the patient's side
31	Ensure correct disposal of sharps into sharps bin at the site of use and waste into clinical waste bins • Clean tray / trolley with Clinell wipes as before and store safely • Store sharps bin safely with aperture closed • Clean hands

ADULTS

Procedure for the Preparation and Administration of aMedication or Clear Fluid Infusion

University Hospitals of Leicester NHS
NHS Trust

Appendix 3
Preparation and Administration of a Medication or Clear fluid

1. Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust procedure for the preparation and administration of a Medication or Clear Fluid Infusion intravenous medication with the aim to provide safe and effective care and prevent micro-organism contamination of the line.

1.2 This procedure uses the principles of aseptic non-touch technique and protecting the key parts.

1.3 All IV medication preparation should occur in the clean treatment room or within an area dedicated to preparation of medications.

1.4 As far as reasonably practicable IV fluid infusion bags should be stored in the original box and decanting avoided. If decanting is unavoidable then bags must be stored separately and not placed in the same container.

1.5 All substances for injection that are reconstituted within the ward / department / unit must be drawn upimmediately prior to administration by the practitioner who will administer the medication.

1.6 There have been numerous errors where the incorrect fluid has been selected and administered, therefore particular attention should be paid to the correct selection of the infusion.

1.7 Where a volumetric / syringe driver is in use it must not be disconnected/ removed when a patient is transferred between locations.

2. Scope

This procedure applies to all Health Professionals authorised and competent to prepare and administer IV medications as per sections 3 and 4of the main policy

3. Equipment required for this procedure

a) Supply of sterile syringes. Blunt fill filter needles and/ or green and blue safety needles for drawing up.

b) 2% chlorhexidine gluconate in 70% alcohol wipe for cleaning tops of vials / hubs / access ports

c) Medication and diluent, IV fluid

d) Clean gloves, plastic apron, goggles if appropriate

e) Compatible fluid to flush cannula (5-10mls)

f) Prescription Chart.

g) Additive, syringe and line labels

h) IV Monograph to check doses, method of administration and if any monitoring is required before or after administration.

i) Appropriate infusion device (e.g. syringe driver or volumetric pump), relevant administration sets /equipment, anti-reflux valves or multiple port needlefree device and drip stand.

j) Aseptic field to prepare and carry medication – in this case a large plastic tray or trolley

k) Sharps bin (to be taken to patients' side)

4. Key Parts for this procedure

Syringe tip, needle, needlefree hub, top of vial, both ends of giving set, hub on fluid bag

ADULTS: Procedure for the Preparation and Administration of a Medication or Clear Fluid Infusion	
No	**Action**
1	Explain and discuss the procedure with the patient Ensure they have a patent cannula or other suitable IV access
2	Check that there is a valid prescription / Patient Group Direction (or equivalent for Imaging) and ascertain the following: • correct medication / fluid • correct dose, units written in full e.g. micrograms not mcg • allergies and contraindications are documented • signed and dated by the authorised prescriber including bleep number • date and time of administration • route and method of administration • the whole prescription is legible • medication / fluid has not been given, utilising previous history chart. If on eMeds, check STAT tab.
3	Two authorised staff, one of whom is IV competent, must check the preparation and patient identification prior to the administration of the intravenous medication. (independent checker to follow the checking procedure as detailed in Appendix One of the IV Policy) Refer to the IV monographs to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Loading doses must be prepared as a separate syringe as per 6.3. Further advice can be sought from Medicines Information Department, Pharmacist, BNF, Medicines Management web pages on INsite **Both staff must independently undertake any medication and infusion rate calculations**
4	Clean hands, as per UHL hand hygiene policy (B32/2003) Check hands for any visibly broken skin and cover with a waterproof dressing Clean all sides of a large plastic tray / trolley with Clinell wipes starting on the inside and then the outside, the tray / trolley will be the aseptic field for the procedure. Allow to air dry. Clean hands
5	Assemble appropriate equipment. Check packages are intact and equipment is all in date. Place in the tray.
6	Assemble all medication / fluid required, check the name of the medication, dose against the prescription chart including expiry dates (if putting up clear fluids only please go to no 19)

ADULTS: Procedure for the Preparation and Administration of a Medication or Clear Fluid Infusion		
No	**Action**	
7	Refer to the IV monographs to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Loading doses must be prepared as a separate syringe as per 6.3. Further advice can be sought from Medicine Information Department, Pharmacist, BNF, Medicines Management web pages on UHL Connect **Both staff must independently undertake any medication and infusion rate calculations**	
8	Clean hands and then pick up and open the syringes, attach the needles straight onto the syringe's tips and loosen sheaths always protecting the key parts. Arrange in an orderly manner in the tray so syringe tips remain sterile once the needles have been removed. Open other equipment ensuring they are placed in the tray protecting key parts.	
9	Open one of the Chlorhexidine 2% and Alcohol 70% wipes using this to wipe the top of the medication vial then open the vials of flush and diluent and place in the tray. Utilise A pre drawn, pre-labelled sodium chloride flush. This needs to remain in thepackaging until it is required.	
10	If required draw up the required amount of diluent • Use a blunt fill filter needle. • Use a blue or green safety needle if diluent is an emulsion or is difficult to draw up via a filter needle	
11	Where a diluent is required to reconstitute the medicine, add it into the vial of medication and gently rotate the vial to mix or follow manufacturers' instructions	
12	Draw up all the fluid from the medication vial and replace any unwanted amount of medication or fluids back into the vial	
13	**Syringe driver:(Note separate policy for T34 syringe driver)** • Draw up or add all medications and diluents to an appropriate sized luer lock syringe using aseptic non- touch technique • Gently invert the syringe 3-5 times to mix the contents	**Infusion Bag:** • Check the fluid bag has no leaks, particles, discolouration, precipitation or other potential contamination • Add either ready prepared or reconstituted medication to the appropriate fluid bag using aseptic non- touch technique • Gently invert the bag 3-5 times to mix the contents
14	Once final solution has been prepared check that it has no leaks, particles, discolouration, precipitation, or other potential contamination	

ADULTS: Procedure for the Preparation and Administration of a Medication or Clear Fluid Infusion		
No	**Action**	
15	Complete additive label and attach to the syringe / fluid bag containing the medication where it can be clearly read The label must include • Date and time of preparation • Name of the patient • Name of the medication and diluent used and including their batch numbers • Signatures of both practitioners preparing, checking and administering the medication.	
16	Check and draw up an appropriate flush as indicated in IV monographs file and label.	
17	Assemble and open all other administration equipment, checking expiry dates and seals are intact. Ensure infusion device is clean. If using a flow regulator device for clear fluids attach as per manufacturer's instructions	
18	**Syringe Driver:** • Insert syringe correctly into driver, follow manufacturer's instructions • Confirm syringe size if asked • Attach extension line ensuring that end not attached to syringe remains covered with blind hub • Zero volume administered • Purge the line	**Volumetric Pump:** • Hang bag onto drip stand • Attach and prime the IV giving set using a no touch technique • Ensure the giving set chamber is filled no more than 1/3 full • Thread giving set through the pump following manufacturer's instructions • Zero volume administered
19	Ensure drip stand is stable and not overloaded with too many devices. Use a 4- or 5-pronged drip stand	
20	Take the prepared medication to the patient's bedside and re-explain the procedure if necessary	
21	Both staff must check the patient's identity against the prescription chart. If the patient is unable to verbally confirm their identity use the patients ID band Check if the patient has a red ID band which will indicate they have an allergy	
22	If another intravenous infusion is in progress, check for medication or fluid incompatibilities and consider stopping the infusion temporarily If the infusion needs to be disconnected protect the open line with a sterile blind end hub **Ensure the correct IV administration line is used for the administration**	
23	Remove the bandage completely, if one in place, to be able to observe the cannula site throughout administration of medication or fluids for signs of redness, swelling, leakage and / or pain.	

ADULTS: Procedure for the Preparation and Administration of a Medication or Clear Fluid Infusion	
No	**Action**
24	Clean hands Hold the end of the line firmly and using a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the hub for at least 10-15 seconds and then using an alternative place on the wipe scrub the sides for at least 10-15 seconds wait for the hub to dry for at least 30 seconds. To prevent contamination of the hub you must continue to hold the end of the line firmly. Remove the wipe and place back onto the aseptic field ensuring you do not contaminate the key parts of the other equipment. Administer appropriate flush to check the line is still patent.
25	Connect the line to the patient using a no-touch technique. Label line If other infusions are required use a anti reflux valve and / or multiple port device **NB: 3-way taps must never be used on central or peripheral lines in general ward areas.**
26	IV giving sets administering medications must be replaced every 24 hours or as per manufacturer's instructions
27	Clear fluid IV giving sets must be replaced every 72 hours or as per manufacturer's instructions
28	Set the infusion device at the correct rate and the correct volume to be infused and press the start button This must be independently checked by both practitioners and recorded on the pump check chart. Run the infusion device from the mains whenever the patient is stationary
29	Any alteration / titration of the infusion rate must also be checked by two authorised staff, one of whom must be IV competent. This change in rate must then be documented and signed by both staff on the pump check chart. In critical care / theatre / high dependency areas where this may happen frequently (e.g. many titrations over a few minutes) and any double checking would delay life sustaining / emergency treatment local documentation procedures should be followed Subsequent checks of the rate and total volume infused should be done at least hourly and documented on the pump check chart (see Appendix 6 for a sample pump check chart) Check for any signs of leakage around the cannula suite or the port. If there is leakage check the cannula site or the IV fluid bag. Report any issues to the prescriber.
30	Replace any extra protective dressing
31	Make sure the patient is comfortable, has call bell within reach and is aware of what the machine should be doing and when to call for assistance, clean hands before leaving patient's side Record the administration of the medication on the prescription chart, both staff to sign. Document phlebitis score
32	If patient requires monitoring of fluids document volume administered and any discontinuation of fluids on fluid balance chart

ADULTS: Procedure for the Preparation and Administration of a Medication or Clear Fluid Infusion	
No	**Action**
33	Ensure correct disposal of sharps into sharps bin at the site of use and waste into clinical waste bins • Decontaminate plastic tray / trolley as before and store safely • Store sharps bin safely with aperture closed • Clean hands
34	Check with the patient during the infusion for any discomfort, observing for signs of positive or adverse effects. Ensure the patient understands any potential complications and know who to inform if the occur.

