CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

Adult Injectable Medicines Guide

Pharmacy Department

Cork University Hospital

March 2021

Version Control

Change Record

Date	Author	Version	Page	Reason for Change
9/9/21	Miriam Flynn	1.1	23	Amikacin – change of formulation
4/2/22		1.2	119	Added Remdesivir
4/2/22		1.2	129	Added Sotrovimab
20/7/22		1.3	23	Amikacin – change of formulation
18/10/22		1.4	20	Added Alfentanil
18/10/22		1.4	21	Alteplase – include unlicensed version
18/10/22		1.4	39	Ceftriaxone -change of formulation
18/10/22		1.4	59	Added Diclofenac
15/11/22		1.5	39	Ceftriaxone – added Rocephin brand
19/12/22		1.6	73	Ganciclovir – hyperlinks added
19/12/22		1.6	83-84	Updated Kiovig® as preferred immunoglobulin
18/01/23	Miriam Flynn	1.7	116	Add Posaconazole Add Phenobarbital
10/08/23		1.8	85	Infliximab dose>1000mg administration change
10/08/23		1.8	124	Rasburicase 1.5mg vials in use
10/08/23		1.8	152	Zoledronic acid 5mg dose added
29/9/23		1.9	28	Andexanet added
29/9/23		1.9	83	Idarucizumab (Praxbind) added
11/1/24	Miriam Flynn	1.10	15	Aciclovir: New brands added
28/3/24		1.11	15	Aciclovir: New brand added
28/3/24		1.11	155	Voriconazole notes clarified re loading
28/3/24		1.11	137	Sodium Valproate: Reconstituted soln conc changed, added contraindications (e.g. pregnancy)
28/3/24		1.11	119	Phenytoin: Filter info added

28/3/24	Miriam Flynn	1.11	133	Rituximab: Updated brands, refer to administration record
28/3/24		1.11	28	Andexanet equipment clarified
28/3/24		1.11	87	Flebogamma: Refer to IVIG Prescription and Administration record
28/3/24		1.11	88	Kiovig: Refer to IVIG Prescription and Administration record
19/4/24		1.11	146	Tobramycin, new brand, remove fridge stability info
24/4/24		1.11	133	Rituximab: updated with latest relevant PPG
21/5/24		1.12	63	Disodium Pamidronate new indications and brand added
21/5/24	Emma Durand	1.12	119	Parecoxib added
24/5/24	Miriam Flynn	1.13	57	Daptomycin new brand
24/5/24		1.13	93	Ferinject new ADR
24/5/24		1.13	126	Potassium Chloride clarify ordering
01/07/24	Ciara O'Riordan	1.14	31	Aprotinin added
01/07/24	Miriam Flynn	1.14	58	Dantrolene added
01/07/24		1.14	150	Synacthen test details added to tetracosactide
19/7/24		1.15	157	Vancomycin brand added
19/7/24		1.15	39	Cefazolin reconstitution edited. Brands updated.
26/7/24	Marih O'Leary	1.16	15	Aciclovir brands updated
		1.16	30	Andulafungin brands updated
6/8/24	Jean Hosford	1.17	149	Added Tenecteplase
27/8/24	Miriam Flynn	1.18	78	Ganciclovir New bag volume
3/9/24	Miriam Flynn	1.18	154	Tobramycin new manufacturer added
3/9/24	Miriam Flynn	1.18	42	Ceftriaxone new manufacturer added.
9/9/24	Jean Hosford	1.18	70	Added Eptifibatide for Stroke
13/9/24	Miriam Flynn	1.18	131	New code updated for Potassium chloride
26/11/24		1.19	32	Update Artesunate info

26/11/24	Miriam Flynn	1.19	All	Replace reference to Microguide with Eolas
			85	Add Intralipid
			58	Add Dalbavancin
			44	Add Ceftolozane/Tazobactam Zerbaxa®
			36	Add Brivaracetam
			139	Add Prochlorperazine
			All	Use filter needle for all glass ampoules
20/12/24	Miriam Flynn	1.20	105	Add hyperlink to UpToDate Labetalol drug information
23/12/24	Miriam Flynn	1.20	172	Add Zanamivir

Table of Contents

I. Introduction

These guidelines have been prepared using the most up-to-date material available at the time of writing. References used in the preparation of each monograph are on file and may be obtained by contacting the Pharmacy Department. Every attempt has been made to ensure the content is clearly and accurately worded. This is not a legal document but serves a complementary role to the drug data sheet contained in the Summary of Product Characteristics (SPC) and the British National Formulary (BNF).

