



Frimley Health
NHS Foundation Trust

Vascular Access and IV Therapy Clinical Guidelines Part 10: Administration of Injectable Medications

Key Points

- Clinical practice requirements for the administration of intravenous medication and fluids.
- Governance structure around assessment and competency for students and trained staff who are undertaking the IV drug administration training course.

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Abbreviations

A&E	Accident and Emergency Unit
AHP	Allied Health practitioner
ANTT	Aseptic non-touch technique
CCU	Coronary care unit
CVC	Central venous catheter
EPR	Electronic patient record
FHFT	Frimley Health NHS Foundation Trust
GMC	General Medical Council
HCPC	Health and care professional council
ID	Identification
INS	Infusion nurse society
ITU	Intensive care unit
IVAS	Intravenous and Vascular Access Services
MEDUSA	Injectables medicine guide
MHRA	Medicines and healthcare products regulatory agency
MRN	Medical Record Number
NEWS	National early warning score
NICE	National institute of clinical excellence
NMC	Nursing and Midwifery Council
NPSA	National Patient Safety Alert
ODP	Operating Department Practitioner
PCA	Patient Controlled analgesia
PICC	Peripherally inserted central catheter
RCN	Royal college of nursing
RPS	Royal Pharmaceutical Society
SCBU	Special care baby unit
VAD	Vascular Access device

1. SUMMARY

The administration of injectable medications via an intravenous route may only be undertaken by:

1. All healthcare professionals who have undergone intravenous therapy training and successfully completed their competency assessment.
2. Staff may only administer IV drugs that they are competent to give. Additional training for the administration of blood, chemotherapy and Parenteral Nutrition (PN) is required.
3. Where a second checker is required, they must be familiar with the drug group being administered and ensure that relevant resources are used. If a checker is required, they must also be registered with the relevant professional body.
4. If required, drugs for IV administration will be checked during reconstitution prior to administration by 2 staff members (at the same time). Both must be registered with the relevant professional body and competent to administer and/or check intravenous therapy.
5. The identity of the patient to receive the injectable drug will be checked verbally and by use of the ID band, by the person administering the medication.
6. All injectable administrations will be documented on the Electronic Patient record (EPR).

Introduction of a new injectable medicine into clinical area

Before a new injectable medicine is procured, the specialist pharmacist for that department must complete a formal risk assessment in conjunction with the ward matron, using the risk assessment tool for the preparation of injectable medicines, which is adapted from the SPS risk assessment tool with permission from Barts Health NHS Trust (see appendix for reference). If the new injectable medicine is an unlicensed medicine, please refer to the risk assessment form in the unlicensed medicines policy. The risk assessment form must be filed in the clinical pharmacy channel of TEAMS under 'Injectable medicines risk assessment forms'. Please note that Medusa also includes the risk rating for some drugs, so this should also be referred to when completing initial risk assessments for new injectable medicines.

This policy must be read in conjunction with:

- FHFT 2020 IVAS Guidelines 1 – 12
- RPS Profession guidance on the administration of medicines in healthcare settings 2019
- RPS Professional guidance on the safe and secure handling of medicines 2019
- NMC Code of Conduct 2018
- Health & Care Professional Council (HCPC) standards 2016

- RCN Medicines Management: an overview for nurses 2020

2. INTRODUCTION

1. This document is intended as a working policy for all healthcare professionals, and the principles are applicable to all staff involved in the administration of injectable drugs.
2. All healthcare professionals should adhere to the rules of their professional governing body in relation to the administration of medicines. Nursing staff should uphold the rules of the Nursing and Midwifery Council (NMC) code of conduct 2018 or the Health & Care Professional Council (HCPC) 2016 and the Royal Pharmaceutical Society (RPS) Professional Guidance on the Administration of Medicines in Healthcare Settings 2019.
3. All healthcare professionals who have undergone the appropriate training (and can provide evidence of this training) may give drugs by an intravenous route on the specific authorisation of a doctor or non-medical prescriber by means of a written prescription/instruction or under a Patient Group Directive.
4. A practising midwife shall only supply and administer those medicines, including analgesics, in respect of receiving the appropriate training to use, dosage and methods of administration (Standards of proficiency for midwives Nov 2019).
5. Where the intravenous drug is to be administered using an infusion device, such as a syringe driver or volumetric pump, the practitioner must have had documented training on the use of this device (MHRA 2021).
6. All qualified clinicians working in Frimley Health NHS Foundation Trust **must** follow the instructions contained in this document.
7. Staff must not modify or practice outside of these guidelines when administering IV therapy.
8. Preparing a sodium chloride 0.9% flush can be undertaken by docking the luer-slip syringe end into the flush ampoule or a blunt fill filter needle can be used. If a luer-lock syringe is being used, a blunt fill needle should be used to draw up the flush. For all other drawing up a blunt fill needle should be used.
9. Vial sharing for single use vials, outside of pharmacy aseptic units, is not permitted.

3. AUTHORISED PERSONNEL

Certification will only be granted if:

- The Doctor/Nurse/Midwife/ODP/AHP is entered as qualified on their professional register (e.g., GMC, NMC, HPC).
 - The Nurse/Midwife/ODP/AHP has attended an IV therapy course and completed the course work and associated assessments satisfactorily.
 - The Junior Doctor has been assessed as part of the F1 or F2 programme.
 - In the case of an ODP, the reconstituted drugs are checked with an Anaesthetist, Doctor or registered Nurse/Midwife before the ODP administers them.
 - A band 4 Nursing Associate, who is registered on the NMC register.
-
- Staff are willing to undertake the procedure.
 - The Practitioners have documented training in the use of medical devices, such as infusion pumps and syringe drivers (training updated according to local protocols).
 - The Nurse/Midwife/ODP/AHP have undertaken IV drug administration training in another Trust and have been using this skill may **not** need to repeat the training at Frimley Health NHS Foundation Trust. Where possible the Nurse/Midwife/ODP/AHP should produce evidence that they are competent to practice IV therapy administration. A professional discussion should be documented (Appendix D) between the Nurse/Midwife/ODP/AHP and the manager or practice development nurse. Where a dispute around competency arises, the IV lead for the Trust should be consulted for advice.
 - If there is any concern that there is a lack of competency or gap in knowledge the Nurse/Midwife/ODP/AHP should undertake the IV study day and be reassessed.
 - Student Nurses will be eligible to attend the Trust IV study day and practice IV therapy administration under direct supervision in line with this policy and the agreement of the University the student nurse is affiliated with.
 - The student nurse must undertake the competency assessment under the Trust framework however, even after the competency has been passed, they must be supervised when administering IV therapy until they become registered with their regulatory body.

4. STAFF EDUCATION

Staff undertaking the administration of intravenous drug therapy and care and management of vascular access devices will have undergone theoretical and practical training in the following aspects:

- Legal, professional and ethical issues
- Complications of IV therapy
- Parenteral administration and IV fluid administration
- Blood administration
- Mathematical calculations under exam conditions
- Pharmacology and pharmaceuticals related to reconstitution and administration.
- Infection Control issues
- Use of equipment including infusion equipment
- Risk Management/Health and Safety
- Care and management of Vascular Access Devices
- Health and Safety issues, sharps issues

The Nurse/Midwife/ODP/AHP has a professional obligation to maintain their competence, knowledge and skills, and will be supported by the Trust. Where significant changes are made to the policy, this will be supported by structured training provision.

5. ROUTES OF ADMINISTRATION

Nurse/Midwife/ODP/AHP, having completed the IV therapy course will be competent to use all vascular access devices listed for the administration of intravenous drugs.

- Peripheral devices e.g., cannula and midline catheters
- Subcutaneously via a soft set butterfly
- Central venous access devices e.g., PICCs, tunnelled lines, acute CVC

Device Selection

The devices selected should be dependent on:

- The length of therapy
- The type of medication
- Patient's condition and preference

Incorporation of a needle-less closed system device is mandatory with regular IV administration of drugs to maintain a closed needleless system. IV drugs may **only** be administered via the port of a cannula in an **emergency** situation, due to the associated risk of infection when using this route.

In order to reduce the risk of vein trauma, phlebitis infiltration and extravasation, IV medications should only be administered into the vein via a cannula or VAD. The use of hollow bore and steel butterfly needles to administer IV bolus or infusions into the vein should be not permitted as this could lead to complications such as phlebitis, haematoma and extravasation.

Vesicants with high and low Ph values, high osmolarity and other irritants should be administered via a central venous catheter in line with the organisation's extravasation guidelines. Information about the drug profile can be found on MEDUSA the injectable medicine guide on line via the AR on the EPR

Vascular Access Device selection tool.