Infants & Children

Procedure for the Preparation and Administration of Bolus Intravenous Medications via a central venous access device (CVAD) in Babies, Children and Young People (*under 18yrs)*

University Hospitals of Leicester NHS
NHS Trust

Appendix 4

Administration of Bolus Medications via a CVAD under 18 yrs

1. Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust procedure for the preparation and administration of bolus intravenous medication via a central venous access devise (CVAD) with the aim to provide safe and effective care and prevent micro-organism contamination of the line.

1.2 This procedure uses the principles of aseptic non-touch technique protecting key parts

1.3 All IV medication preparation should occur in the clean treatment room or within an area dedicated to the preparation of medications

1.4 All substances for injection that are reconstituted within the ward/department/unit must be drawn up immediately prior to administration by the practitioner who will administer the medication

2. Scope

This procedure applies to all registered professionals who administer peripheral intravenous medication to babies, children or young people under 18yrs in UHL.

Staff authorised to ADMINISTER medicines to children MUST have had the appropriate training and been assessed as competent. (For more details refer to the Leicester Medicines Code)

2.1 This procedure should be used in conjunction with:

- UHL consent policy to ensure the child receives safe care and children and families are able to understand the reasons for care to facilitate co-operation.
- The Leicestershire Medicines Code Section 13, accessible via UHL Connect Leicestershire Medicines Code (xuhl-tr.nhs.uk)
- Central Line UHL Paediatric Intensive Care Guideline (C12/2016)

2.2 The procedure excludes:

- All cytotoxic chemotherapy (Covered by Leicestershire Medicines Section 14 & EMCN Cytotoxic policy)

3.1 Recommendations, Standards and Procedural Statements

3.1.1 It is essential that all staff involved in the administration of medicines to children familiarise themselves with the potential hazards and challenges of this patient group.

3.1.2 Paediatric formularies (BNFC, Paediatric medusa injectable medicines guide, Badgernet) must be used when checking the dose and preparation methods.

3.1.3 The weight (and surface area where required) must be recorded in kilograms and written on the medication chart. The weight must be updated at least weekly, but this may be more frequent in young children whose weight may fluctuate.

3.1.4 A final weight-based dose prescribed may have been adjusted to within +/- 5% of the exact dose to ease administration. Adjustments of greater than +/- 5% must be discussed with a pharmacist and medical staff.

3.1.5 Paediatric formulations must be used where available. Where they are not available, particular vigilance should be exercised when calculating or preparing the dose.

3.1.6 Only the correct volume of medication should be taken to the patient - this may include a known quantity or solution for priming the line in very small doses (eg NNU). Excess medication must be withdrawn from the bottle or bag, or the correct dose drawn into a new syringe.

3.1.7 The volume to be infused limit should not be routinely used to control the amount of medication to be administered.

3.2 Locking Central Lines using Heparinised Sodium Chloride

3:2.1 When using Central Lines (*including Tunnelled and Non-Tunnelled Central and PICC Lines)* if accessing line within 8 hours lock using Sodium Chloride 0.9% 4mls, if not accessing for more than8 hours lock you must use 2-4mls Heparinised Sodium Chloride 10 units/ml.

3.2.2 When using Needled Portacaths after each use you must lock with 2-4ml Heparinised Sodium Chloride 100units/ml. Before removing the needle you must also flush with 10mls Sodium Chloride 0.9% before locking with 2-4ml Heparinised Sodium Chloride 100units/ml.

3:2.3 When using Longlines after each use you must lock with Heparinised Sodium Chloride 10 units/ml unless the line is more prone to blocking for example when using Neonatal Longlines when 2ml Heparinised Sodium Chloride 100units/ml can be considered

Other Care

3:2.4 It is important to remember with double/triple lumen lines that the lumens are separate and therefore the mixing of medication running concurrently does not occur until they exit the catheter – however there are exceptions therefore compatibilities must be checked before any medication is administered via any Central Line.

3:2.5 You must only use syringes of 10mls or greater as smaller size syringes may cause the line to rupture due to excess pressure. The exceptions are where syringes are pre-mixed, giving smaller quantitiesor when accessing Central Lines in Neonates.

3:2.5 All babies, children and young people with a central line should be commenced on daily Stellisept wash and nasal Mupirocin TDS or Octenisan for Neonates whilst they are in-patients.

4. Equipment

a) A selection of sterile intravenous Luer Lock syringes appropriate for the volumes to be administered

b) Blunt Fill Filter Needles for drawing up flush/diluent (or green/blue safety needles if required)

c) Chlorhexidine 2% and Alcohol 70% wipes (Large PDI Wipes)

d) Medication and any required diluents

e) Clean gloves and aprons if appropriate

f) Prescription Chart

g) Sodium Chloride 0.9% (or other compatible flush)

h) Heparinised Sodium Chloride 10units/ml (central lines) Heparinised Sodium Chloride

100units/ml (Neonatal long lines and Portacath) or other compatible lock line solution

i) Syringe labels

j) Bonded Triple Lumen with Double Lumen anti-reflux valve connector (Squid) if giving more than oneMedication

k) Large Plastic Tray or Trolley

l) Appropriate protective dressing to secure line (eg polo, or mepore tape)

m) IV Monographs (Paediatric Medusa or Badgernet for neonates)

n) Sharps bin

5. Key parts

Syringe tip, needle, needle free hub, top of vial, blind end hub

Procedure for The Administration of a bolus medication via a Central Venous Access Device in Babies, Children, and Young People	
No	Action
1	Approach the infant, child or young person and family in a friendly and open manner Depending on the age and development of the child or young person, explain the procedure to them and their parents or carers and obtain their verbal consent. (*You may need to involve a play specialist in the explanation to gain a suitable level of understanding)* Identify the type of central venous access device the child has in situ.
2	Reassure the infant/child and parent throughout the procedure.
3	Check that there is a valid prescription and ascertain the following: • Child's name, date of birth, and S-number is recorded • Child has a recent weight (or body surface area if required) (within 7 days) documented • Correct medication, diluents, and line locks are prescribed and are suitable to be given via a central venous access device • Ensure dose and frequency prescribed are correct for age/weight of the child (checked against BNFC) pay particular attention to decimal points and dosage units • Units are written in full where required e.g. micrograms not mcg • Allergies and contraindications are documented • Signed and dated by the authorised prescriber • Date and time of administration recorded • Route and method of administration recorded • The whole prescription is legible • Medication is due and has not been given
4	Two authorised staff, one of whom is central line competent, must check the preparation and patient prescription prior to the administration of the intravenous medication. (Independent checker to follow the checking procedure as detailed in Appendix One of the IV Policy). Refer to the Paediatric IV monographs via Medusa or Badgernet (neonatal units only) to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Further advice can be sought from Medicine Information Service, Pharmacist, BNFC, Badgernet, Medicines Management web pages on UHL Connect, or area specific specialist guidelines

	Both staff must independently undertake any medication calculations
5	When in contact with blood/body fluid, non-intact skin, or mucous membranes. Cytotoxic/Cytostatic medications If you have a skin condition that requires protection. If you do have any concerns with skin integrity, please visit Occupational Health. There should also be yearly assessment in-line with your appraisal to assess skin integrity. Appropriate PPE must be worn when in contact with any patients with known or suspected infection or colonisation
6	Clean hands, as per UHL hand hygiene policy (Document No 23813) Check hands for any visibly broken skin and cover with a waterproof dressing. Clean all sides of a large plastic tray / trolley with Clinell wipes, starting on the inside and then the outside, the tray / trolley will be the aseptic field for the procedure. Either allow to air-dry (for a minimum of three minutes) Alternatively dry with paper towels and then disinfect using distilled wipes. Your tray / trolley now provides an aseptic field.
7	Gather all equipment required. Check packages are intact and equipment is in date. Place next to the tray on a clean surface or the bottom of the trolley. Gather medication and any diluents required, check the name of the medication, and dose against the prescription chart, including expiry dates.
8	Clean your hands and then pick-up and open the syringes, attach the needles straight onto the syringe's and loosen sheaths always protecting the key parts. Arrange in an orderly manner in the tray so syringe tips remain sterile once the needles have been removed. Open other equipment ensuring they are placed in the tray protecting key parts.
9	Open one of the Chlorhexidine 2% and Alcohol 70% wipes using this to wipe the top of the medication vial. Open the vials of flush and diluent and place them outside of the tray on a clean surface. A pre-filled saline syringe needs to remain in its packaging until it is required
10	If required, draw up the required amount of diluent indicated by the IV monograph. Use a blunt fill filter needle for drawing up all solutions except for emulsions or it is difficult to draw the solution up through the filter in which case a green/ blue safety needle should be used. If drawing up from a glass ampoule, the filter needle must be changed before injecting the solution for reconstitution as the filter will trap and glass particles and re-infusion of glass particles must be avoided. ***Coring occurs when small fragments of rubber sheer off when the needle punctures the vial top. Any solutions drawn up through a rubber vial top should be closely observed for signs that the vial top may have 'cored'. Any indication that coring has occurred should be reported to Health and safety and the cored vial and syringe/ needle retained for later collection. A Datix incident form must be completed***
11	Where a diluent is required to reconstitute the medication, add it into the vial of medication and gently rotate the vial to mix, or follow instructions in the IV monograph/manufacturer instructions
12	Draw up all the fluid from the medication vial to ensure the correct concentration is achieved. Carefully calculate the volume of medication to be given and replace any unwanted amount of medication back into the vial. **Neonatal and paediatric calculations can often be complex, take particular note of decimal points in all calculations.**

13	If the medication requires further dilution, check, draw up, and add the amount and type of diluent as instructed in the IV drug monograph.
14	Check the final solution has no particles, discoloration, precipitation, or other potential contamination. Retain all vials until after the administration is complete in case of reaction and batch numbers are required
15	If required, check and draw up heparinised sodium chloride (or alternative line lock solution) as prescribed Check and draw up an appropriate type and volume of flush as indicated in the IV monograph. Use a pre filled and labelled 0.9% saline flush if available.
16	Label all syringes with their contents, including the flush (unless using a prefilled saline flush).
17	Using an aseptic non-touch technique, all needles should be removed without re-sheathing prior to leaving the preparation area and disposed of in the sharps bin. Key parts can be protected by carefully placing the syringes back into the syringe packaging, or using a blind ended hub.
18	Clean hands upon entering patient zone. Both practitioners must take the prepared tray containing medication to the child's bedside, re-explain the procedure to the child and family if necessary and gain consent. Reassure the child and family throughout procedure. If required ensure appropriate methods of clinical holding are utilised in a supportive manner with the agreement of the child and parent/carer
19	Both practitioners must check the child's identity both verbally and from their identity band against the prescription chart. Check if the child has a red ID band which will indicate they have an allergy. At this stage the independent checker must sign the chart ensuring that they clean their hands before leaving the bed space, they do not have to wait until the medication has been fully administered.
20	If another intravenous infusion is in progress, check for medication incompatibilities and consider stopping the infusion temporarily if safe to do so. Consider using a bonded triple lumen, double anti- reflux device (octopus) to administer several infusions at the same time. 3 way taps must never be used in general wards. If the infusion needs to be temporarily disconnected, protect the open line with a sterile blind end hub.
21	Remove the protective dressing from the child's central line and check site prior to and throughout administration for signs of redness, swelling, leakage, and/or pain. Document observations on the CVAD care pathway.
22	Clean your hands. Hold the end of the line firmly and using a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the hub for at least 10-15 seconds, and then using an alternative place on the wipe scrub the sides for at least 10-15 seconds, wait for the hub to dry for at least 30 seconds. To prevent contamination of the hub you must continue to hold the end of the line firmly. You must remove the wipe and place back onto the aseptic field ensuring you do not contaminate the key parts of the other equipment.