This guide is intended as a support tool for health professionals working within Cork University Hospital Group (CUHG) and is provided for reference only. The information contained in the guide was collated by CUHG and reflects internal processes and procedures of CUHG and relevant local factors. The guide is not intended to be used outside CUHG. The information provided in this guide does not take into account the particular circumstances of any individual or patient and may not contain all the information required for taking treatment decisions. It is intended to support but not replace clinical judgement. It should therefore not be used as the sole basis for prescribing any drugs or for the care of any patient, and should not be used for purposes other than supporting health professionals within CUHG. As such, users remain responsible for any prescribing, treatment or other decisions taken after consulting this guide.
Therefore, use of this guide by any persons, including health professionals working within other hospitals, is at your own risk, and we make no representations or guarantees as to the adequacy or completeness of any of the information contained in this guide, or the guide's compatibility with any policies or procedures of other hospitals where this guide is used by persons other than healthcare professional working within CUHG.
Updates may be released periodically and it is up to you to ensure that you are using the most up to date version available. The editors and copyright holders may choose to modify these terms and conditions, in whole or in part, at any time and for any reason, without prior notice to you. Such modified terms and conditions shall supersede these terms and conditions and shall become binding when published on the guide
CUHG, the authors, editors and/or copyright holders shall not be liable for any claim, injury, loss or damage (however caused) arising from the use or misuse of the guide, its contents, or any omissions from its contents or otherwise.
Use of the CUHG IV guidelines is only permitted on acceptance of these terms and conditions. By continuing to use this guide, you confirm that you have read, understood and agree to the terms and conditions above and are bound by them.

The monographs are referenced according to the brand/generic available at CUH at the time of going to print. On occasion there will be switches of brands for supply reasons or cost considerations. The intranet version (available on **Staff Directory**, under Guidelines – Pharmacy Guidelines) will be updated immediately. Where changes to brands stocked impacts significantly on administration details, pharmacy will make every effort to inform the relevant ward areas.

Other notes

1) The information contained in these drug monographs is not exhaustive; the patient's clinical condition may require administration techniques which vary from these guidelines. If required, seek further advice from Pharmacy Dept on 22542 or 22146.

2) **The monographs contain the basic practical information relating to the administration of these drugs. Detailed information on dosage, indication, cautions, contraindications and adverse effects is not included and may be found in the BNF and SPC.**

3) If a drug is compatible with both sodium chloride 0.9% and glucose 5% it will also be compatible with a combination of both.

4) The information provided is for the treatment of adults.

5) The drug monographs are largely organised in alphabetical order by approved generic name – see contents.

6) It is essential to use good aseptic technique to prepare and administer parenteral drugs in order to prevent bacterial contamination. Deviation from these guidelines may affect the chemical stability of the drug. See Aseptic Non Touch Technique (ANNT) poster for further information.

7) Data has generally not been provided for stability beyond 24 hours, due to concern about microbial contamination. Parenteral drugs should not be infused over greater than 24 hours.

8) When a solid is dissolved in a fluid, the volume of the fluid increases. The volume of this increase is called the displacement value. Displacement values for powders for injection become important when only part of a reconstituted vial is to be administered to a patient, a situation that commonly arises when small doses are administered to neonates and children. The consideration of displacement values is usually not clinically significant in adult patients.

9) Other information is available for drugs not included in these Guidelines – see Critical Care (**Appendix 1**).

10) **CUH Adult Antimicrobial Guidelines** are available on the **Staff Directory**.

11) These guidelines are to be used in conjunction with

- Policy Procedure and Guidelines for Management of Patients attending CUH Infusion Unit for Intravenous Therapy **(PPG-CUH-CUH-243)**
- The Administration of Intravenous Therapy to Adult Patients by Nurses and Midwives. (**PPG-CUH-NUR-19**)
- Protocol on the Administration of 0.9% w/v Sodium Chloride Injection Intravenous Flush to Adult Patients by Nurses and Midwives (**PPG-CUH-NUR-18**)
- The Management of Infiltration of non vesicant and extravasation of vesicant cytotoxic intravenous medications. **(PPG-CUH–CUH-138)**
- Policy for the handling of Cytotoxic IV medications for Non oncology patients available on **PPG-CUH-CUH-266**
- Recognising, investigating and managing a suspected transfusion reaction in CUH Group **(PPG-CUH-CUH-30**
- Medication protocol for the administration of Epinephrine (Adrenaline) Injection BP 1:1000 IM injection by nurses and midwives for the management of a patient with anaphylaxis in CUH **(PPG-CUH-NUR-21)**
- Management of High Alert Medications in Cork University Hospital **(PPG CUH CUH 261)**
- Guide on Sound-Alike Look-Alike Drugs (SALAD) in Cork University Hospital **(PPG-CUH-CUH-224)**

II. Key

IV Injection: Intravenous injection introduced directly into a vein or a freely flowing IV line. Usual fluid volumes used 10-20mL.