Indwell time	Up to 4 days	Up to 10 days	Up to 29days	Up to 6 wks	>18 months	Permanent	Permanent	Difficult Vein Access
Vascular Access Device	Peripheral Intravenous Cannula	Short Term Acute CVC	PowerGlide Midline	Silicone Groshong Midline	SOLO Power PICC	Long-term Tunnelled CVC	Long-term Implanted CVC Port	Use Vein Location Technology
Suitable Treatment Options	Peripheral Ph 5-9 only Bolus IV IV Infusions Emergency High flow rates achievable Blood Products Chemotherapy	Central Vesicants Multi-lumen Blood draw Bolus IV IV Infusions Emergency High flow rates achievable Blood Products	Peripheral Ph 5-9 only Power injectable OPAT Bolus IV OPAT Blood draw Bolus IV IV Infusions High flow rates achievable Blood Products	Peripheral Ph 5-9 only OPAT Bolus IV IV Infusions Blood Products	Central Vesicants Multi-lumen Power injectable OPAT Blood draw Bolus IV IV Infusions Blood Products Chemotherapy	Central Vesicants Multi-lumen OPAT Blood draw Bolus IV IV Infusions Blood Products Chemotherapy	Central Vesicants Multi-lumen Power injectable OPAT Blood draw Bolus IV IV Infusions Blood Products Chemotherapy	Ultrasound Veins below 5mm Infrared Veins up to 7mm Vein Stimulation Enlarges and stabilise peripheral arm veins Consider local/topical anaesthetic

6. METHODS OF ADMINISTRATION

Drugs that may be prescribed to be given as:

- A bolus injection used when a rapid response of a high serum concentration is required.
- An intermittent infusion used to avoid toxicity when regular administration or greater dilution of a drug is required.
- A continuous infusion given continuously where a continuous or controlled therapeutic response is required. A drug additive label must be attached to any such infusion (either on the syringe, bag or giving set, as near to the pump as possible). (See section 13 for details).
- PCA pump controlled by patient (as above).
- Attention must be given to the drug residue left in the IV therapy administration set tubing. Where possible this residue drug should be administered into the patient by removing the completed IV fluid bag and replacing with a new sterile, 100mL bag of compatible diluent. 30mL should be administered at the same rate as the previous drug administration; this will ensure the drug residue has been administered, the remaining diluent can be discharged.
- Where a specific infusion giving set system is already in place to deliver specialised IV infusions, this should continue to be used such as in IVAS or oncology.

7. PREPARATION OF INJECTABLE MEDICATIONS

1. All clinicians must familiarise themselves with the most recent version of the Frimley Health Medicine Management Policy and the online injectable medicines guide (MEDUSA).
2. ONLY blunt fill filter needles should be used for IV therapy practice.
3. Under no circumstances can drugs be added to the following:
 - Plasma
 - Blood or blood products
 - Plasma expanders
 - Fluids already containing potassium.
 - Mannitol
 - Sodium bicarbonate
 - Phosphates
 - Pre-packed epidural and PCA infusions
 - Parenteral Nutrition
4. No additions may be made to amino acid solutions, fat emulsions and other solutions used for parenteral nutrition, e.g., Compleven, Kabiven.
5. Drugs must only be added to an infusion immediately prior to its commencement and never during the course of the infusion, adding drugs to infusion bags of fluids should be witnessed by the second checker. Pre-prepared solutions must be used where available. An additive label must be placed on the infusion bag.
6. Read the EPR prescription carefully and confirm that it relates to the patient being treated, checking the MRN number and allergies.
7. Clean the preparation area. Ensure it is uncluttered and free from interruption. Ideally, preparation should take place in an area dedicated to this process.
8. Assemble everything you need. All materials and equipment: sharps bin, medicines, ampoule(s), vial(s), diluents, syringes, blunt fill filter needles, chlorhexidine wipe (Clinell), disposable gloves and a clean reusable tray (blue).
 - Expiry dates, damage to containers, vials and packaging should be checked.
 - Ensure the medicines were stored as recommended (e.g. fridge).
 - Be aware of the risk of confusion between similar looking packs, names and strengths.
 - All labels should be read carefully.
 - The formulation, dose, diluent, infusion fluid and rate of administration correspond to the prescription and the product information and the Medusa online injectable medicines guide.
 - Ensure that the patient has no allergy to the preparation.

Calculate the volume of the medicine solution required to give the prescribed dose. Write down the calculation and obtain an independent check by another qualified healthcare professional.

1. Prepare the adhesive additive label, preferably using the EPR to scan the drugs and MRN and printing a label. Hand written labels can be used if electronic systems are not available.
2. Clean your hands according to local policy (Infection Control manual 2023). Put on a pair of disposable protective gloves to prepare the medication following a risk assessment which should determine the appropriateness of using gloves.
3. Use a detergent wipe to disinfect the surface of the reusable plastic tray.
4. Assemble syringe(s) and blunt fill filter needles. Peel away and open wrappers carefully and arrange ampoule(s)/vial(s), blunt fill filter needles and syringes neatly in the tray.
5. Use an aseptic non-touch technique (ANTT), i.e., avoid touching areas where bacterial contamination may be introduced to key parts. Never put down a syringe attached to an unsheathed needle.
6. Prepare the injection by following the manufacturer's product information or the online injectable medicines guide (MEDUSA).

8. WITHDRAWING SOLUTIONS FROM AN AMPOULE (GLASS OR PLASTIC) INTO A SYRINGE

NB: A blunt fill filter needle should be used to draw up IV therapy from a glass or plastic ampoule with or without a bung, and where a needle is referred to in this document this type of device is recommended.

1. Tap the ampoule gently to dislodge any medicine in the neck. Snap open the neck of the glass ampoule.
2. Attach a blunt fill filter needle to the syringe. Withdraw required volume of solution into the syringe. Tilt ampoule if necessary.
3. If the ampoule contains a suspension rather than solution, it should be gently swirled to mix the contents immediately before they are drawn up into the syringe.
4. Invert the syringe and tap lightly to aggregate the air bubbles at the needle end. Expel the air carefully. Place the filled syringe back into the syringe wrapper which will be sterile inside and place in clean tray.
5. If the filled syringe is going to be added to a bag of fluids, fit a new blunt fill filter needle to the syringe and leave the cap on, place the capped, filled syringe in a cleaned tray.
6. For a syringe infusion attach the prepared label to the or for bolus administration, if available, attach a drug label to the syringe.
7. If required, keep the ampoule and any unused medicine for checking by

the second checker and until administration is complete.

9. **WITHDRAWING SOLUTION OR SUSPENSION FROM A VIAL INTO A SYRINGE**

NB: a blunt fill filter needle should be used to draw up IV therapy and where a needle is referred to in this document this type of device is required.

1. Remove the tamper evident seal from the vial. Wipe rubber septum with an chlorhexidine/alcohol wipe and allow drying for at least 30 seconds.
2. With the BFF needle sheathed, draw into the syringe a volume of air equivalent to the volume of solution to be drawn up.
3. Remove the needle cover and insert into the vial through the rubber septum.
4. Invert the vial. Keep the needle in the solution. Slowly depress plunger to push air into the vial. Release the plunger so that solution flows back into the syringe.
5. If vial contains a suspension rather than solution, it should be swirled to mix the contents, immediately before they are drawn into the solution.
6. If a large volume of solution is to be withdrawn, use a push pull technique: repeatedly inject small volumes of air and draw up an equal volume of solution until the required total is reached. This "equilibrium method" helps to minimise build up of pressure in the vial.
7. Alternatively pierce rubber septum with a second needle to let air into the vial as solution is withdrawn. The tip of the vent needle must be kept above the solution to prevent leakage.
8. With the vial still attached, invert the syringe. With the needle and vial uppermost, tap the syringe lightly to aggregate the air bubbles at the needle end.
9. Push the air back into the vial. Fill the syringe with the required volume of solution then draw in a small amount of air. Withdraw the needle from the vial.
10. Invert the syringe and tap lightly to aggregate the air bubbles at the needle end. Expel the air carefully. Place the filled syringe back into the syringe wrapper which will be sterile inside and place in clean tray.
11. If the filled syringe is going to be added to a bag of fluids, fit a new blunt fill filter needle to the syringe and leave the cap on, place the capped, filled syringe in a cleaned tray.
11. Attach the prepared label to the syringe.

10. RECONSTITUTING POWDER INTO VIAL AND DRAWING THE RESULTING SOLUTION OR SUSPENSION INTO A SYRINGE

NB: a blunt fill filter needle should be used to draw up IV therapy and where a needle is referred to in this document this type of device is required.