23	Connect the syringe containing the flush to the end of the needle free hub, undo the clamp, and pull back gently to obtain flashback (longlines will not bleed back) Administer a small amount of the flush into the line checking for signs of leakage, pain or swelling around the cannula site. Observe for signs of line damage, or rupture
24	Attach the syringe containing the medication and administer at the rate instructed in the IV monograph, continuing to check for signs of leakage, swelling and/ or pain Observe the patient throughout administration for any positive/adverse effects.
25	If administering more than one medication, the line must be flushed between each medication with a compatible flush.
26	On completion of medication administration, flush the line with 0.9% saline or a compatible flush. If required, following administration of the flush instil heparinised sodium chloride (or alternative line lock) as prescribed to lock the line. This should be given using a push-pause turbulent flow technique and a positive pressure lock with at least 0.5ml (ensuring the line is firmly clamped at the appropriate part of the line). At the end of the procedure, clean the needle free hub using a Chlorhexidine 2% and Alcohol 70% wipe. Replace any protective dressing as required
27	Record the administration of the CVAD medication and flush on the patients prescription chart ensuring both nurses have signed the chart.
28	Recommence any infusions that may have been stopped temporarily during administration. If fluids have been stopped for more than 30 minutes this must be recorded on the fluid balance chart.
29	Ensure the child is comfortable, has the call bell within reach. Clean hands before leaving the bedside.
30	Ensure correct disposal of sharps into sharps into a sharps container and other equipment into an orange bag. Decontaminate the tray with Clinell wipes before putting it away.

Infants & Children
Procedure for the Preparation and Administration of an Intravenous Infusion via a central venous access device (CVAD) in Babies, Children and Young People (*under 18yrs)*

University Hospitals of Leicester NHS
NHS Trust

Appendix 5
Procedure for the Preparation of an Intravenous Infusion via a CVAD under 18 years

1.0 Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust procedure for the preparation and administration of bolus intravenous medication via a central venous access device (CVAD) with the aim to provide safe and effective care and prevent micro- organism contamination of the line.

1.2 This procedure uses the principles of aseptic non-touch technique protecting key parts

1.3 All IV medication preparation should occur in the clean treatment room or within an area dedicated to the preparation of medications

1.4 All substances for injection that are reconstituted with the ward/department/unit must be drawn up immediately prior to administration by the practitioner who will administer the medication

1.5 As far as reasonable practicable, IV infusion bags should be stored in their original box. If decanting is unavoidable then different bag types must be stored separately and not placed in the same container

1.6 There have been numerous errors where an incorrect fluid have been selected and administered therefore particular attention should be paid to the correct selection for the infusion

1.7 Where a volumetric pump/syringe drive is in use, it must not be disconnected/removed when a patient is transferred between locations.

2. Scope

This procedure applies to all registered professionals who administer peripheral intravenous medication to babies, children or young people under 18yrs in UHL.

Staff authorised to ADMINISTER medicines to children MUST have had the appropriate training and been assessed as competent. (For more details refer to the Leicester Medicines Code)

2.1 This procedure should be used in conjunction with:

- UHL consent policy to ensure the child receives safe care and children and families are able to understand the reasons for care to facilitate co-operation.
- The Leicestershire Medicines Code Section 13, accessible via UHL Connect Leicestershire Medicines Code (xuhl-tr.nhs.uk)
- Central Line UHL Paediatric Intensive Care Guideline (C12/2016)

2.2 The procedure excludes:

All cytotoxic chemotherapy (Covered by Leicestershire Medicines Section 14 & EMCN Cytotoxic policy)

3. Recommendations, Standards and Procedural Statements

3.1 It is essential that all staff involved in the administration of medicines to children familiarise themselves with the potential hazards and challenges of this patient group.

3.2 Paediatric formularies (BNFC, Paediatric medusa injectable medicines guide, Badgernet) must be used when checking the dose and preparation methods.

3.3 The weight (and surface area where required) must be recorded in kilograms and written on the medication chart. The weight must be updated at least weekly, but this may be more frequent in very young children whose weight may fluctuate.

3.4 A final weight based dose prescribed may have been adjusted to within +/- 5% of the exact dose to ease administration. Adjustments of greater than +/- 5% must be discussed with a pharmacist and medical staff.

3.5 Paediatric formulations must be used where available. Where they are not available, particular vigilance should be exercised when calculating or preparing the dose.

3.6 Only the correct volume of medication should be taken to the patient - this may include a known quantity or solution for priming the line in very small doses (eg NNU). Excess medication must be withdrawn from the bottle or bag, or the correct dose drawn into a new syringe.

3.7 The volume to be infused limit should not be routinely used to control the amount of medication to be administered.

3.8 Locking Central Lines using Heparinised Sodium Chloride

3:8.1 When using Central Lines (*including Tunnelled and Non-Tunnelled Central and PICC Lines)* if accessing line within 8 hours lock using Sodium Chloride 0.9% 4mls, if not accessing for more than 8 hours lock you must use 2-4mls Heparinised Sodium Chloride 10 units/ml.

3.8.2 When using Needled Portacaths after each use you must lock with 2-4ml Heparinised Sodium Chloride 100units/ml. Before removing the needle you must also flush with 10mls Sodium Chloride 0.9% before locking with 2-4ml Heparinised Sodium Chloride 100units/ml.

3:8.3 When using Longlines after each use you must lock with Heparinised Sodium Chloride 10 units/ml unless the line is more prone to blocking for example when using Neonatal Longlines when 2ml Heparinised Sodium Chloride 100units/ml can be considered

Other Care

3:8.4 It is important to remember with double/triple lumen lines that the lumens are separate and therefore the mixing of medication running concurrently does not occur until they exit the catheter – however there are exceptions therefore compatibilities must be checked before any medication is administered via any Central Line.

3:8.5 You must only use syringes of 10mls or greater as smaller size syringes may cause the line to rupture due to excess pressure. The exceptions are where syringes are pre-mixed, giving smaller quantities or when accessing Central Lines in Neonates.

3:8.6 All babies, children and young people with a central line should be commenced on daily Stellisept wash and nasal Mupirocin TDS or Octenisan for Neonates whilst they are in-patients.

4 Equipment

a) A selection of sterile intravenous Luer Lock syringes appropriate for the volumes to be administered. Luer lock syringes must only be used with a syringe driver

b) Blunt Fill Filter Needles for drawing up flush/diluent (or green/blue safety needles if required)

c) Chlorhexidine 2% and Alcohol 70% wipes (Large PDI Wipes)

d) Medication and required diluents

e) Clean gloves and aprons if appropriate

f) Prescription Chart

g) Sodium Chloride 0.9% flush (or other compatible flush)

h) Heparinised Sodium Chloride 10units/ml (central lines) Heparinised Sodium Chloride 100units/ml (Neonatal long lines and Portacath) or other compatible lock line solution

i) Syringe, additive, and administration set labels

j) Bonded Triple Lumen with Double Lumen anti-reflux valve connector (Squid) if giving more than one Medication

k) Large Plastic Tray or Trolley

l) Appropriate protective dressing to secure line (eg polo, or mepore tape)

m) IV Monographs (Paediatric Medusa or Badgernet for neonates)

n) Appropriate infusion device (syringe drive or volumetric pump) and relevant administration set/equipment

o) Sharps bin

5 Key parts

Syringe tip, needle, needle free hub, top of vial, both ends of administration sets, hub of IV fluid bag

Procedure for The Administration of a bolus medication via a Central Venous Acccess Device in Babies, Children, and Young People	
No	Action
1	Approach the child or young person and family in a friendly and open manner. Depending on the age and development of the child or young person, explain the procedure to them and their parents or carers and obtain their verbal consent. (*You may need to involve a play specialist in the explanation to gain a suitable level of understanding).* Identify the type of central venous access device the child has in situ.
2	Reassure child and parent throughout procedure.

3	Check that there is a valid prescription and ascertain the following: • Child's name, date of birth, and S-number is recorded • Child has a recent weight (or body surface area if required) (within 7 days) documented • Correct medication/fluid, diluents, and line locks are prescribed and are suitable to be given as a central line infusion • Ensure dose and frequency prescribed are correct for age/weight of the child (checked against BNFC) pay particular attention to decimal points and dosage units • Units are written in full where required e.g. micrograms not mcg • Allergies and contraindications are documented • Signed and dated by the authorised prescriber • Date and time of administration • Route and method of administration • The whole prescription is legible • Medication/fluid is due and has not been given
4	Two authorised staff, one of whom is central line competent, must check the preparation and patient prescription prior to the administration of the intravenous medication. (Independent checker to follow the checking procedure as detailed in Appendix One of the IV Policy). Refer to the Paediatric IV monographs via Medusa or Badgernet (neonatal units only) to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Loading doses must be prepared in separate syringes/bags to maintenance doses (as per section 6.3). Further advice can be sought from Medicine Information Service, Pharmacist, BNFC, Badgernet, Medicines Management web pages on UHL Connect , or area specific guidelines **Both staff must independently undertake any medication calculations**
5	When in contact with blood/body fluid, non-intact skin, or mucous membranes. Cytotoxic/Cytostatic medications If you have a skin condition that requires protection. If you do have any concerns with skin integrity, please visit Occupational Health. There should also be yearly assessment in-line with your appraisal to assess skin integrity. Appropriate PPE must be worn when in contact with any patients with known or suspected infection or colonisation
6	Clean hands, as per UHL hand hygiene policy (Document No 23813) Check hands for any visibly broken skin and cover with a waterproof dressing. Clean all sides of a large plastic tray / trolley with Clinell wipes, starting on the inside and then the outside, the tray / trolley will be the aseptic field for the procedure. Either allow to air-dry (for a minimum of three minutes) Alternatively dry with paper towels and then disinfect using distilled wipes. Your tray / trolley now provides an aseptic field.