IV Infusion: Intermittent – an infusion from a burette or minibag running over approximately 15-60 minutes. Fluid volume used usually 50-1000mL.

Continuous – an infusion running over more than 1 hour. Fluid volume usually exceeds 250mL.

IM Injection: Intramuscular Injection

SC Injection: Subcutaneous Injection

CSCI: Continuous Subcutaneous Infusion

WFI	=	Water for Injection
Glucose	=	Dextrose
mg/min	=	milligrams per minute
mg/mL	=	milligrams per mL
mg/kg	=	milligrams per kilogram bodyweight
w/v	=	weight in grams/ per 100 mL volume

Peripheral & central intravenous medication administration

For the ANTT Practice Framework see: www.antt.org

ANTT® Aseptic Non Touch Technique

★ Prep patient, expose IV access

★ Check medications

Preparation zone

1


Clean hands with alcohol hand rub or soap & water

2


Clean tray according to local policy - creating a Main General Aseptic Field; whilst it dries . . . .

3


Gather equipment place around tray

4


Clean hands with alcohol hand rub or soap

5


Apply non-sterilized gloves and plastic apron (use sterilized gloves if you must touch Key-Parts)

6


Prepare Equipment protecting Key-Parts with non-touch technique (NTT) and Micro Critical Aseptic Fields (Caps & Covers)

Patient zone

Proceed to the patient and…

if your gloves have not been contaminated

if, your gloves have been contaminated, clean your hands & re-glove

6a


6b


7


Scrub the hub

- Use a 2% chlorhexidine/70% alcohol wipe
- Open the wipe fully & use NTT
- Scrub the HUB TIP for 15 secs creating friction using different areas of the wipe
- Then wipe away from the tip
- Allow to dry before use

8


Administer drugs using NTT

9


Dispose of sharps & equipment

1


Dispose of gloves then apron & immediately…

1


Clean hands with alcohol hand rub or soap & water

Decontamination zone

1


Clean tray according to local policy

1


Clean hands with alcohol hand rub or soap & water

Cork University Hospital Dec 2016

IV. Extravasation of Non-Chemotherapy Drugs

1. Definitions

Extravasation
The inadvertent or accidental administration of vesicant medication into the subcutaneous or subdermal tissues rather than into the intended intravenous compartment.
Extravasation causes pain, erythema, inflammation and discomfort and in some cases necrosis, and functional loss of the tissue of the affected limb. Extravasation injuries can therefore range from erythematous reaction through skin sloughing to severe necrosis.

Infiltration
The inadvertent administration of a non-vesicant solution or medication into the tissues surrounding the intravenous cannula or vascular catheter.
Tissue damage may occur from compression of surrounding tissues by a large volume of fluid in the event of an infiltration.

Vesicant
A vesicant is a drug or solution that has corrosive properties and thereby has the potential to cause tissue destruction. This damage can involve nerves, tendons and joints.

2. Recognition of Extravasation

An infiltration/extravasation should be suspected if one or more of the following signs and/or symptoms are present:

- The patient complains of stinging, burning pain, or other acute changes at/above/below the injection site or along the chest wall. This should be distinguished from a feeling of cold which may occur with some medications or which occurs with infiltration of non vesicant cytotoxic medications or venospasm.
- Observation of induration (hardening of a normally soft tissue or organ), swelling, redness or blistering at/above/below the injection site or along the tunnel/around port pocket.
- No blood return is obtained from the cannula or Central Venous Access Device. This is not always a sign of infiltration/extravasation, if found in isolation.
- A resistance is felt on the plunger of the syringe while attempting to administer a bolus medication.
- There is absence of free flow of an infusion.

3. Risk factors

Careful assessment of all patients receiving non-vesicant and vesicant intravenous medications must be carried out. Patient assessment involves identifying any potential factors that may increase a patient's risk of developing infiltration/extravasation.