1. Remove the tamper-evident seal from the vial and wipe the rubber septum with an alcohol wipe. Allow to dry for at least 30 seconds.
2. Use the same procedure as above in section (9) to withdraw the required volume of diluents (e.g., water for injection or sodium chloride) from the ampoule(s) into the syringe.
3. Inject the diluent into the vial. Keeping the tip of the needle above the level of the solution into the vial, release the plunger. The syringe will fill with the air which has been displaced by the solution. (If the contents of the vial were packed under a vacuum, solution will be drawn into the vial and no air will be displaced).
4. If a large volume of diluent is to be added, use a push-pause syringe technique to allow pressure to equalise regularly from the syringe to the vial.
5. With the syringe and needle still in place, gently swirl the vial to dissolve all the powder, unless otherwise indicated by the product information. This may take several minutes.
6. Invert the syringe and tap lightly to aggregate the air bubbles at the needle end. Expel the air carefully. Place the filled syringe back into the syringe wrapper which will be sterile inside and place in clean tray.
7. If the filled syringe is going to be added to a bag of fluids, fit a new blunt fill filter needle to the syringe and leave the cap on, place the capped, filled syringe in a cleaned tray.
8. Attach the prepared label to the syringe.

11. ADDING A MEDICINE TO AN INFUSION BAG

NB: a blunt fill filter needle should be used to draw up IV therapy and where a needle is referred to in this document this type of device is required.

1. Prepare the medicine in a syringe using one of the previously described methods.
2. Check wrapper of the bag is undamaged. Remove the wrapper and check the bag itself in good light. It should be intact, free from cracks, punctures and leaks. Check infusion solution is free from haziness, particles and discoloration.
3. Remove the tamper-evident seal on the additive port or wipe rubber septum on the bag with alcohol wipe. Allow to dry for at least 30 seconds.

4. If the volume of medicine to be added is more than 10% of the bag, equivalent volume must be first removed using a closed system.
5. Inject the medicine into the bag through the centre of the injection port or via a closed system. Keep the tip of the blunt fill filter needle away from the side of the bag.
6. Withdraw the needle and syringe and invert the container at least five times to ensure thorough mixing before starting the infusion.
7. Check the appearance for absence of particles, cloudiness or discoloration.
8. Attach the prepared label to the bag and take any required precautions to protect the infusion bag from light etc. if applicable.

12. DILUTING A MEDICINE INTO A SYRINGE FOR USE IN AN INFUSION DEVICE

1. Prepare the medicine in a syringe using one of the previously described methods, if possible, using a closed transfer system.
2. Draw the diluent into the syringe to be used for administration by the pump or syringe driver. Draw in some air (slightly more than the volume of medicine needed) and remove the needle.
3. Using an aseptic-non-touch technique, stand the diluent syringe upright. Insert the end of the blunt fill filter needle of the syringe containing the medicine into the top opening of the diluent (administration) syringe and add the medicine to it.
4. Total volume of injection solution in a syringe is as specified on the prescription, ensuring that the infusion can be delivered at the prescribed rate by the administration device chosen.
5. Ensure that the rate of administration is set correctly on the administration device and according to the manufacturer's instructions. The initial rate should be checked by 2 nurses as correct prior to starting the infusion.
6. Any infusion that requires a rate change at any time during its administration must have every rate adjustment checked and verified by two nurses to ensure accuracy and patient safety. This includes adjustments related to clinical condition, prescribing changes, or titrated therapies. This guidance applies to all infusions including adult, paediatric and neonatal patients and covers all infusions (e.g., continuous infusion, intermittent infusion, syringe drivers and Volumatic pumps).
7. Attach a capped blunt fill filter needle to the administration syringe. Invert several times to mix the contents.

8. Tap syringe lightly to aggregate the air bubbles at the needle end and expel the air.
9. Carefully check the syringe for cracks and leaks, and then label it, especially noting the requirements specific to syringe drivers.

For all methods, place the final syringe or infusion and the empty ampoule(s) or vial(s) in a clean plastic tray for transportation to the bedside for administration

13. LABELLING OF INJECTABLE MEDICATIONS AND INFUSION CONTAINER

1. Where possible an electronic EPR generated additive label should be used, if this is not available a handwritten label can be used.
2. All injections, including both medicines and flushes, should be labelled immediately after preparation. The only exception is syringes intended for immediate push (bolus) administration when the syringe has not left the hands of the person who prepared it between preparation and administration, this is usually under emergency conditions.
3. There should never be more than one unlabeled syringe in a tray at any one time, nor must an unlabeled syringe be fitted to a syringe driver or similar device.
4. Injectable medications (Bolus)
5. Infusion containers (Intermittent and continuous infusions)
6. Labels should be attached immediately after preparation and for bolus administration a pre-printed label can be used if available, for infusion therapy where an additive has been added the label should carry the following information:
 - Name of the patient
 - Name of the drug
 - Strength of the drug
 - Route of administration
 - Diluent
 - Final volume
 - Expiry date and time
 - Name of the practitioner preparing the medicine
7. Where a second checker of the IV therapy is required, they should check the drug and witness the adding of the drug, they should then sign the additive label.
8. Place the final syringe or infusion and the empty ampoule(s) vial(s) in a clean plastic tray for transportation to the bedside for administration.

14. RECORD KEEPING

1. The electronic prescription chart (MAR) is to be completed on the EPR immediately following the administration of an injectable drug.
2. The EPR fluid balance chart/local monitoring chart must be completed, including intravenous fluids, from midnight to midnight, and the totals entered on the patient's fluid balance summary chart. This should be totaled every four hours or hourly if required.
3. Two registered nurses should check the infusion pump rate at the start of the infusion to confirm accuracy, and this check must be documented in EPIC EPR flowsheets. In addition, all subsequent rate changes for any infusion, regardless of patient group (adult, paediatric, or neonatal), must also be independently checked and verified by two registered nurses and documented accordingly.
4. EPIC captures the name of the verifying nurse at both the initial set-up and for any rate change within the MAR. In addition, the EPIC flowsheet includes a designated row for documenting the second nurse checker. Both nurses involved must ensure their names are recorded in the appropriate fields at each stage.
5. Ideally, prescriptions in the EPR MAR and infusions/pumps should be checked at the beginning of every shift for accuracy in real time.

15. INCIDENT REPORTING

- Any adverse patient incident must be documented on a Trust Incident form. The incident must be graded and investigated in accordance with the Incident Reporting Procedure.
- If the incident involved the use of a Medical Device, EME must also be informed and check the device. Any adverse incidents involving a medical device must be reported to the MHRA via the Trust medical engineering. Defective IV devices such as pumps should be taken out of service as soon as they are discovered by the person who discovered them. (Patel and Maheriya 2021)
- Any pump device involved in an infusion rate error must be kept and given to medical engineering, who can download the program history. A note should be made of the serial number and attached to the incident form.

16. INSTRUCTIONS ON THE ADMINISTRATION OF INJECTABLE DRUGS

Cautions

It must be remembered that all medicines given by the injectable route, on the first or subsequent occasions, may produce a reaction by the patient, which may require immediate medical attention. Commonly this reaction will take the form of anaphylactic shock (see Emergency Resuscitation Guideline).

For all patients:

- 1. Potassium must never be given as a bolus injection.**
- 2. Where possible Infusion pumps should be used for every infusion and MUST be used where a drug additive has been added to the infusion.**
3. An EPR infusion pump checklist must be used when administering any infusion for more than an hour, especially when there is an additive within the infusion. The infusion must be checked hourly to ensure infiltration and extravasation is avoided.
4. Nurses/Midwives/ODPs/AHPs must **not** add potassium to IV fluids except in specialist areas (ITU, SCBU, CCU, A&E and F1) where cardiac monitoring must be in place.
5. Before administering IV opioids, staff must consider:
 - The dose (to be titrated in relation to the individual patient's needs and parameters of prescription)
 - The route of administration (consider whether IV is the most appropriate route)
 - Whether staff are competent and have the resources available to monitor the patient for signs of respiratory depression. NB. Monitoring of sedation is recommended because increasing drowsiness is the best clinical indicator of respiratory depression. (This should be referenced to FHFT PCA guidelines).
6. The appropriate giving set should be used for injectable infusions (continuous and intermittent). However, in an emergency situation, based on the assessment of risk, a blood-giving set may be used for any fluids to ensure a speedy infusion.

17. ADMINISTRATION INSTRUCTIONS

Checks to be made before administering any injection include:

- The drug and diluent are compatible and in date including the flushing solution.

Confirm that the prescription relates to the patient being treated by checking the following:

- Full name
- Date of Birth
- EPR MRN number

Re-check the following:

- Approved medicine name
- Dose and frequency of administration
- Date and route of administration
- Allergy status of the patient

Also check when relevant:

- Brand name and formulation of the medicine
- Concentration or total quantity of medicine in the final infusion container or syringe
- Name and volume of diluent and/or infusion solution
- Rate and duration of administration
- Type of pump or device to be used
- Patient age and weight
- Date on which treatment is to be reviewed.