7	Gather all equipment required. Check packages are intact and equipment is in date. Place next to the tray on a clean surface or the bottom of the trolley. Luer lock syringes must be used for all administrations via a CVAD Gather medication/fluid (including any diluents required), check the name of the medication, and dose against the prescription chart, including expiry dates. **If administering a clear fluid only with no additives please go to point 16**
8	Clean your hands and then pick-up and open the syringes, attach the needles straight onto the syringe's and loosen sheaths always protecting the key parts. Arrange in an orderly manner in the tray so syringe tips remain sterile once the needles have been removed. Open other equipment ensuring they are placed in the tray, protecting key parts.
9	Open one of the Chlorhexidine 2% and Alcohol 70% wipes using this to wipe the top of the medication vial. Open the vials of flush and diluent and place them outside of the tray on a clean surface. A pre-filled saline syringe needs to remain in its packaging until it is required.
10	If required, draw up the required amount of diluent indicated by the IV monograph. Use a blunt fill filter needle for drawing up all solutions except for emulsions or if it is difficult to draw the solution up through the filter in which case a green/ blue safety needle should be used. If drawing up from a glass ampoule the filter needle must be changed before injecting the solution for reconstitution as the filter will trap and glass particles and re-infusion of glass particles must be avoided. ***Coring occurs when small fragments of rubber sheer off when the needle punctures the vial top. Any solutions drawn up through a rubber vial top should be closely observed for signs that the vial top may have 'cored'. Any indication that coring has occurred should be reported to Health and safety and the cored vial and syringe/ needle retained for later collection. A Datix incident form must be completed***
11	Where a diluent is required to reconstitute the medication, add it into the vial of medication and gently rotate the vial to mix, or follow instructions in the IV monograph/manufacturer instructions.
12	Draw up all the fluid from the medication vial to ensure the correct concentration is achieved. Carefully calculate the volume of medication to be given and replace any unwanted amount of medication back into the vial. **Neonatal and paediatric calculations can often be complex, take particular note of decimal points in all calculations**
13	If the medication requires further dilution check, draw up, and add the amount and type of diluent as instructed in the IV drug monograph.

<table>
<tr><td>14</td><td>If administration via syringe driver:
Ensure medication is prepared in an appropriate sized luer lock syringe
Gently invert the syringe 3-5 times to mix the contents</td><td>If administration via an infusion bag:
Check the infusion bag has no leaks, particles discolouration, or other potential contamination
Swab the latex access port of fluid bag with a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the port for at least 10-15 seconds and then using an alternative place on the wipe scrub the sides for at least 10-15 seconds wait for the port to dry for at least 30 seconds
If whole volume of the bag is not required, aspirate the amount of fluid not required from the infusion bag using an IV syringe and blunt fill needle
Add the prepared medication to the fluid bag via the access port using aseptic non-touch technique
Gently invert the bag 3-5 times to mix the contents</td></tr>
<tr><td>15</td><td colspan="2">Check the final solution has no particles, discoloration, precipitation, or other potential contamination.</td></tr>
<tr><td>16</td><td colspan="2">Complete additive label and attach to the syringe/fluid bag containing the medication where this can be clearly read.
The label must include:
Date and time of preparation
Name of patient
Name of medication and diluent used (including batch numbers)
Signature of both practitioners preparing, checking and administering the medication</td></tr>
<tr><td>17</td><td colspan="2">If required, check and draw up heparinised sodium chloride (or alternative line lock solution) as prescribed.
Check and draw up an appropriate type and volume of flush as indicated in the IV monograph.
Use a pre filled and labelled 0.9% saline flush if available
If using ampoules to prepare the flush, ensure the syringe is labelled.</td></tr>
<tr><td>18</td><td colspan="2">Using an aseptic non-touch technique, all needles should be removed without re-sheathing prior to leaving the preparation area and disposed of in the sharps bin. Key parts can be protected by carefully placing any syringes back into the syringe packaging, or using a blind ended hub.</td></tr>
<tr><td>19</td><td colspan="2">Assemble and open all other equipment, checking expiry dates and seals are intact.
Ensure the infusion device is clean</td></tr>
</table>

20	**If administration via syringe driver:** • Attach extension line to syringe containing medication, ensuring that the end not attached to the syringe remains protected • Prime extension line with the medication • Insert syringe correctly into syringe driver device as per manufacturer instructions • Zero volume administered • Use purge function on device to reduce start up delay/mechanical backlash	**If administration via an infusion bag:** • Hang bag onto drip stand • Open administration set and ensure all clamps are closed • Attach the administration set to the infusion bag via the entry port, pushing firmly to ensure a tight connection • Ensure the chamber of the administration set is no more than 1/3 full • Open the roller clamp slowly allowing fluid to flow to prime the line • Thread the giving set through the pump as per manufacturer instructions • Ensure the pump is retaining the fluid by opening all clamps and observing for any signs of leakage • Zero volume administered
21	Ensure all administration lines are labelled as per section 5.10.3.	
22	Ensure the drip stand is stable and not overloaded with too many devices. Drip stands that hold multiple devices are available if required.	
23	Clean hands upon entering patient zone Both practitioners must take the prepared medication/fluid to the child's bedside, re-explain the procedure to the child and family if necessary and gain consent. Reassure the child and family throughout procedure. If required ensure appropriate methods of clinical holding are utilised in a supportive manner with the agreement of the child and parent/carer	
24	Both practitioners must check the child's identity both verbally and from their identity band against the prescription chart. Check if the child has a red ID band which will indicate they have an allergy.	
25	If another intravenous infusion is in progress, check for medication incompatibilities and consider stopping the infusion temporarily if safe to do so. Consider using a bonded triple lumen, double anti-reflux device (octopus) to administer several infusions at the same time. 3 way taps must never be used on peripheral lines in general wards. If the infusion needs to be temporarily disconnected, protect the open line with a sterile blind end hub.	

26	Remove the protective dressing from the child's central line and check site prior to and throughout administration for signs of redness, swelling, leakage, and/or pain. Document observations on the CVAD care pathway.
27	Clean your hands. Hold the end of the line firmly and using a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the hub for at least 10-15 seconds, then using an alternative place on the wipe scrub the sides for at least 10-15 seconds, wait for the hub to dry for at least 30 seconds. To prevent contamination of the hub you must continue to hold the end of the line firmly. You must remove the wipe and place back onto the aseptic field ensuring you do not contaminate the key parts of the other equipment.
28	Connect the syringe containing the flush to the end of the needle free hub, undo the clamp, and pull back gently to obtain flashback (longlines will not bleed back) Administer a small amount of the flush into the line checking for signs of leakage, pain or swelling around the cannula site. Observe for signs of line damage, or rupture
29	Connect the administration line to the needle free hub or triple lumen, or double anti- reflux device (squid) if required.
30	Set the infusion device to the correct rate and the correct volume to be infused (where required) and press start. Both practitioners must independently check the pump settings Check that clamps have been opened. Run the device from the mains electricity whenever possible At this stage the independent checker must sign the chart ensuring that they clean their hands before leaving the bed space.
31	Any further alteration / titration of the infusion rate must also be checked by two registered practitioners, one of whom must be IV competent. This change in rate must then be documented and signed by both staff on the pump check chart. In critical care / theatre / high dependency areas where this may happen frequently (e.g. many titrations over a few minutes) and any double checking would delay life sustaining / emergency treatment local documentation procedures should be followed The rate and total volume infused should then be checked at least hourly and documented. Check for any signs of leakage around the cannula site or connections.
32	Replace any protective dressing where appropriate
33	Before leaving the child's bedside you must check the pressure counter on the infusion device and note the established pumping pressure and record this on the child's fluid balance chart. Adjust pressure limits on device as required.

34	Ensure the child is comfortable, has the call bell within reach. Ensure the child and carer is aware of what the machine should be doing and when to call for assistance Clean hands before leaving the bedside.
35	Record the administration of the CVAD medication and flush on the patients prescription chart ensuring both nurses have signed the chart
36	If the child requires monitoring of fluids, document volume administered and any discontinuation on fluid balance chart. If any fluid that has been stopped for more than 30 minutes, this must be recorded on the fluid balance chart.
37	On completion of medication/fluid administration, flush the line with 0.9% Saline or compatible flush. To ensure a full dose has been administered to the patient the flush should be administered via the administration line at the same rate the medication was infused. If required, following administration of the flush instil heparinised sodium chloride (or alternative line lock) as prescribed to lock the line. Clean the needle free hub using a Chlorhexidine 2% and Alcohol 70% wipe.
38	Ensure correct disposal of sharps into sharps into a sharps container and other equipment into an orange bag. Decontaminate the tray with Clinell wipes before putting it away.

Infants & Children

Procedure for the Preparation and Administration of an Intravenous Infusion via a peripheral line in Babies, Children and Young People (*under 18yrs)*

University Hospitals of Leicester NHS
NHS Trust

Appendix 6 Procedure for the preparation and administration of an Intravenous infusion via peripheral line under 18 yrs.

1. Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust procedure for the preparation and administration of bolus intravenous medication via a Peripheral Line with the aim to provide safe and effective care and prevent micro- organism contamination of the line.