Risk factors include:

- Fragile veins
- Small blood vessels
- Hard sclerosed veins
- Mobile veins
- Impaired circulation
- Obstructed vena cava
- Pre-existing conditions (e.g. diabetes, Raynauds Syndrome, radiation damage)
- Obesity
- Sedated or confused patient's inability to report discomfort
- Decreased sensation (e.g. as a result of neuropathy, diabetes, peripheral vascular disease, cerebral vascular accident (CVA))
- Multiple attempts at cannulation

4. Initial Management of infiltration/extravasation

Extravasation is a medical emergency. Early detection and prompt action is required for the management of an infiltration/extravasation.

There is a large degree of clinical judgement when treating an infiltration/extravasation and each injury should be assessed and managed on an individual basis by competent staff. The following management procedure should be used as a guide only. Not all steps may be necessary. Prescribe treatment depending on the severity of the extravasation. Clinicians should consider the appropriateness of each step.

- Stop the infusion immediately. Where the abrupt discontinuation of a treatment would be clinically detrimental, inform the medical team immediately.
- Inform relevant team and seek their assistance.
- Consider referral to a plastic surgeon at the earliest opportunity in the event of an extravasation of a vesicant drug, or in the event of an infiltration of a large volume of fluid/medication.

- Explain what has happened to the patient and educate on all interventions necessary.
- Use a marker to measure the extent of the extravasation.
- Withdraw as much of the medication as possible from the cannula.
- Promote patient comfort and administer prescribed analgesia as required.
- Instruct the patient on the correct care of the site and on the use of any treatment formulations which they may need to apply/perform.
- Complete Infiltration/extravasation record
- Complete National Incident Report Form
- If appropriate inform patient's Public Health Nurse and/or GP

5. Documentation

In the event of infiltration/extravasation the documentation should include the following:

- National Incident Report Form.
- Patient details and any additional relevant information. Attach a patient identification label if available.
- Date and time of infiltration/extravasation and the medication/s used.
- The administration method used, e.g. bolus or infusion.
- The approximate amount of medication/s infiltrated or extravasated.
- Type of vascular access device used e.g. peripheral cannula or CVAD.
- The catheter site and size if possible (a diagram or photograph is useful to indicate the location and size of the infiltration/extravasation site).
- Document date/approximate length of time since cannula was sited.
- Document the appearance of the affected area and any signs/symptoms observed or reported by the patient.
- Document name of doctor notified and any other referrals ordered e.g. plastic surgeons.
- Document treatment measures used e.g. antidotes administered and the effect of these interventions.
- Record any instructions given to patient if relevant.

V. Administration Risk Rating

Administration of injectable medications is associated with a high risk of adverse drug events (ADE). These ADEs may include, but are not limited to:

- medication errors (e.g. wrong drug, dose, route, rate etc.)
- adverse drug reactions
- catheter-related complications (e.g. phlebitis, bloodstream infection, and extravasation)
- allergic reactions.

Cork University Hospital acknowledges the high risk associated with administration of **all injectable medications**. To mitigate these risks, staff must ensure they are familiar with and adhere to individual drug data sheets, the BNF and local PPGs, as applicable.

If an adverse drug event occurs, this should be reported to the CUH Quality and Patient Safety Department on a National Incident Report Form (NIRF) and to the Health Products Regulatory Authority (HPRA), if applicable.

1. Consider the Medication

To assist staff, the CUH Pharmacy Department has assigned a High Administration Risk Rating to medications that *may* be more likely to cause patient harm. When devising this list, the following categories were considered:

- High alert medicines as classified by Institute for Safe Medication Practice (ISMP) APINCH classification.

  A: **Anti-infective** – e.g. Gentamicin, Vancomycin, Tobramycin, Ambisome
  P: **Potassium** and other **conc. electrolytes** e.g. Magnesium Sulphate
  I: **Insulin**
  N: **Narcotics** – e.g. opioids, sedatives
  C: **Chemotherapy**
  H: **Heparins**

- Medications outlined in ISMP List of High-Alert Medications in Acute Care Settings:
  - Adrenergic Antagonists (e.g. **Metoprolol, Labetolol**)
  - Antiarrythmics (**Lidocaine, Amiodarone**)
  - Inotropic medications (**Digoxin**)

- Medications:
  - **With a therapeutic risk:** where there is a significant risk of patient harm if the injectable medicine is not used as intended.
  - **Requiring complex calculation:** any calculation with more than one step required for preparation and/or administration, e.g. micrograms/kg/hour, dose unit conversion such as mg to mmol or % to mg.
  - **With a complex method of preparation:** where a number of manipulations are involved or other steps including syringe-to-syringe transfer, preparation of a burette, or the use of a filter.