18. GENERAL INJECTABLE ADMINISTRATION INFORMATION

1. Only one drug at a time shall be given as a bolus injection. The vascular access device lumen should be flushed before and after each drug administered, and between different medications. The volume of flush solution should be equal to at least twice the volume of the catheter and add-on devices (usually 10mL for adults). The solution of choice is generally 0.9% sodium chloride to check device patency. For IV therapy administration, the flush should be compatible with the IV drug.
2. A 10mL syringe (or larger) can be used for all drugs and IV flushes. Using a smaller syringe (5mL, 3mL, 2mL, 1mL) will create excessive pressure which could result in catheter rupture and should be avoided. (Bravery & Hannan 1997, Catudal 2002, RCN 2016, Mallett & Dougherty 2010, INS 2023).
3. When flushing IV lines, staff should use the 'push-pause' positive pressure technique. This creates turbulence within the catheter lumen, removing debris from the internal catheter wall. It also prevents reflux of blood. (RCN 2016 INS 2023).
4. All infusions prepared in the clinical environment must be discarded a maximum of 24 hours after preparation. Some products are assigned a shorter expiry. Consult Medusa injectable medicines guide on the intranet.

5. No infusion set should be used for more than 72 hours. The set should be labelled with the date and time it was first utilised and only for the same like for like infusion solution. (DH 2005 and Frimley Health Infection Control Policy 2020)
6. IV infusions should never be disconnected after setting up. Disconnecting and reconnecting IV lines increases the risk of introducing bacteria or other pathogens into the bloodstream, potentially leading to serious infections.
7. Infusion sets must always be changed after intravenous nutrition every 24 hours, blood transfusions at the end of the transfusion or for multiple units of blood in the same infusion after 12 hours, whichever is sooner). (Pironi et al 2020, FPH 2020 Infection Control Policy, RCN 2016).
8. The date and time of cannula insertion should be recorded in the patient's notes on the EPR in the LDA Avatar and on the cannula dressing itself. Peripheral cannulas should be in place for the minimum amount of time necessary and be replaced after 96 hours (FHFT IVAS Guidelines). Peripheral cannulas should be recited sooner if signs of infection are present. If intravenous drug therapy is needed for longer than 96 hours, the use of a peripheral line needs to be reviewed in case a longer term vascular access device is more suitable.
9. Needle free connectors should be changed with the peripheral cannula, or every 7days for a long term vascular access device or after 200 activations.
10. Where an infusion pump/syringe driver is used to administer IV insulin sliding scale or GTN, a line incorporating a back-check valve/anti-siphon must be used to prevent free flow or backing up of one infusion to another.
10. 3-way taps should not be used outside of theatres unless it's use is for unblocking PICC lines.

19. IV DRUG ADMINISTRATION – PROCESS FOR QUALIFICATION OF TRAINED STAFF, ASSOCIATE PRACTITIONERS (REGISTERED) AND STUDENT NURSES

1. All staff who undertake the IV drug administration training course must be competent to give oral medications.
2. Staff will attend an IV drug administration training course.
3. During the IV drug administration training course the candidates will undertake a calculations exam which must be passed before supervised practice.
4. After the IV drug administration training course the candidates can practice the administration of IV therapy under the direct supervision of another trained, competent nurse.
5. At an agreed point in time, (usually within 2 months of the IV drug administration training course) when the candidate and the assessor feel they have had enough supervised practice, a formal assessment can be undertaken by a senior IV therapy giver, this could be a senior band, a band 6 sister or charge nurse or above, or a practice development practitioner.

Competency evidence will include:

- Passing the calculations exam

- Action plan of identified learning needs
- Diary of events/log sheet
- Final assessment of competency – competency can only be assessed by a practitioner who has been IV assessed at level 5

This must be completed within three months. The final assessment must be photocopied and the original held with the Practice Development team.

20. IV DRUG ADMINISTRATION – PROCESS OF UPDATE (TRAINED STAFF)

- All staff who are competent to administer IV therapy should keep themselves updated at least every 3 years.
- IV updates will be available annually within the Trust by way of skills days, IV link nurse meetings and e-learning.
- This session will include:
 - Legal issues
 - Complications
 - Line care
 - Current issues
 - Safety issues

21. IV DRUG ADMINISTRATION – PROCESS FOR QUALIFICATION (MEDICAL STAFF)

- IV training will be provided, and competence assessments performed on all FY1's being inducted in the Trust.

22. STUDENT NURSES

In agreement with its affiliated universities and NHS Education the Trust has embarked on the education of student nurses in the practice of IV therapy administration.

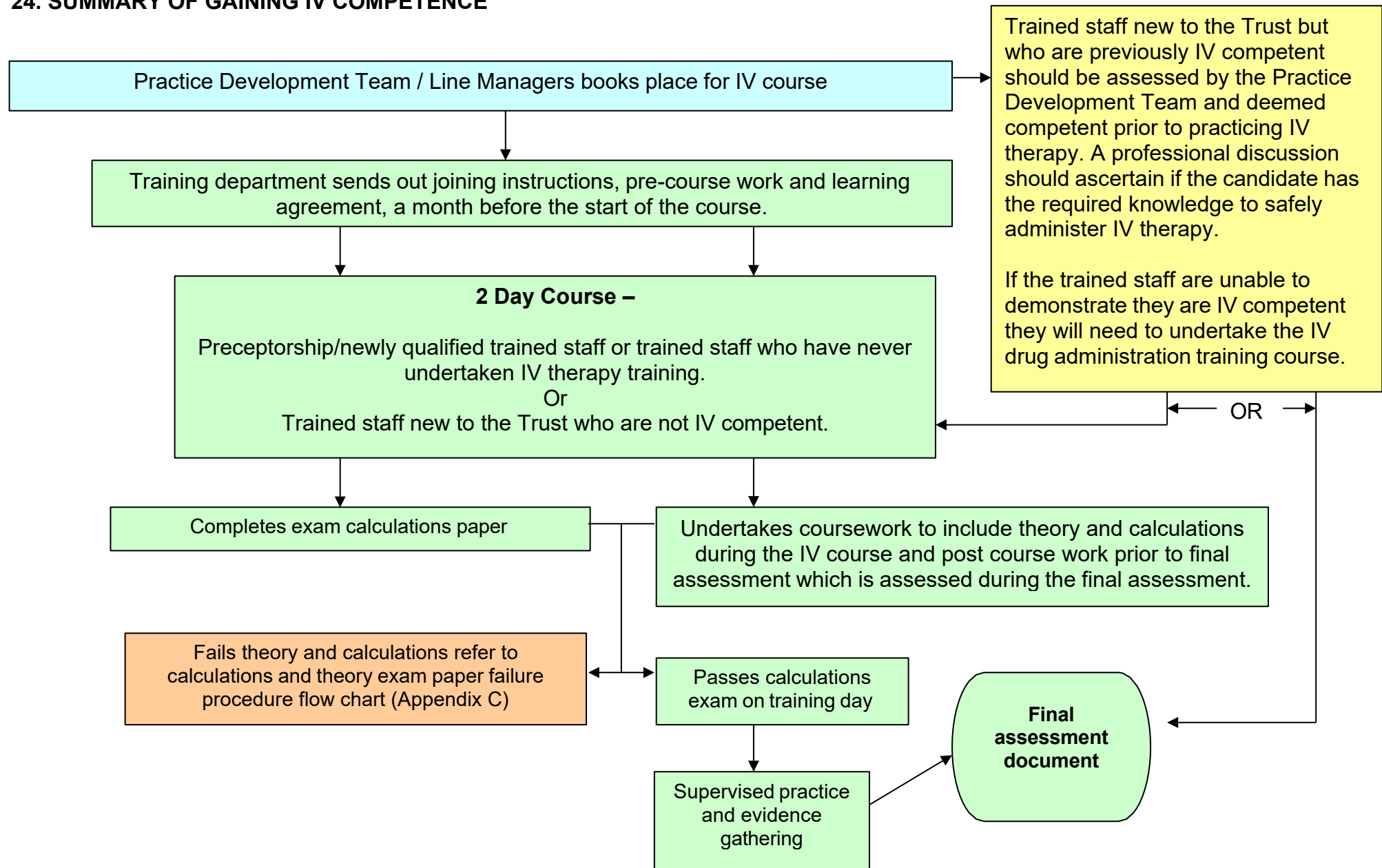
- The student nurse shall follow the same course, guidelines and policies when undertaking the IV drug administration training course.
- The student nurse does not need to be signed off in their oral drug administration competency to undertake the IV drug administration training course.
- The student nurse must pass the calculations exam on the IV study day before they can practice under supervision.
- They can practice IV therapy administration under direct supervision of their mentor who must be a competent and qualified IV therapy giver too.
- Once ready, the student nurse can undertake the final competency assessment, if they pass the assessment, they cannot undertake IV therapy administration until they qualify and have professional registration.
- They can continue to be directly supervised in the administration of IV therapy.

- A student who fails the final assessment will follow the Trust guidance.
- A student who fails the 3rd attempt must be referred to the learning environment lead and their university tutor for further action.
- Once the student is qualified and has a professional registration they must complete their competency in oral drug administration before they can practice IV therapy administration independently.