1.2 This procedure uses the principles of aseptic non-touch technique protecting key parts

1.3 All IV medication preparation should occur in the clean treatment room or within an area dedicated to the preparation of medications

1.4 All substances for injection that are reconstituted with the ward/department/unit must be drawn up immediately prior to administration by the practitioner who will administer the medication

1.5 As far as reasonable practicable, IV infusion bags should be stored in their original box. If decanting is unavoidable then different bag types must be stored separately and not placed in the same container

1.6 There have been numerous errors where an incorrect fluid have been selected and administered therefore particular attention should be paid to the correct selection for the infusion

1.7 Where a volumetric pump/syringe drive is in use, it must not be disconnected/removed when a patient is transferred between locations

2. Scope

This procedure applies to all registered professionals who administer peripheral intravenous medication to babies, children or young people under 18yrs in UHL.

Staff authorised to ADMINISTER medicines to children MUST have had the appropriate training and been assessed as competent. (For more details refer to the Leicester Medicines Code)

This procedure should be used in conjunction with the UHL consent policy to ensure the child receives safe care and children and families are able to understand the reasons for care to facilitate co-operation.

3. Recommendations, Standards and Procedural Statements

This procedure should be used in conjunction with the Leicester Medicines Code Section 13, accessible via UHL Connect Leicestershire Medicines Code (xuhl-tr.nhs.uk)

3.1 It is essential that all staff involved in the administration of medicines to children familiarise themselves with the potential hazards and challenges of this patient group.

3.2 Paediatric formularies (BNFC, Paediatric medusa injectable medicines guide, Badgernet) must be used when checking the dose and preparation methods.

3.3 The weight (and surface area where required) must be recorded in kilograms and written on the medication chart. The weight must be updated at least weekly, but this may be more frequent in very young children whose weight may fluctuate.

3.4 A final weight based dose prescribed may have been adjusted to within +/- 5% of the exact dose to ease administration. Adjustments of greater than +/- 5% must be discussed with a pharmacist and medical staff.

3.5 Paediatric formulations must be used where available. Where they are not available, particular vigilance should be exercised when calculating or preparing the dose.

3.6 Only the correct volume of medication should be taken to the patient - this may include a known quantity or solution for priming the line in very small doses (eg NNU). Excess medication must be withdrawn from the bottle or bag, or the correct dose drawn into a new syringe.

3.7 The volume to be infused limit should not be routinely used to control the amount of medication to be administered.

4. Equipment

a) A selection of sterile intravenous syringes appropriate for the volumes to be administered. Luer lock syringes must only be used with a syringe driver

b) Blunt Fill Filter Needles for drawing up flush/diluent

c) Chlorhexidine 2% and Alcohol 70% wipes (Large PDI Wipes)

d) Medication and required diluents

e) Clean gloves and aprons if appropriate

f) Prescription Chart

g) Sodium Chloride 0.9% flush (or other compatible flush)

h) Syringe, additive, and administration set labels

i) Bonded Triple Lumen with Double Lumen anti-reflux valve connector (Squid) if giving more than one Medication

j) Large Plastic Tray or Trolley

k) Tubifast to cover peripheral cannula

l) IV Monographs (Paediatric Medusa or Badgernet for neonates)

m) Appropriate infusion device (syringe drive or volumetric pump) and relevant administration set/equipment

n) Sharps bin

5. Key parts

Syringe tip, needle, needle free hub, top of vial, both ends of administration sets, hub of IV fluid bag

Procedure for The Administration of an Intranevous infusion via a Peripheral Line in Babies, Children, and Young People	
No	Action
1	Approach the child or young person and family in a friendly and open manner. Depending on the age and development of the child or young person, explain the procedure to them and their parents or carers and obtain their verbal consent. (*You may need to involve a play specialist in the explanation to gain a suitable level of understanding).* Ensure the child has a patent cannula in situ.
2	Reassure child and parent throughout procedure.
3	Check that there is a valid prescription and ascertain the following: • Child's name, date of birth, and S-number is recorded • Child has a recent weight (or body surface area if required) (within 7 days) documented • Correct medication/fluid (including any diluents) are prescribed and are suitable to be given as an IV infusion • Ensure dose and frequency prescribed are correct for age/weight of the child (checked against BNFC) pay particular attention to decimal points and dosage units • Units are written in full where required e.g. micrograms not mcg • Allergies and contraindications are documented • Signed and dated by the authorised prescriber • Date and time of administration • Route and method of administration • The whole prescription is legible • Medication/fluid is due and has not been given
4	Two authorised staff, one of whom is IV competent, must check the preparation and patient prescription prior to the administration of the intravenous medication. (Independent checker to follow the checking procedure as detailed in Appendix One of the IV Policy). Refer to the Paediatric IV monographs via Medusa (or Badgernet for the neonatal units) to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Loading doses must be prepared in separate syringes/bags to maintenance doses (as per section 6.3). Further advice can be sought from Medicine Information Department, Pharmacist, BNFC, Badgernet (neonatal unit), Medicines Management web pages on INsite. **Both staff must independently undertake any medication calculations**

5	When in contact with blood/body fluid, non-intact skin, or mucous membranes. Cytotoxic/Cytostatic medications If you have a skin condition that requires protection. If you do have any concerns with skin integrity, please visit Occupational Health. There should also be yearly assessment in-line with your appraisal to assess skin integrity. Appropriate PPE must be worn when in contact with any patients with known or suspected infection or colonisation
6	Clean hands, as per UHL hand hygiene policy (INsite Document No 23813) Check hands for any visibly broken skin and cover with a waterproof dressing. Clean all sides of a large plastic tray / trolley with Clinell wipes, starting on the inside and then the outside, the tray / trolley will be the aseptic field for the procedure. Either allow to air-dry (for a minimum of three minutes) Alternatively dry with paper towels and then disinfect using distilled wipes. Your tray / trolley now provides an aseptic field.
7	Gather all equipment required. Check packages are intact and equipment is in date. Place next to the tray on a clean surface or the bottom of the trolley. If administration is via a syringe driver, luer lock syringes must be used. Gather medication/fluid (including any diluents required), check the name of the medication, and dose against the prescription chart, including expiry dates. **If administering a clear fluid only with no additives please go to point 16**
8	Clean your hands and then pick-up and open the syringes, attach the needles straight onto the syringe's tips and loosen sheaths always protecting the key parts. Arrange in an orderly manner in the tray so syringe tips remain sterile once the needles have been removed. Open other equipment ensuring they are placed in the tray, protecting key parts.
9	Open one of the Chlorhexidine 2% and Alcohol 70% wipes using this to wipe the top of the medication vial. Open the vials of flush and diluent and place them outside of the tray on a clean surface. A pre-filled saline syringe needs to remain in its packaging until it is required.
10	If required, draw up the required amount of diluent indicated by the IV monograph. Use a blunt fill filter needle for drawing up all solutions except for emulsions or if it is difficult to draw the solution up through the filter in which case a green/ blue safety needle should be used. If drawing up from a glass ampoule the filter needle must be changed before injection the solution for reconstitution as the filter will trap and glass particles and re-infusion of glass particles must be avoided. ***Coring occurs when small fragments of rubber sheer off when the needle punctures the vial top. Any solutions drawn up through a rubber vial top should be closely observed for signs that the vial top may have 'cored'. Any indication that coring has occurred should be reported to Health and safety and the cored vial and syringe/ needle retained for later collection. A Datix incident form must be completed***
11	Where a diluent is required to reconstitute the medication, add it into the vial of medication and gently rotate the vial to mix, or follow instructions in the IV monograph/manufacturer instructions.

12	Draw up all the fluid from the medication vial to ensure the correct concentration is achieved. Carefully calculate the volume of medication to be given and replace any unwanted amount of medication back into the vial. **Neonatal and paediatric calculations can often be complex, take particular note of decimal points in all calculations**	
13	If the medication requires further dilution check, draw up, and add the amount and type of diluent as instructed in the IV drug monograph.	
14	**If administration via syringe driver:** • Ensure medication is prepared in an appropriate sized luer lock syringe • Gently invert the syringe 3-5 times to mix the contents	**If administration via an infusion bag:** • Check the infusion bag has no leaks, particles discolouration, or other potential contamination • Swab the latex access port of fluid bag with a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the port for at least 10-15 seconds and then using an alternative place on the wipe scrub the sides for at least 10-15 seconds wait for the port to dry for at least 30 seconds If whole volume of the bag is not required, aspirate the amount of fluid required from the infusion bag using an IV syringe and blunt fill needle • Add the prepared medication to the fluid bag via the access port using aseptic non-touch technique • Gently invert the bag 3-5 times to mix the contents
15	Check the final solution has no particles, discoloration, precipitation, or other potential contamination.	
16	Complete additive label and attach to the syringe/fluid bag containing the medication where this can be clearly read. The label must include: • Date and time of preparation • Name of patient • Name of medication and diluent used (including batch numbers) • Signature of both practitioners preparing, checking and administering the medication	
17	Check and draw up an appropriate type and volume of flush as indicated in the IV monograph. Use a pre filled and labelled 0.9% saline flush if available If using ampoules to prepare the flush, ensure the syringe is labelled.	

18	If required, using a non-touch aseptic technique, all needles should be removed without re-sheathing prior to leaving the preparation area and disposed of in the sharps bin. Key parts can be protected by carefully placing any syringes back into the syringe packaging, or using a blind ended hub.	
19	Assemble and open all other equipment, checking expiry dates and seals are intact. Ensure the infusion device is clean	
20	**If administration via syringe driver:** • Attach extension line to syringe containing medication, ensuring that the end not attached to the syringe remains protected • Prime extension line with the medication • Insert syringe correctly into syringe driver device as per manufacturer instructions • Zero volume administered • Use purge function on device to reduce start up delay/mechanical backlash	**If administration via an infusion bag:** • Hang bag onto drip stand • Open administration set and ensure all clamps are closed • Attach the administration set to the infusion bag via the entry port, pushing firmly to ensure a tight connection • Ensure the chamber of the administration set is no more than 1/3 full • Open the roller clamp slowly allowing fluid to flow to prime the line • Thread the giving set through the pump as per manufacturer instructions • Ensure the pump is retaining the fluid by opening all clamps and observing for any signs of leakage • Zero volume administered
21	Ensure all administration lines are labelled as per section 5.10.3.	
22	Ensure the drip stand is stable and not overloaded with too many devices. Drip stands that hold multiple devices are available if required.	
23	Clean hands upon entering patient zone Both practitioners must take the prepared medication/fluid to the child's bedside, re-explain the procedure to the child and family if necessary and gain consent. Reassure the child and family throughout procedure. If required ensure appropriate methods of clinical holding are utilised in a supportive manner with the agreement of the child and parent/carer	
24	Both practitioners must check the child's identity both verbally and from their identity band against the prescription chart. Check if the child has a red ID band which will indicate they have an allergy.	