  These medicines include Intravenous Immunoglobulin (IVIG), monoclonal antibodies, IV iron, flumazenil, naloxone, phenytoin, ITU/Resuscitation medications (e.g. adenosine, adrenaline, atropine).

A *High Administration Risk Rating Medication* is denoted in individual IV monographs by a red box stating **CAUTION: High Administration Risk Rating**. It is essential that administrators adhere to individual drug data sheets, the BNF and local PPGs when handling, preparing, administrating, disposing and monitoring the effects of these medicines.

2. Consider the Route of Administration

In addition, staff must consider the risk associated with administering medication via specific routes. For example,

- Some medications are too irritant or toxic to be administered as a concentrated injection. Erythromycin is too painful and irritant to the vein, while potassium chloride 15% injection is too toxic to the myocardium in high concentration and inadvertent IV bolus administration has resulted in fatalities. Both medications must be administered via IV infusion.
- A medication administered via a continuous subcutaneous infusion, for example cyclizine, may pose additional risks than if it were administered as an IV injection. These risks may include calculation errors and drug incompatibility/ instability issues.

Staff should refer to individual monographs, drug data sheets, the BNF and local PPGs for guidance on the suitability of administering a medication by a specific route.

VI. Sound-Alike Look Alike Drugs

Sound-Alike Look-Alike Drugs (SALADs) involve medications that are visually similar in physical appearance or packaging and names of medications that have spelling similarities and/or similar phonetics. Mix-ups between SALADs is one of the leading causes of medication errors according to the WHO Collaborating Centre for Patient Safety Solutions.[1]

Throughout this guide, individual medications have been highlighted if they are considered to be a **Potential SALAD**. As packaging and brands of specific products may change from time to time, administrators are advised to mindful of the potential risk of SALAD errors for all medication administrations. Refer to **PPG-CUH-CUH-224** for further information.

VII. Monographs

Abatacept

Reduce direct handling to a minimum and wear appropriate personal protective equipment

Abatacept dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form & Storage	Powder for concentrate for solution for infusion Pack includes a silicone free syringe Refrigerate unopened vials at 2 - 8°C & protect from light.
Reconstitution	• Using the silicone-free syringe provided, reconstitute each vial with 10mL water for injections, directing the stream to the wall of the vial. • Remove the syringe and needle before swirling and rotating the vial gently to minimise foam formation; do not shake. • Once the powder has dissolved, vent the vial with a needle to dissipate any foam. The reconstituted solution (25mg/mL) requires further dilution before administration. • See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information
Compatibility & Stability	Sodium chloride 0.9%
Administration	**IV Infusion** • Dilute required dose to a total volume of 100mL with sodium chloride 0.9%. • Remove a volume of sodium chloride 0.9% from a 100mL infusion bag or bottle equal to the volume of the reconstituted dose required. • Using the same silicone-free disposable syringe as before, slowly add the reconstituted dose to the infusion container and gently mix the solution. The final concentration of abatacept should be no more than 10mg/mL • Give over 30 minutes through a low-protein-binding **filter** (0.2 to 1.2micron). • See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	Medicinal products for the treatment of hypersensitivity reactions, e.g. adrenaline, oxygen, antihistamines and corticosteroids should be available for immediate use in the event of an allergic reaction during administration of all infusions.
Disposal	Dispose used vials, infusion bag and administration set in purple-lidded bins.
Additional Information	• Orencia® contains maltose. Medicinal products containing maltose can interfere with the readings of blood glucose monitors that use test strips with glucose dehydrogenase pyrroloquinolinequinone (GDH-PQQ). ACCU-CHEK Inform II (stocked in CUH) that are labelled with a green symbol on the outer box do not have a clinically relevant maltose interference.