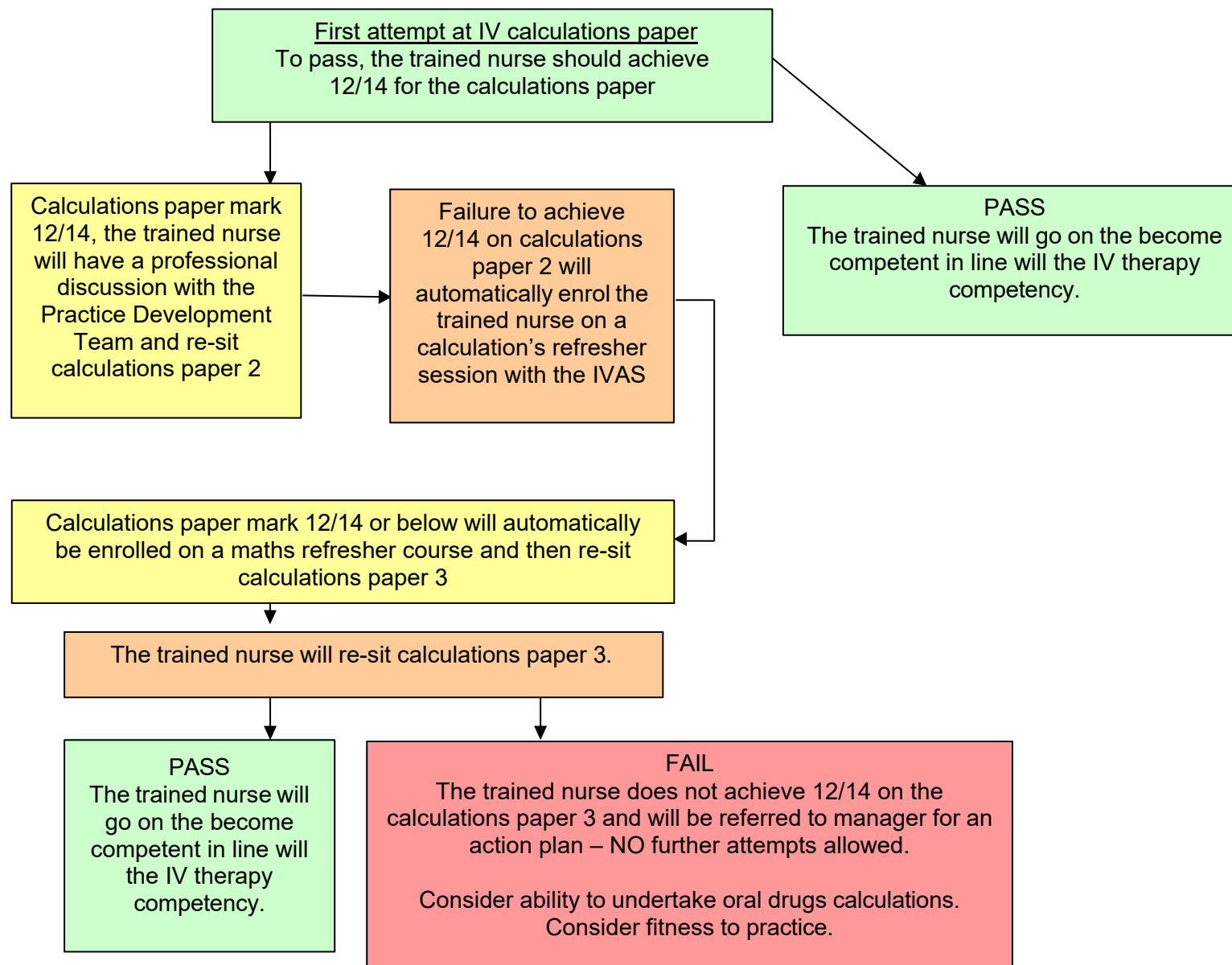
23. ASSOCIATE PRACTITIONERS (REGISTERED BAND 4)

- The NMC has provided the band 4 associate practitioner a space on the nursing and midwifery register, this means they are accountable for their own actions in clinical practice.
- The NMC standards for band 4 practitioners allows for the administration of drugs in different forms. The administration of IV therapy for this group of practitioners needs to be clarified further; however, there is an agreement in principle that the registered band 4 workforce locally will be able to undertake the administration of IV therapy.
- **As soon as an agreement has been reached, this document will be further updated to reflect this change in the registered band 4 practice.**

24. SUMMARY OF GAINING IV COMPETENCE



25. PROCEDURE FOR FAILURE OF IV THEORY AND CALCULATIONS PAPER



26. IV DRUG ADMINISTRATION – PROCESS FOR VERIFYING PAST IV EXPERIENCE

- Doctor/Nurse/Midwife/ODP/AHP who join Frimley Health NHS Foundation Trust having administered IV drugs at another healthcare organisation (in the UK or overseas) in the capacity of a qualified practitioner may not need to undergo the full IV drug administration training course.
- The member of staff should ideally produce evidence of competency from their previous job.
- If written evidence is not available but it can be shown that the member of staff has the required skills and knowledge to prove they are competent in the administration of IV therapy, they can have a professional conversation with their manager of practice development which should be documented using the template.
- It may be that the member of staff is able to demonstrate that at their previous job, IV therapy was part of their daily role and this could be verbally confirmed by their previous manager via a telephone conversation, this should be documented using the 'IV medicines administration assessment - professional discussion' template.
- The member of staff should be given an IV update and induction into our local guidelines and IV equipment to ensure they are confident in any local variations to practice.
- If the individual is **unable** to supply the manager with evidence of training in IV administration from their previous post, or the member of staff fails to satisfy the manager that they have a higher level of knowledge in IV therapy administration, the individual **may not** administer IV drugs at this stage.
- If the individual did not give IV drugs in their former post (in the past 3 years), they need to attend the IV drug administration training course.
- If the individual is newly qualified and new to the Trust or is on the preceptorship programme, they must attend the IV drug administration training course, unless they completed the course while they were a student in Frimley Health.
- Students qualifying from other organisations will need to undertake the IV drug administration training course.
- Band 4 registered Associate Practitioners must complete the Trust IV drug administration training course even if they were competent in another Trust.

27. NICE INTRAVENOUS FLUID THERAPY: INTRAVENOUS FLUID THERAPY IN ADULTS IN HOSPITAL

Key priorities for implementation

1. The NICE fluid administration guidelines for adults were produced in response nationally to the occurrence of serious complications associated with the over prescribing and administration of inappropriate intravenous fluids. These harms are well documented in the guidance publication. There is an expectation that all NHS hospitals will be compliant with these safety guidelines which aim to see a reduction nationally in patient harm.

Principles and protocol for intravenous fluid therapy

When prescribing IV fluids, remember the 5 Rs:

Resuscitation
Routine maintenance
Replacement
Redistribution and Reassessment

Offer IV fluid therapy as part of a protocol (see Algorithms for IV fluid therapy):

- Assess patient's fluid and electrolyte needs following Algorithm 1: Assessment.
- If patients need IV fluids for fluid resuscitation, follow Algorithm 2: Fluid resuscitation.
- If patients need IV fluids for routine maintenance, follow Algorithm 3: Routine maintenance.
- If patients need IV fluids to address existing deficits or excesses, ongoing abnormal losses or abnormal fluid distribution, follow Algorithm 4: Replacement and redistribution.

Patients should have an IV fluid management documented on the EPR and MAR which should include details of:

- The fluid and electrolyte prescription over the next 24 hours
- The assessment and monitoring plan.
- Initially, the IV fluid management plan should be reviewed by an expert daily.
- IV fluid management plans for patients on longer-term IV fluid therapy whose condition is stable may be reviewed less frequently.

Assessment and monitoring

- Assess the patient's likely fluid and electrolyte needs from their history, clinical examination, current medications, clinical monitoring, and laboratory investigations.
- History should include any previous limited intake, thirst, the quantity, and composition of abnormal losses (see diagram of ongoing losses), and any comorbidities, including patients who are malnourished and at risk of refeeding syndrome (see Nutrition support in adults [NICE clinical guideline 32]).
- Clinical examination should include an assessment of the patient's fluid status, including: -
 - pulse, blood pressure, capillary refill and jugular venous pressure
 - presence of pulmonary or peripheral oedema
 - presence of postural hypotension.
- Clinical monitoring should include current status and trends in:-
 - National Early Warning Score (NEWS)
 - fluid balance charts
 - weight
- Laboratory investigations should include current status and trends in:-
 - full blood count
 - urea, creatinine and electrolytes.

5. All patients continuing to receive IV fluids need regular monitoring which should include daily reassessments of clinical fluid status, laboratory values (urea, creatinine and electrolytes) and fluid balance charts, along with weight measurement twice weekly.