25	If another intravenous infusion is in progress, check for medication incompatibilities and consider stopping the infusion temporarily if safe to do so. Consider using a bonded triple lumen, double anti-reflux device (squid) to administer several infusions at the same time. 3 way taps must never be used on peripheral lines in general wards. If the infusion needs to be temporarily disconnected, protect the open line with a sterile blind end hub.
26	Remove the tubifast (or bandage) from the child's cannula site and check the cannula site prior to and throughout administration for signs of redness, swelling, leakage, and/or pain. Document observations on the cannula care pathway.
27	Clean your hands. Hold the end of the line firmly and using a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the hub for at least 10-15 seconds, then using an alternative place on the wipe scrub the sides for at least 10-15 seconds, wait for the hub to dry for at least 30 seconds. To prevent contamination of the hub you must continue to hold the end of the line firmly. You must remove the wipe and place back onto the aseptic field ensuring you do not contaminate the key parts of the other equipment.
28	Connect the syringe containing the flush to the end of the needle free hub, undo the clamp and administer a small amount of the flush into the line checking for signs of leakage, pain or swelling around the cannula site.
29	Connect the administration line to the needle free hub or triple lumen, or double anti- reflux device (squid) if required.
30	Set the infusion device to the correct rate and the correct volume to be infused (where required) and press start. Both practitioners must independently check the pump settings Check that clamps have been opened. Run the device from the mains electricity whenever possible At this stage the independent checker must sign the chart ensuring that they clean their hands before leaving the bed space.
31	Any further alteration / titration of the infusion rate must also be checked by two registered practitioners, one of whom must be IV competent. This change in rate must then be documented and signed by both staff on the pump check chart. In critical care / theatre / high dependency areas where this may happen frequently (e.g. many titrations over a few minutes) and any double checking would delay life sustaining / emergency treatment local documentation procedures should be followed The rate and total volume infused should then be checked at least hourly and documented. Check for any signs of leakage around the cannula site or connections.
32	Replace any protective dressing (eg tubifast)
33	Before leaving the child's bedside you must check the pressure counter on the infusion device and note the established pumping pressure and record this on the child's fluid balance chart. Adjust pressure limits on device as required.

34	Ensure the child is comfortable, has the call bell within reach. Ensure the child and carer is aware of what the machine should be doing and when to call for assistance Clean hands before leaving the bedside.
35	Record the administration of the IV medication and flush on the patients prescription chart ensuring both nurses have signed the chart
36	If the child requires monitoring of fluids, document volume administered and any discontinuation on fluid balance chart. If any fluid that has been stopped for more than 30 minutes, this must be recorded on the fluid balance chart.
37	On completion of medication/fluid administration, flush the line with 0.9% Saline or compatible flush. To ensure a full dose has been administered to the patient the flush should be administered via the administration line at the same rate the medication was infused. Clean the needle free hub using a Chlorhexidine 2% and Alcohol 70% wipe.
38	Ensure correct disposal of sharps into sharps into a sharps container and other equipment into an orange bag. Decontaminate the tray with Clinell wipes before putting it away.

Infants & Children

Procedure for the Preparation and Administration of Bolus Intravenous Medications via a peripheral line in Babies, Children and Young People (*under 18yrs)*

University Hospitals of Leicester NHS
NHS Trust

Appendix 7

Preparation and Administration of Bolus Intravenous Infusion via a peripheral line under 18 yrs

1 Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust procedure for the preparation and administration of bolus intravenous medication via a Peripheral Line with the aim to provide safe and effective care and prevent micro- organism contamination of the line.

1.2 This procedure uses the principles of aseptic non-touch technique protecting key parts

1.3 All IV medication preparation should occur in the clean treatment room or within an area dedicated to the preparation of medications

1.4 All substances for injection that are reconstituted within the ward/department/unit must be drawn up immediately prior to administration by the practitioner who will administer the medication

2 Scope

This procedure applies to all registered professionals who administer peripheral intravenous medication to babies, children or young people under 18yrs in UHL.

Staff authorised to ADMINISTER medicines to children MUST have had the appropriate training and been assessed as competent. (For more details refer to the Leicester Medicines Code)

This procedure should be used in conjunction with the UHL consent policy to ensure the child receives safe care and children and families are able to understand the reasons for care to facilitate co-operation.

3 Recommendations, Standards and Procedural Statements

This procedure should be used in conjunction with the Leicestershire Medicines Code Section 13, accessible via UHL Connect

3.1 It is essential that all staff involved in the administration of medicines to children familiarise themselves with the potential hazards and challenges of this patient group.

3.2 Paediatric formularies (BNFC, Paediatric medusa injectable medicines guide, Badgernet) must be used when checking the dose and preparation methods.

3.3 The weight (and surface area where required) must be recorded in kilograms and written on the medication chart. The weight must be updated at least weekly, but this may be more frequent in very young children whose weight may fluctuate.

3.4 A final weight based dose prescribed may have been adjusted to within +/- 5% of the exact dose to ease administration. Adjustments of greater than +/- 5% must be discussed with a pharmacist and medical staff.

3.5 Paediatric formulations must be used where available. Where they are not available, particular vigilance should be exercised when calculating or preparing the dose.

3.6 Only the correct volume of medication should be taken to the patient - this may include a known quantity or solution for priming the line in very small doses (eg NNU). Excess

medication must be withdrawn from the bottle or bag, or the correct dose drawn into a new syringe.

3.7 The volume to be infused limit should not be routinely used to control the amount of medication to be administered.

4 Equipment

a) A selection of sterile intravenous syringes appropriate for the volumes to be administered

b) Blunt Fill Filter Needles for drawing up flush/diluent (or blue/green safety needle if required)

c) Chlorhexidine 2% and Alcohol 70% wipes (Large PDI Wipes)

d) Medication and any required diluents

e) Clean gloves and aprons if appropriate

f) Prescription Chart

g) Sodium Chloride 0.9% (or other compatible flush)

h) Syringe and additive labels

i) Bonded Triple Lumen with Double Lumen anti-reflux valve connector (Squid) if giving more than oneMedication

j) Large Plastic Tray or Trolley

k) Tubifast to cover peripheral cannula

l) IV Monographs (Paediatric Medusa or Badgernet for neonates)

m) Sharps bin

5 Key parts

Syringe tip, needle, needle free hub, top of vial, blind end hub

Procedure for The Administration of a bolus medication via a Peripheral Line in Babies, Children, and Young People	
No	Action
1	Approach the infant, child or young person and family in a friendly and open manner Depending on the age and development of the child or young person, explain the procedure to them and their parents or carers and obtain their verbal consent. (*You may need to involve a play specialist in the explanation to gain a suitable level of understanding)* Ensure the child has a cannula in situ.
2	Reassure the infant/child and parent throughout the procedure.

3	Check that there is a valid prescription and ascertain the following: • Child's name, date of birth, and S-number is recorded • Child has a recent weight (or body surface area if required) (within 7 days) documented • Correct medication and diluents are prescribed and are suitable to be given as an IV bolus • Ensure dose and frequency prescribed are correct for age/weight of the child (checked against BNFC) pay particular attention to decimal points and dosage units • Units are written in full where required e.g. micrograms not mcg • Allergies and contraindications are documented • Signed and dated by the authorised prescriber • Date and time of administration recorded • Route and method of administration recorded • The whole prescription is legible • Medication is due and has not been given
4	Two authorised staff, one of whom is IV competent, must check the preparation and patient prescription prior to the administration of the intravenous medication. (Independent checker to follow the checking procedure as detailed in Appendix One of the IV Policy). Refer to the Paediatric IV monographs via Medusa or Badgernet (neonatal units onlt) to correctly identify the diluents and reconstitution methods for the medication and compatible flush. Further advice can be sought from Medicine Information Service, Pharmacist, BNFC, Badgernet, Medicines Management web pages on UHL Connect , or area specific specialist guidelines **Both staff must independently undertake any medication calculations**
5	When in contact with blood/body fluid, non-intact skin, or mucous membranes. Cytotoxic/Cytostatic medications If you have a skin condition that requires protection. If you do have any concerns with skin integrity, please visit Occupational Health. There should also be yearly assessment in-line with your appraisal to assess skin integrity. Appropriate PPE must be worn when in contact with any patients with known or suspected infection or colonisation
6	Clean hands, as per UHL hand hygiene policy. Check hands for any visibly broken skin and cover with a waterproof dressing. Clean all sides of a large plastic tray / trolley with Clinell wipes, starting on the inside and then the outside, the tray / trolley will be the aseptic field for the procedure. Either allow to air-dry (for a minimum of three minutes) Alternatively dry with paper towels and then disinfect using distilled wipes. Your tray / trolley now provides an aseptic field.
7	Gather all equipment required. Check packages are intact and equipment is in date. Place next to the tray on a clean surface or the bottom of the trolley. Gather medication and any diluents required, check the name of the medication, and dose against the prescription chart, including expiry dates.
8	Clean your hands and then pick-up and open the syringes, attach the needles straight onto the syringe's and loosen sheaths always protecting the key parts. Arrange in an orderly manner in the tray so syringe tips remain sterile once the needles have been removed. Open other equipment ensuring they are placed in the tray protecting key parts.
9	Open one of the Chlorhexidine 2% and Alcohol 70% wipes using this to wipe the top of the medication vial. Open the vials of flush and diluent and place them outside of the tray on a clean surface. A pre-filled saline syringe needs to remain in its packaging until it is required