Be aware that:

- The 24 hour review should be undertaken by a consultant or senior doctor looking after the patient.
- Patients receiving IV fluid therapy to address replacement or redistribution problems may need more frequent monitoring.
- Additional monitoring of urinary sodium may be helpful in patients with high-volume gastrointestinal losses. (Reduced urinary sodium excretion [less than 20 mmol/L may indicate total body sodium depletion even if plasma sodium levels are normal. Urinary sodium may also indicate the cause of hyponatraemia and guide the achievement of a negative sodium balance in patients with oedema. However, urinary sodium values may be misleading in

the presence of renal impairment or diuretic therapy.)

- Patients on longer-term IV fluid therapy whose condition is stable may be monitored less frequently, although decisions to reduce monitoring frequency should be detailed in their IV fluid management plan.

Clear incidents of fluid mismanagement (for example, unnecessarily prolonged dehydration or inadvertent fluid overload due to IV fluid therapy) should be reported through standard critical incident reporting to encourage improved training and practice via the RL incident reporting system.

Content	Plasma	Sodium chloride 0.9% ⁺	Sodium chloride 0.18%/4% glucose	0.45% NaCl/4% glucose	5% glucose	Hartmann's	Lactated Ringer's (USP)	Ringer's acetate	Alternative balanced solutions for resuscitation	Alternative balanced solutions for maintenance
Na ⁺ (mmol/l)	135–145	154	31	77	0	131	130	130	140	40
Cl ⁻ (mmol/l)	95–105	154	31	77	0	111	109	112	98	40
[Na ⁺]:[Cl ⁻] ratio	1.28 – 1.45:1	1:1	1:1	1:1	-	1.18:1	1.19:1	1.16:1	1.43:1	1:1
K ⁺ (mmol/l)	3.5–5.3	4	4	4	4	5	4	5	5	13
HCO ₃ ⁻ /Bicarbonate	24–32	0	0	0	0	29 (lactate)	28 (lactate)	27 (acetate)	27(acetate) 23(gluconate)	16(acetate)
Ca ²⁺ (mmol/l)	2.2–2.6	0	0	0	0	2	1.4	1	0	0
Mg ²⁺ (mmol/l)	0.8–1.2	0		0		0	0	1	1.5	1.5
Glucose (mmol/l)	3.5–5.5	0	222(40 g)	222 (40g)	278(50 g)	0	0	0	0	0
pH	7.35–7.45	4.5–7.0	4.5		3.5–5.5	5.0–7.0	6–7.5	6–8	4.0–8.0	4.5–7.0
Osmolarity (mOsm/l)	275–295	308	284		278	278	273	276	295	389

Resuscitation

If patients need IV fluid resuscitation, use crystalloids that contain sodium in the range 130–154 mmol/L, with a bolus of 500 mL over less than 15 minutes.

- Plasmalyte is the recommended crystalloid the organisation has decided to use.
- Do not use tetrastarch for fluid resuscitation.
- Consider human albumin solution 4–5% for fluid resuscitation only in patients with severe sepsis.

Routine maintenance

If patients need IV fluids for routine maintenance alone, restrict the initial prescription to:

- 25–30mL/kg/day of water **and**
- approximately 1 mmol/kg/day of potassium, sodium and chloride **and**
- approximately 50–100g/day of glucose to limit starvation ketosis. (This

quantity will not address patient's nutritional needs; see Nutrition support in adults [NICE clinical guideline 32].)

For more information see IV fluid prescription (by body weight) for routine maintenance over a 24-hour period.

For more information see the IV fluid prescription (by body weight) for routine maintenance over a 24-hour period diagram further on.

For patients who are obese, adjust the IV fluid prescription to their ideal body weight. Use lower range volumes per kg (patients rarely need more than a total of 3 litres of fluid per day) and seek expert help if their BMI is more than 40 kg/m².

Consider prescribing less fluid (for example, 20–25mL/kg/day fluid) for patients who:

- are older or frail
- have renal impairment or cardiac failure
- are malnourished and at risk of refeeding syndrome (see Nutrition support in adults [NICE clinical guideline 32]).

When prescribing for routine maintenance alone, consider using 25–30mL/kg/day sodium chloride 0.18% (0.18% NaCl is not recommended in paediatrics due to NPSA alert re: hyponatremia, March 2007) in 4% glucose with 27 mmol/L potassium on day 1 (there are other regimens to achieve this). Prescribing more than 2.5 litres per day increases the risk of hyponatraemia. These are initial prescriptions and further prescriptions should be guided by monitoring.

Consider delivering IV fluids for routine maintenance during daytime hours to promote sleep and wellbeing.

Replacement and redistribution

Adjust the IV prescription (add to or subtract from maintenance needs) to account for existing fluid and/or electrolyte deficits or excesses, ongoing losses (see Diagram of ongoing losses, p28) or abnormal distribution.

Seek expert help if patients have a complex fluid and/or electrolyte redistribution issue or imbalance, or significant comorbidity, for example:

- gross oedema
- severe sepsis
- hyponatraemia or hypernatremia
- renal, liver and/or cardiac impairment
- post-operative fluid retention and redistribution
- malnourished and refeeding issues (see Nutrition support in adults [NICE clinical guideline 32]).

Training and education

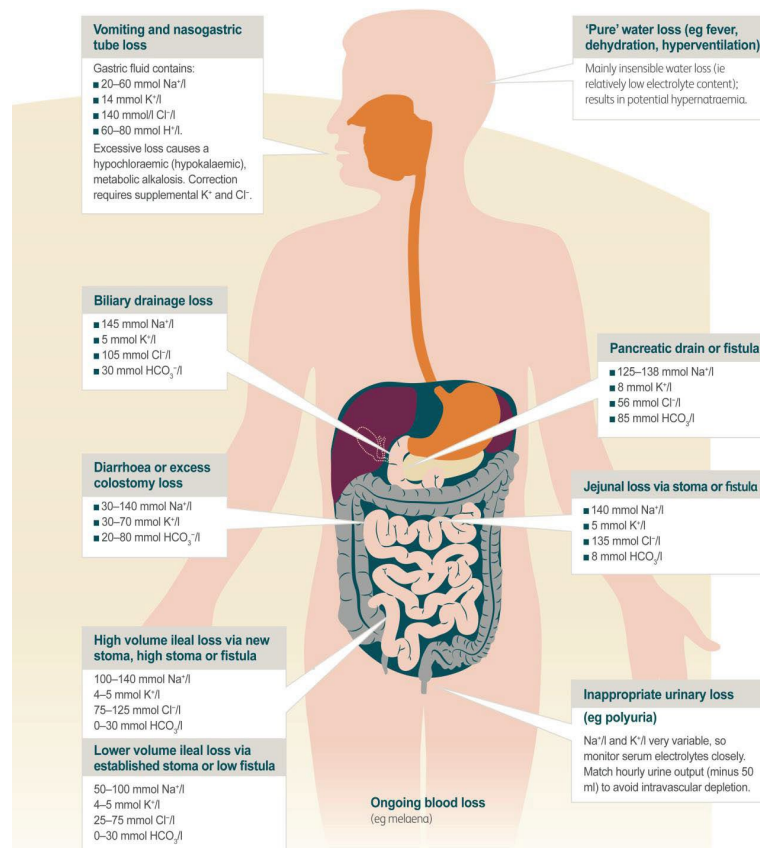
A compulsory e-learning module has been developed to ensure that all healthcare professionals involved in prescribing and delivering IV fluid therapy are trained on the principles covered in this guideline, and are then formally assessed and reassessed at regular intervals to demonstrate competence in:

- understanding the physiology of fluid and electrolyte balance in patients with normal physiology and during illness
- assessing patient's fluid and electrolyte needs (the 5 Rs: Resuscitation, Routine maintenance, Replacement, Redistribution and Reassessment)
- assessing the risks, benefits and harms of IV fluids
- prescribing and administering IV fluids
- monitoring the patient response
- evaluating and documenting changes **and**
- taking appropriate action as required.

In line with the guidance the organisation has an IV fluids lead, responsible for training, clinical governance, audit and review of IV fluid prescribing and patient outcomes. The IV Nurse lead for the organisation will support this person

Composition of commonly used crystalloid fluids.

On-going losses.



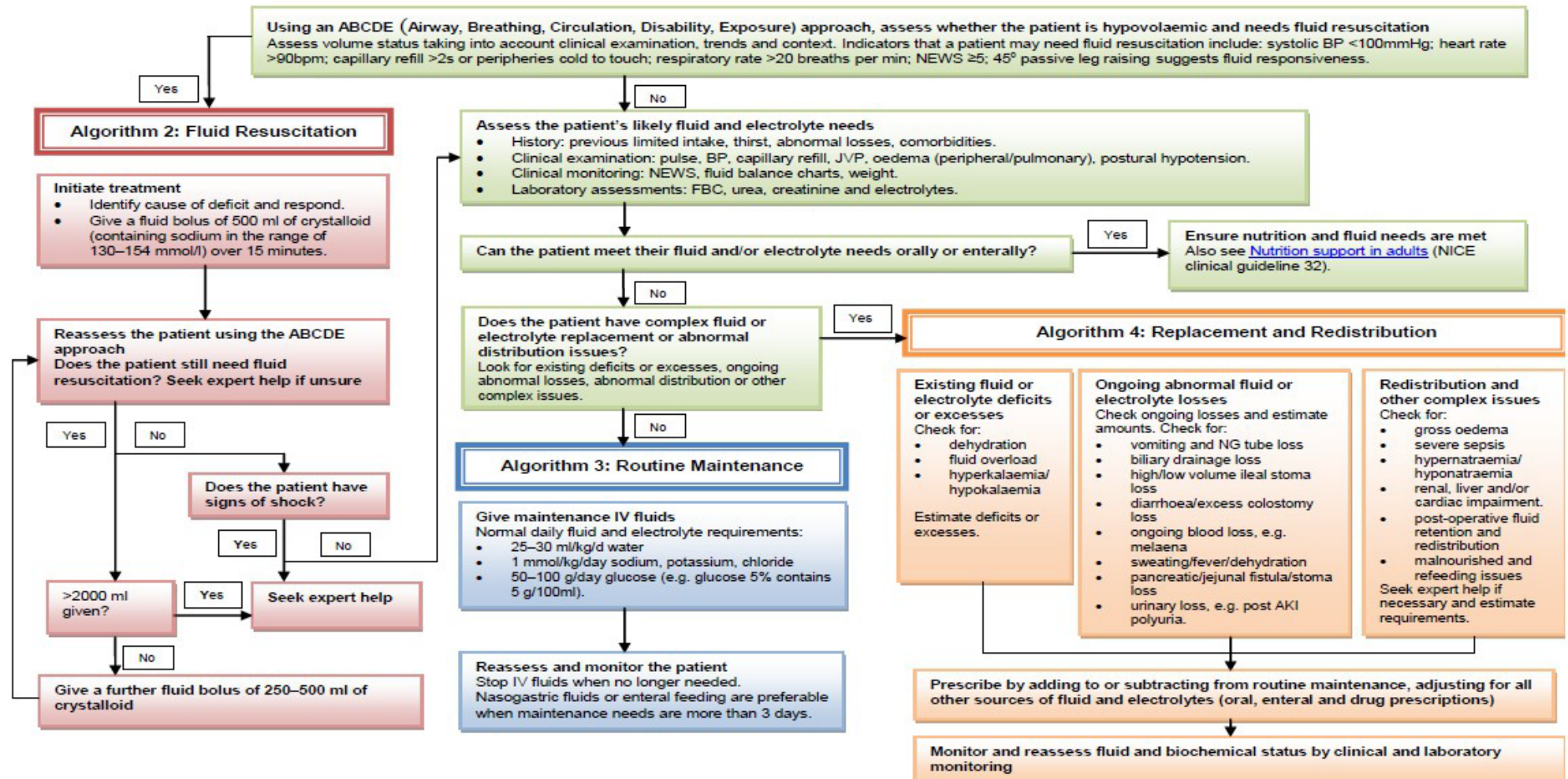
IV fluid prescription (by body weight) for routine maintenance over a 24-hour period

Body Weight	Water	Sodium, chloride, potassium	Body weight	Water	Sodium, chloride, potassium
kg	25–30 mL/kg/day	approx. 1 mmol/kg/day of each	kg	25–30mL/kg/day	approx. 1 mmol/kg/day of each
40	1000–1200	40	74	1850–2220	74
41	1025–1230	41	75	1875–2250	75
42	1050–1260	42	76	1900–2280	76
43	1075–1290	43	77	1925–2310	77
44	1100–1320	44	78	1950–2340	78
45	1125–1350	45	79	1975–2370	79
46	1150–1380	46	80	2000–2400	80
47	1175–1410	47	81	2025–2430	81
48	1200–1440	48	82	2050–2460	82
49	1225–1470	49	83	2075–2490	83
50	1250–1500	50	84	2100–2520	84
51	1275–1530	51	85	2125–2550	85
52	1300–1560	52	86	2150–2580	86
53	1325–1590	53	87	2175–2610	87
54	1350–1620	54	88	2200–2640	88
55	1375–1650	55	89	2225–2670	89
56	1400–1680	56	90	2250–2700	90
57	1425–1710	57	91	2275–2730	91
58	1450–1740	58	92	2300–2760	92
59	1475–1770	59	93	2325–2790	93
60	1500–1800	60	94	2350–2820	94
61	1525–1830	61	95	2375–2850	95
62	1550–1860	62	96	2400–2880	96
63	1575–1890	63	97	2425–2910	97
64	1600–1920	64	98	2450–2940	98
65	1625–1950	65	99	2475–2970	99
66	1650–1980	66	100	2500–3000	100
67	1675–2010	67	>100	2500–3000	100
68	1700–2040	68			
69	1725–2070	69			
70	1750–2100	70			
71	1775–2130	71			
72	1800–2160	72			
73	1825–2190	73			

Consequence of fluid mismanagement		
Hypovolaemia	Patient's fluid needs not met by oral, enteral or IV intake and - Features of dehydration on clinical examination - Low urine output or concentrated urine - Biochemical indicators, such as more than 50% increase in urea or creatinine with no other identifiable cause	Before and during IV fluid therapy
Pulmonary oedema (breathlessness during infusion)	- No other obvious cause identified (for example, pneumonia, pulmonary embolus or asthma) - Features of pulmonary oedema on clinical examination - Features of pulmonary oedema on X-ray	During IV fluid therapy or within 6 hours of stopping IV fluids
Hyponatraemia	- Serum sodium less than 130 mmol/l - No other likely cause of hyponatraemia identified	During IV fluid therapy or within 24 hours of stopping IV fluids
Hypernatremia	- Serum sodium 155 mmol/l or more - Baseline sodium normal or low - IV fluid regimen included 0.9% sodium chloride - No other likely cause of hypernatremia identified	During IV fluid therapy or within 24 hours of stopping IV fluids
Peripheral oedema	- Pitting oedema in extremities and/or lumbar sacral area - No other obvious cause identified (for example, nephrotic syndrome or known cardiac failure)	During IV fluid therapy or within 24 hours of stopping IV fluids
Hyperkalaemia	- Serum potassium more than 5.5 mmol/l - No other obvious cause identified	During IV fluid therapy or within 24 hours of stopping IV fluids
Hypokalaemia	- Serum potassium less than 3.0 mmol/l likely to be due to infusion of fluids without adequate potassium provision - No other obvious cause (for example, potassium-wasting diuretics, refeeding syndrome)	During IV fluid therapy or within 24 hours of stopping IV fluids

Algorithms for IV fluid therapy

Algorithm 1: Assessment



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APPENDIX Risk Assessment Tool for the Preparation of Injectable Medicines

(adapted from SPS Risk Assessment for the Preparation of Injectable Medicine, with permission from Barts Health NHS Trust)

Hospital:	Clinical area:	Directorate:	Date of assessment:
Name and strength of prepared medicinal product:		Bag, syringe, other (please specify):	
Diluent:			
Final volume:			
Pre-preparation storage condition and expiry:		Post preparation storage condition and expiry:	

Proforma 1: Risk assessment of injectable medicines

	Risk factors	Description of individual risks	Allocated score	Score if applicable
1	Therapeutic risk	There is a significant inherent risk of patient harm if the injectable medicine is not prepared and/or administered as intended		1
2	High risk route of administration	Examples include intra-ocular, intrathecal, intracerebral, epidural, intraosseous etc.		10
3	Use of a concentrate	Where further dilution after first reconstitution is essential for safe administration use, i.e. when slow IV injection of undiluted medicine is not appropriate and/or potentially harmful		3
4	Complex calculation	Any calculation with more than one step required for preparation and/or administration		1
5	Complex method	Complex preparation method - tick all in the list below that apply	N/A	N/A
5.1	Complex method	Greater than 5 non-touch aseptic manipulations		1
5.2	Complex method	Syringe-to-syringe transfer		1
5.3	Complex method	Use of a burette admin set		1
5.4	Complex method	Any other "open system" manipulations such as use of ampoules (higher risk of microbial contamination than vials)		1
5.5	Complex method	<i>Mandatory</i> removal of fluid from infusion container		1
5.6	Complex method	Preparation does not follow SmPC exactly e.g. use of an alternative diluent or method		5
5.7	Complex method	Multiple preparations needed to administer a single "dose" because the shelf-life of the infusion is shorter than 24 hours, or less than the expected duration of infusion		1