10	If required, draw up the required amount of diluent indicated by the IV monograph. Use a blunt fill filter needle for drawing up all solutions except for emulsions or it is difficult to draw the solution up through the filter in which case a green/ blue safety needle should be used. If drawing up from a glass ampoule, the filter needle must be changed before injecting the solution for reconstitution as the filter will trap and glass particles and re-infusion of glass particles must be avoided. ***Coring occurs when small fragments of rubber sheer off when the needle punctures the vial top. Any solutions drawn up through a rubber vial top should be closely observed for signs that the vial top may have 'cored'. Any indication that coring has occurred should be reported to Health and safety and the cored vial and syringe/ needle retained for later collection. A Datix incident form must be completed***
11	Where a diluent is required to reconstitute the medication, add it into the vial of medication and gently rotate the vial to mix, or follow instructions in the IV monograph/manufacturer instructions
12	Draw up all the fluid from the medication vial to ensure the correct concentration is achieved. Carefully calculate the volume of medication to be given and replace any unwanted amount of medication back into the vial. **Neonatal and paediatric calculations can often be complex, take particular note of decimal points in all calculations.**
13	If the medication requires further dilution, check, draw up, and add the amount and type of diluent as instructed in the IV drug monograph.
14	Check the final solution has no particles, discoloration, precipitation, or other potential contamination. Retain all vials until after the administration is complete in case of reaction and batch numbers are required
15	Check and draw up an appropriate type and volume of flush as indicated in the IV monograph. Use a pre filled and labelled 0.9% saline flush if available.
16	Label all syringes with their contents, including the flush (unless using a prefilled saline flush).
17	Using an aseptic non-touch technique, all needles should be removed without re-sheathing prior to leaving the preparation area and disposed of in the sharps bin. Key parts can be protected by carefully placing the syringes back into the syringe packaging, or using a blind ended hub.
18	Clean hands upon entering patient zone. Both practitioners must take the prepared tray containing medication to the child's bedside, re-explain the procedure to the child and family if necessary and gain consent. Reassure the child and family throughout procedure. If required ensure appropriate methods of clinical holding are utilised in a supportive manner with the agreement of the child and parent/carer
19	Both practitioners must check the child's identity both verbally and from their identity band against the prescription chart. Check if the child has a red ID band which will indicate they have an allergy. At this stage the independent checker must sign the chart ensuring that they clean their hands before leaving the bed space, they do not have to wait until the medication has been fully administered.

20	If another intravenous infusion is in progress, check for medication incompatibilities and consider stopping the infusion temporarily if safe to do so. Consider using a bonded triple lumen, double anti- reflux device (octopus) to administer several infusions at the same time. 3 way taps must never be used on peripheral lines in general wards. If the infusion needs to be temporarily disconnected, protect the open line with a sterile blind end hub.
21	Remove the tubifast (or bandage) from the child's cannula site and check site prior to and throughout administration for signs of redness, swelling, leakage, and/or pain. Document observations on the cannula care pathway.
22	Clean your hands. Hold the end of the line firmly and using a Chlorhexidine 2% and Alcohol 70% wipe firstly scrub the top of the hub for at least 10-15 seconds, and then using an alternative place on the wipe scrub the sides for at least 10-15 seconds, wait for the hub to dry for at least 30 seconds. To prevent contamination of the hub you must continue to hold the end of the line firmly. You must remove the wipe and place back onto the aseptic field ensuring you do not contaminate the key parts of the other equipment.
23	Connect the syringe containing the flush to the end of the needle free hub, undo the clamp, and administer a small amount of the flush into the line checking for signs of leakage, pain or swelling around the cannula site.
24	Attach the syringe containing the medication and administer at the rate instructed in the IV monograph, continuing to check for signs of leakage, swelling and/ or pain around the cannula site. Observe the patient throughout administration for any positive/adverse effects.
25	If administering more than one medication, the cannula must be flushed between each medication with a compatible flush.
26	On completion of medication administration, flush the line with 0.9% saline or a compatible flush. This should be given using a push-pause turbulent flow technique and a positive pressure lock with at least 0.5ml (ensuring the line is firmly clamped at the appropriate part of the line). At the end of the procedure, clean the needle free hub using a Chlorhexidine 2% and Alcohol 70% wipe. Replace the tubifast (or bandage) as required around the cannula site.
27	Record the administration of the IV medication and flush on the patients prescription chart ensuring both nurses have signed the chart.
28	Recommence any infusions that may have been stopped temporarily during administration. If fluids have been stopped for more than 30 minutes this must be recorded on the fluid balance chart.
29	Ensure the child is comfortable, has the call bell within reach. Clean hands before leaving the bedside.

30	Ensure correct disposal of sharps into sharps into a sharps container and other equipment into an orange bag. Decontaminate the tray with Clinell wipes before putting it away.

Sample Infusion Pump Check Chart

University Hospitals of Leicester NHS
NHS Trust

Appendix 8

Ward Infusion Pump Check Chart

Patient Name:	**Date:**	
NHS / Hospital Number: **Date of Birth:**	**Ward / Unit:**	**Site:**

Pump Type:	**Frequency of checking:**	
Medication:	**Start Rate:**	**Volume to be Infused:**

Exact Time	Rate	Volume Infused	Volume Remaining	Comments/ Actions taken e.g. prescription / rate change, discontinued	Signature(s) 2 required for rate change	

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All Cytotoxic Chemotherapy (including some monoclonal antibodies)

Amphotericin Intracameral & Intravitreal Injections

Bleomycin Intralesional Injection

Caspofungin Eye Drops

Cidofovir Intravenous & Intra-lesional Injections

Clonidine& Levobupivaciane Epidural Infusion

Cyclophosphamide

Fluorouracil Subconjunctival Injection

Foscarnet Infusion for peripheral line administration only (for central lines administeredneat from ready to use infusion bottles). **N.B. This has a high workload impact on the unit and needs discussion before ordering**

Ganciclovir IV infusion

Ganciclovir Intravitreal Injection

Methotrexate Intramuscular Injection for ectopic pregnancies

Mitomycin Subconjunctival Injection

MitomycinTopical Solution for Ophthalmology

Pentamidine Isetionate Infusion

Ribavirin Injection (unlicensed medicine not routinely stocked at UHL)

Eye drops now purchased as unlicensed medicines but if necessary could be made as a one-off

Amphotericin Eye Drops

Voriconazole Eye Drops

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All other giving sets to be changed at 72 hrs for continuous infusions, including medication except for:

- Blood products (refer to Blood Transfusion policy B16/2003)
- Total Parenteral Nutrition (change at 24hrs)
- Patient Controlled Analgesia
- Some commonly used ITU drugs as detailed below:
    - Propofol (change at 12 hrs)
    - Insulin (change at 24hrs)
    - GTN (change at 24hrs)- if no PVC lines in use, then GTN is ok for 72hrs
    - Epoprostenol (rarely used now)
    - Enoximone (rarely used at GH so should not be used at other sites either, Milrinone now first line)
    - Octreotide (change at 8hrs)
- Giving sets for intermittent infusions e.g. paracetamol which should be discarded after eachinfusion

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Administration of infusions without a pump (gravity infusions)

FOR USE WITH ADULTS ONLY

The following fluids can be administered without the need for a rate controlled device if one is unavailable

- Sodium chloride 0.45%
- Sodium chloride 0.9%
- Sodium chloride 0.18% and dextrose 4%
- Dextrose 5%
- Dextrose 10%
- Gelatine 4%
- Hartann's solution

Basic principles for gravity infusions
As there is no infusion pump you cannot rely on the alarm to indicate lack of flow orair in the line, as such observation is key. The main points to note are below.

The fluid should be administered via a plain giving set e.g. Spirit Medical Airguard infusion set or comparable

- Set the rate as indicated in the table below
- Check hourly that the infusion is running at that rate
- Count the drip rate over 30 seconds to ensure it is correct, but be aware that if the patient bends their arm, the flow may obstruct
- Keep a note of when the infusion should be complete, so as you check you can see if the bag contains about the right volume – you do this by eye.
- The need for documentation on the fluid balance chart is unchanged
- VIP scoring continues as per policy

Bag size	Duration of admin	ml per hour	Drops per minute
100ml	30 min	200	66
250 ml	1 hr	250	82
250ml	2 hr	125	42
500ml	4 hr	125	42
500ml	8hr	62.5	20
1000ml	4 hr	250	82
1000ml	6 hr	167	56
1000ml	8 hr	125	42
1000ml	12 hr	83	28

Fluid Volumes/ timings not covered above

If the fluid prescription is for a less common volume or time the following allows you to work out the drop rate. Please check your calculation with a colleague.

1. How many mls per hour?

2. $\frac{\text{mls per hour} \times 20}{60} = \textbf{drops per min}$

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Extravasation

Extravasation occurs when fluid that should be delivered intravenously is inadvertently delivered into tissue space. It can be caused by misplaced cannulae or if the cannula migrates and punctures the vessel wall or during infusion into a thrombosed vein.

Causes

Extravasations have been associated with:

- The occurrence of phlebitis
- The use of drugs that cause local vasoconstrictive effect
- The use of steel cannulae e.g. butterfly

Suggested causes

- A blocked vein
- A misplaced cannula
- A fibrin sheath that develops around a long line, such as a peripherally inserted central catheter (PICC). The sheath prevents flow from the tip of the cannula into the vascular system, and can channel it backwards between the sheath and the outside surface of the catheter. This can result in fluid leaking into the tissues where the cannula is inserted into the vein

Drugs:

Vesicants and irritant drugs are the most likely to cause extravasation issues:

- Vesicants : capable of causing pain, inflammation and blistering of the skin, underlying flesh structures, leading to death and necrosis
- Irritants : capable of causing inflammation and irritation, rarely proceeding to breakdown of the tissue

Cytotoxic drugs are the most likely to cause problems with extravasation

Examples of Non cytotoxic drugs (not definitive)

Vesicants	Aciclovir Aminophylline Amphotericin Calcium chloride or gluconate Diazepam Digoxin Glucose > 10%	Hypertonic sodium chloride >5% Parenteral Nutrition Phenytoin Potassium chloride >40mmol/l Sodium Bicarbonate Iron infusions
Irritants	Adrenaline Amiodarone Clarithromycin Dobutamine Dopamine	Erythromycin Noradrenaline Phentolamine Vancomycin

Infusion site

The most effective safeguard against extravasation is to visually inspect the infusion site regularly. Intravenous pumps do not always alert staff to an extravasation injury in progress. Limiting the pump cycle to one hour may minimise the extent of tissue damage from extravasation by triggering a reminder to inspect the insertion site and limb for signs of extravasation. Nursing vigilance along with prompt recognition and management is the key to avoiding or minimising injury.