	Risk factors	Description of individual risks	Allocated score	Score if applicable
6	Reconstitution of powder in a vial	Where a dry powder must be reconstituted with a liquid solvent		1
7.1	Use of a part vial or ampoule, or use of more than one vial or ampoule	Part vial/ampoule		1
7.2	Use of a part vial or ampoule, or use of more than one vial or ampoule	2-4 vials/ampoules		2
7.3	Use of a part vial or ampoule, or use of more than one vial or ampoule	5-10 vials/ampoules		4
7.4	Use of a part vial or ampoule, or use of more than one vial or ampoule	11-20 vials/ampoules		5
8	Use of an infusion pump	Tick all that apply	N/A	N/A
8.1	Use of an infusion pump	All infusion pumps require some element of calculation and therefore have potential for error and should be included in the risk factors. However this potential risk is considered less significant than the risks associated with not using a pump when indicated.		1
8.2	Use of an infusion pump	Use of an elastomeric infusion device at near-body temperature		2
9	Use of any administration set or other device with which staff may not be familiar	Examples include; empty infusion bag, light protected, low adsorption, non-PVC administration set, set with non-standard in-line filter or air inlet		1

Add all risk scores together and determine total risk rating

Total risk score	
-------------------------	--

Risk Score less than 6	Low Risk: Proposed method/ arrangements have controlled the risks to acceptable levels and preparation can proceed as assessed once assigned actions are complete.	☐
Risk Score 6 to 8	Medium Risk: Proposed method/arrangements control some risks, but residual risks remain. Preparation may proceed as assessed after introduction of assigned actions. Additional mitigation should be considered where possible to further reduce these risks. Where the risk points come from multiple starting containers (i.e. vials), these cannot be mitigated in a clinical area, and preparation in pharmacy is recommended.	☐
Risk Score greater than 8	High Risk: Despite proposed method/arrangements, the risk remains high. To proceed with preparation the organisation must fully understand and accept the risks and must ensure that all proposed mitigations are implemented. Written justification must be documented and an entry in the organisation's risk register should be made. Regular review of the process is required to identify further risk reduction opportunities. Where the risk points come from multiple starting containers, use of elastomeric device at near body temperature and/or doesn't exactly follow the SmPC, these risks cannot be mitigated in a clinical area, and preparation in pharmacy is recommended.	☐

Pharmacist Name		Clinician Name:	
Signature		Signature	

Risk reduction methods to minimise risks of injectable medicine products assessed as moderate/ high risk

Suggested risk reduction methods that can be used to minimise risks with injectable medicines

1. Simplify and rationalise the range of products and presentations of injectable medicines. Where possible, reduce the range of strengths of high-risk products and provide the most appropriate vial/ampoule sizes
2. Guidelines and policies to be implemented for administration of injectable medicines with high-risk route of administration
3. Provide ready-to-administer or ready-to-use injectable products – this will minimise preparation risks and simplify administration
4. Provide dose calculating tools – for example, dosage charts for a range of body weights that eliminate the need for dose calculations
5. Provide additional guidance on how to prescribe, prepare and administer high-risk injectable medicines
6. Consider the provision of care plans – this will help to ensure that information on the prescription about preparation and administration of high-risk products is clearer
7. Provide locally approved protocols that clarify approved unlicensed and 'off-label' use of injectable medicines
8. Use double-checking systems – an independent second check from another practitioner and/or the use of dose-checking software in 'Smart' infusion pumps and syringe drivers
9. Use an infusion monitoring form or checklist – this will help to ensure that infusions are monitored throughout administration

Proforma 2: Summary of risk reduction methods for medicines assessed as moderate or high risk

Hospital:	Clinical area:	Directorate:	Date of assessment:
Name and strength of prepared medicinal product:		Bag, syringe, other (please specify):	
Diluent:			
Final volume:			
Pre-preparation storage condition and expiry:		Post preparation storage condition and expiry:	
Initial risk assessment score			

Risk factors		Risk reduction method(s)	Revised score
1	Therapeutic risk		
2	High risk route of administration		
3	Use of a concentrate		
4	Complex calculation		
5	Complex method- Complex preparation method - tick all in the list below that apply		
5.1	Complex method- Greater than 5 non-touch aseptic manipulations		
5.2	Complex method- Syringe-to-syringe transfer		
5.3	Complex method- Use of a burette admin set		
5.4	Complex method- Any other "open system" manipulations such as use of ampoules (higher risk of microbial contamination than vials)		
5.5	Complex method- <i>Mandatory</i> removal of fluid from infusion container		
5.6	Complex method- Preparation does not follow SmPC exactly e.g. use of an alternative diluent or method		

Risk factors		Risk reduction method(s)	Revised score
5.7	Complex method- Multiple preparations needed to administer a single "dose" because the shelf-life of the infusion is shorter than 24 hours, or less than the expected duration of infusion		
6	Reconstitution of powder in a vial		
7.1	Use of a part vial or ampoule, or use of more than one vial or ampoule		
7.2	Use of a part vial or ampoule, or use of more than one vial or ampoule		
7.3	Use of a part vial or ampoule, or use of more than one vial or ampoule		
7.4	Use of a part vial or ampoule, or use of more than one vial or ampoule		
8	Use of an infusion pump		
8.1	Use of an infusion pump - All infusion pumps require some element of calculation and therefore have potential for error and should be included in the risk factors. However, this potential risk is considered less significant than the risks associated with not using a pump when indicated.		
8.2	Use of an infusion pump – Use of an elastomeric infusion device at near-body temperature		
9	Use of any administration set or other device with which staff may not be familiar - with non-standard in-line filter or air inlet		
Total Revised Score			
Risk assessment undertaken by:		Name of pharmacist:	Name of clinical practitioner:
Risk Score less than 6	Low Risk: Proposed method/ arrangements have controlled the risks to acceptable levels and preparation can proceed as assessed once assigned actions are complete.		☐
Risk Score 6 to 8	Medium Risk: Proposed method/arrangements control some risks, but residual risks remain. Preparation may proceed as assessed after introduction of assigned actions. Additional mitigation should be considered where possible to further reduce these risks. Where the risk points come from multiple starting containers (i.e. vials), these cannot be mitigated in a clinical area, and preparation in pharmacy is recommended.		☐

Risk factors	Risk reduction method(s)	Revised score
Risk Score greater than 8	High Risk: Despite proposed method/arrangements, the risk remains high. This should be escalated to the MSO to fully understand and accept the risks and all proposed mitigations. Written justification must be documented and an entry in the pharmacy risk register should be made. Regular review of the process is required to identify further risk reduction opportunities. Where the risk points come from multiple starting containers, use of elastomeric device at near body temperature and/or doesn't exactly follow the SmPC, these risks cannot be mitigated in a clinical area, and preparation in pharmacy is recommended.	☐

FULL VERSION CONTROL RECORD

Version:	4.2
Guidelines Lead(s):	Andrew Barton – IV Therapy and Vascular Access organisational lead & Nurse Consultant
Contributor(s):	Deirdre Kriel, Preparative Services Pharmacy Manager Angela Hastings, IVAS Matron
Lead Director / Chief of Service:	Melani Van Limborch, Chief Nursing Officer
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Pharmaceutical dosing advice and formulary compliance checked by:	Deirdre Kriel, Preparative Services Pharmacy Manager, 1 February 2024
Key words:	Injectable medicines, infusion devices

This guideline has been registered with the Trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt, contact a senior colleague or expert. Caution is advised when using guidelines after the review date.

This guideline is for use in Frimley Health NHS Foundation Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

Version History

Version	Date	Guideline Lead(s)	Status	Comment
2.0	April 2018	IVAS Lead	Final	
2.1	March 2021	IVAS Lead	Interim	
3.0	Sept 2023	IVAS Lead	Final	
3.1	Feb 2024	Preparative Services Pharmacy Manager	Interim	Introduction, section 9, updated. Summary, section 6-7 changed.
4.0	March 2025	IVAS Lead	Final	General injectable administration information, part 9 added section 6, Full version control record updated. Chief Nursing Officer. IVAS CG meeting 27/03/2025
4.1	April 2026	IVAS Lead	interim	Section 12 and section 14 updated

4.2	July 2026	Preparative Services Pharmacy Manager	Interim	Removal of references to the NPSA20 risk assessment tool and replacement with an adaption to the SPS Risk Assessment for the Preparation of Injectable Medicines, with permission from Barts Health NHS Trust. Interim changes approved: IVAS CG Meeting (14/07/2026)
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Related Documents

Document Type	Document Name
Guideline	Part 1 Introduction and Fundamental Principles of Practice
LocSSIP	Part 2 Vascular access LocSSIP
Guideline	Part 3 Peripheral Cannulation
Guideline	Part 4 Venepuncture
Guideline	Part 5 Midline IV Catheters
Guideline	Part 6 PICCs
Guideline	Part 7 Short Term Non-Tunnelled CVCs
Guideline	Part 8 Implanted Ports and Tunnelled Cuffed CVCs
Guideline	Part 9 Arterial Catheters and Blood Sampling
Guideline	Part 11 Infiltration and Extravasation
Guideline	Part 12 Long-term CVC Complications