Risk factors

- Increased skin and vein fragility (e.g. Neonates, multiple cannulations, flexible subcutaneoustissue, chemotherapy)
- Inability to report pain
- Inability to visualise insertion sites
- Limbs with central venous access devices or peripheral intravenous cannulas being coveredor unable to be visualised
- Prolonged intravenous therapy
- Volume, pH (outside of blood pH, arterially 7.35-7.45) osmolarity chemical composition of thefluid or drug being infused

Initial acute assessment

A site assessment should be conducted every hour when there are fluids or medications running through the line. If nothing is being infused, the site should be assessed before accessing the line at least every eight hours (twice daily)

Grade 1	Grade 2	Grade 3	Grade 4
Pain at infusion site Difficulty flushing cannula Minimal swelling Nil redness	Pain at infusion site Difficulty flushing cannula Mild swelling Minimal redness Normal capillary refill time Normal perfusion	Pain at infusion site Difficulty/inability to flush cannula Swelling Skin blanching +/- redness at the site Sluggish capillary refill time Normal/decreased perfusion	Pain at infusion site Marked swelling Skin blanching Cool blanched area Reduced capillary refill time Decreased perfusion +/- Arterial occlusion +/- Blister

Ongoing assessment

Continue to observe affected area post extravasation injury for 24 hours to ensure no signs of infection or further complications. If there are any signs of infection/complications, the site should continue to be observed until signs and symptoms resolve. Any signs of infection must be reported to the treating medical team to determine the need for antibiotic treatment.

Management

Acute management

- Stop infusion **immediately**
- Medical staff of the treating team should be informed **immediately** of any extravasation injury
- Most extravasation injuries are Grades 1 & 2 and do not require extensive intervention toprevent long-term skin and soft tissue damage
- Grade 3 & 4 injuries have a greater potential for skin necrosis, compartment syndrome and the potential need for plastic surgery involvement, depending on the type and volume of solution extravasated. Once the treating team is informed the decision can be made to referto the plastics team for further input and/or management.

Grade 1	Grade 2	Grade 3	Grade 4
Stop infusion Remove cannula and tapes Elevate limb	Stop infusion Remove cannula and tapes Elevate limb	Stop infusion Remove constricting tapes **Leave cannula insitu until reviewed by a doctor (treating team)** Photograph injury if this will not delay treatment Doctor to commence irrigation procedure within 1 hour of extravasation by irrigating affected area using hylauronidase and sodium chloride 0.9% or sodium chloride 0.9% irrigation alone **Give appropriate pain relief prior to beginning procedure** Apply non occlusive dressing as advised by treating medical team or plastics Elevate limb +/- Refer to plastics team	Stop infusion Remove constricting tape **Leave cannula insitu until reviewed by a doctor (treating team)** Photograph injury if this will not delay treatment Doctor to commence irrigation procedure within 1hour of extravasation by irrigating affected area using hylauronidase and sodium chloride 0.9% or sodium chloride 0.9% irrigation alone **Give appropriate pain relief prior to beginning procedure** Apply non occlusive dressing as advised by treating medical team or plastics Elevate limb Refer to plastics team

1. Introduction

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS Trust guideline for the safe preparation and administration of Subcutaneous (SC) fluids in adult patients, and is based primarily on the guidance in the Royal Marsden Manual of Clinical Procedures.

This guideline does not cover the administration of SC **medications** such as:

- Insulin (refer to Trust guideline B66/2011)
- Low molecular weight heparin (refer to trust guideline B24/2006)
- Opioids via syringe drivers

1.2 The subcutaneous compartment is a layer of loose supporting tissue under the skin. Subcutaneous fluid absorption is possible due to the large number of capillaries which ensure complete and rapid absorption from the site. Subcutaneous administration of fluid is well recognised and commonly used as an effective measure to correct mild to moderate dehydration (O'Keefe and Geoghegan 2000, Mei and Auerhahn 2009).

1.3 Advantages of this route include the following:

- Side-effects are few and not generally significant.
- Low cost.
- Less likely to cause fluid overload

1.4 Side-effects of *subcutaneous* fluid administration include pain, bruising, local oedema, erythema and local inflammation and can be reduced by changing the site of *infusion* (Mei and Auerhahn 2009).

1.5 This guideline **applies to all** health care staff working in the University Hospitals of Leicester NHS Trust who have the skill and competency to undertake this role (including bank, agency and locum and those operating under an honorary contract).

1.6 This guideline applies to adult patients only (over the age of 18), guidance relating to administration of fluids in children is contained in the IV Policy (trust ref B25/2010)

2. Guideline Standards and Procedural

2.1 General Principles

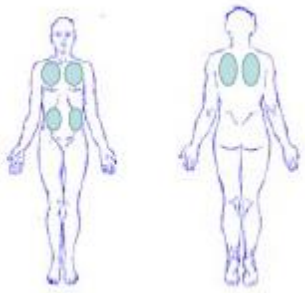
a) Intravenous access can be problematic in elderly or debilitated patients; avoidance of this, by utilising the subcutaneous route, can reduce anxiety and distress (Mei and Auerhahn 2009, Sasson and Schwartzman 2001). Slesak et al (2003) note that for patients who are confused, or where IV access is difficult SC infusion is a superior method to IV infusion.

b) A volume of 1000–2000 mL of crystalloid solution can be administered via the subcutaneous route over 24 hours; this can be given as a continuous infusion, over a number of hours (such as overnight) or as intermittent boluses.

c) More than one site can be used if greater volumes are required.

d) It is recommended that electrolyte-containing fluids such as sodium chloride 0.9% or dextrose saline be used although 5% glucose has also been used.

e) Suitable sites for infusion insertion are areas with adequate subcutaneous tissue. Potential sites shown below are:
• Abdomen
• Anterior and lateral aspects of chest wall
• Scapula



f) Rotation of sites can decrease the likelihood of irritation and ensure improved absorption. It is good practice to document the site of cannula administration on the patients administration chart to facilitate this.
Subcutaneous cannulas can be left insitu, as long as there is a clinical need and the VIP (**Visual Infusion Phlebitis score)** is zero. (EPIC guidelines 2014).

g) The minimum possible volume, no greater than 2mL, should be administered via subcutaneous injection to prevent irritation.

2.2 Procedure for the insertion of administration set

Procedure	
1	Collect essential equipment • Sharps box • Chlora-prep • Transparent adhesive dressing • Administration set • 22 or 24G non-ported cannula (such as Introcan safety 3) • Fluid for infusion
2	Explain procedure to patient and ensure consent as per UHL Policy for Consent to examination or treatment (B35/2024)
3.	Check Fluid prescription and check fluid with another registered nurse who independently checks
4.	Wash hands

5.	Check patient identity against prescription chart
6.	Place infusion bag on flat surface and insert spike from giving set, ensure fully inserted in the port.
7.	Hang infusion bag from stand and open roller clamp to prime giving set, close roller clamp when primed.
8.	Clean chosen site for infusion with Chlora-prep and wait for it to dry.
9.	Grasp skin firmly and insert infusion cannula into the skin at an angle of 45^{o} and release grasped skin.
10.	Remove stylet and place in sharps box.
11.	Apply transparent dressing to secure and write date applied on dressing
12.	Connect administration set
13.	Open roller clamp until flow rate is achieved – flow should be via gravity only, volumetric pump should not be used.
14.	Commence fluid balance chart and document within nursing notes the date and site used.
15.	The registered professional who administered the fluid and the registered professional who checked the fluid should sign the Emeds chart/paper chart.

Aftercare

Post Procedure	
1.	Observe site for signs of inflammation/patient discomfort To minimise peripheral catheter-related complications, the insertion site should be inspected at each shift change and the subcutaneous cannula removed if signs of inflammation, irritation or blockage are present (as per Epic guidelines 2014)
2.	Resite cannula if observed and document within the nursing notes.

3. Education and Training

3.1 In order to ensure safe practice and minimise risk, staff must be appropriately skilled and competent in the above technique and follow the steps set out in the procedure described in section 2.

3.2 No formal training is required for practitioners to undertake this procedure although they must reflect upon their own competence, skills and knowledge. Staff should read and understand this guideline and act in accordance with both Trust and professional guidelines. Registered professionals should refuse to undertake any action or procedure for which they do not feel adequately trained and competent.

3.3 If required, a Subcutaneous Infusion worksheet and associated LCAT assessment may be accessed via the practitioners Education and Practice Development Team.

3.4 UHL is a teaching hospital and provides placements for pre-registration training for students such as Medicine, Nursing, Midwifery, Paramedic, Radiography and Pharmacy. If SC administration is a specific competency requirement of their placement or programme then

these students are able to prepare and administer SC fluids **under direct supervision of their mentor / supervisor.**

3.5 If SC administration is not a specific competency requirement of their placement or programme then the pre-registration student is only allowed to participate in the process of preparation of medications under direct supervision of their mentor / supervisor and **must not** administer SC fluids.

4. Monitoring Compliance

Key Performance Indicator	Method of Assessment	Lead	Frequency	Reporting arrangements
Incidents from the administration of SC fluids	Datix incident reporting	Medication safety pharmacist	Annual	Medicines Optimisation Committee CMG Heads of Nursing
High Impact Intervention Audit	Audit Tool	Infection Prevention & Control Team	Quarterly	Medicines Optimisation Committee CMG heads of Nursing

5. Supporting Documents and Key References

EPIC Guidelines (2014) National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England. Journal of Hospital Infection 8651 s1-s70

Policy for Consent to examination or treatment 2016. B35/2024

Loveday et al (2014) epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England Journal of Hospital Infection 86S1 (2014) S1–S70

Khan M and Younger G (2008) Promoting safe administration of subcutaneous infusions. *Nursing Standard* 21, 31, 50-58

Mei, A. and Auerhahn, C. (2009) Hyperdermoclysis maintaining hydration in the frail older adult. *Annals of Long Term Care*, 17 (5), 28–30.

O'Keefe s, Geoghegan M (2000) Subcutaneous hydration in the elderly, *Irish Medical Journal* 93 (7) October

Royal Marsden Manual of Clinical Procedures chapter 16 (8th Edition).

Royal College of Nursing (2010) Standards for Infusion therapy Chapter 7 (3rd Edition)

Sasson, M. and Shvartzman, P. (2001) Hypodermoclysis: an alternative infusion technique. *American Family Physician*, 64 (9), 1575–1578.

Slesak G, Schnürle JW, Kinzel E, Jacob J, Dietz PK (2003) Comparison of subcutaneous and intravenous rehydration in geriatric patients: a randomised trial. *Journal of American Geriatric Society* 2003 51(2): 155-160

6. Key Words

Subcutaneous, Fluids

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