Information relates to Orencia® manufactured by BMS.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Aciclovir

Caution: We may provide stock from any of suppliers listed below. Please be aware of different concentrations available (**25mg/mL** and **50mg/mL**)

Aciclovir dosing is weight based; ensure accuracy of documented weight before administration

Form	**Concentrate for solution for infusion 25mg/mL** 250mg per 10mL vial (Pfizer) 500mg per 20mL vial (Pfizer) **Concentrate for solution for infusion 50mg/mL** 500mg per 10mL vial (Eugia, Fresenius Kabi)	250mg **powder for solution for infusion** (Bowmed Ibisqus, Hikma and Zovirax (GSK)) (**25mg/mL once reconstituted**)
Reconstitution	Already in solution **Dilute further before administration**	Reconstitute with 10mL WFI or Sodium Chloride 0.9% Shake gently until the contents of the vial have dissolved completely.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view should be used immediately**. Stable for up to 12 hours at room temperature when diluted as recommended	
Administration	**IV Infusion** Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Infusion concentration should not exceed 5mg/mL. Shake well before administration to ensure thorough mixing. Administer over at least 1 hour. Discard the solution if it becomes cloudy or crystals appear before or during the infusion.	
Disposal	Vial should be discarded after use as it contains no preservative.	
Extravasation	Extravasation can cause tissue damage due to high pH of aciclovir.	
Additional Information	• Maintain adequate hydration of patient. • To avoid excessive dosage in obese patients, dose should be calculated on the basis of Adjusted Body Weight – see the CUH Antimicrobial Guidelines on Eolas for guidance.	

Required Dose	Volume of Infusion Fluid
250 - 500mg	100mL
500 - 1250mg	250mL
≥1250mg	500mL

Information provided relates to Aciclovir manufactured by Pfizer, Bowmed Ibisqus, Eugia, Hikma, GlaxoSmithKline and Fresenius Kabi.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Additrace®

Form	10mL vial: Each vial contains Iron, Zinc, Manganese, Copper, Chromium, Selenium, Molybdenum, Fluoride and Iodide in trace amounts. Each vial contains less than 1mmol of both potassium and sodium.
Reconstitution	Already in solution **Dilute further before administration**
Compatibility & Stability	Glucose 5% Sodium Chloride 0.9%
Administration	Do not use if solution is cloudy or has sediments. **IV infusion** Add 10mL of Additrace® to 100mL of compatible infusion fluid and administer over 2 - 3 hours. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Extravasation	Extravasation is likely to cause tissue damage due to low pH.
Additional Information	• Additrace® is normally administered in conjunction with Parenteral Nutrition. • For patients prescribed Additrace®, Solivito N®, and Vitlipid N Adult®, or a combination of these, they can be infused together in 100mL glucose 5% or sodium chloride 0.9% over 2 - 3 hours. • Additrace® should be used with caution in patients with impaired biliary and/or impaired renal function in whom excretion of trace elements may be significantly decreased. • Use with caution in patients with biochemical or clinical evidence of liver dysfunction (especially cholestasis). • If treatment is to continue for more than 4 weeks, check manganese levels.

Information provided relates to Additrace® manufactured by Fresenius Kabi.

Addiphos®

CAUTION: High Administration Risk Rating	
Form	Addiphos® concentrate containing potassium dihydrogen phosphate, disodium phosphate dihydrate and potassium hydroxide One vial (20 mL Addiphos) provides the following: **Phosphate** 40 mmol, **Potassium** 30 mmol, **Sodium** 30 mmol
Reconstitution	In solution. **Must be diluted before administration**
Compatibility & Stability	Glucose 5% Sodium chloride 0.9% Addiphos® must not be added to infusions containing Addamel/Additrace due to the risk of precipitation.
Administration	**IV infusion:** Dilute and give slowly over at least 6 hours using an infusion pump. The rate of administration should be appropriate to correct electrolyte deficiency and suitable for individual fluid requirements. Administration via a central venous access device is preferred. If diluted sufficiently, Addiphos® may be given via a large peripheral vein. **IV infusion via a peripheral line:** Add 10mL Addiphos® to 500mL glucose 5%. Mix well This provides approximately: 20mmol phosphate (0.04mmol in 1mL) 15mmol potassium (0.03mmol in 1mL) 15mmol sodium (0.03mmol in 1mL) **or** Add 20mL Addiphos® to 750mL glucose 5%. Mix well This provides approximately: 40mmol phosphate (0.053mmol in 1mL) 30mmol potassium (0.04mmol in 1mL) 30mmol sodium (0.04mmol in 1mL) **IV infusion via central line** Add 10 mL Addiphos to 40 mL glucose 5%. Mix well and infuse via syringe pump. This provides: 20mmol phosphate (0.4mmol in 1mL) 15mmol potassium (0.3mmol in 1mL) 15mmol sodium (0.3mmol in 1mL)
Monitoring	Monitor serum electrolytes (calcium, phosphate, potassium, sodium), renal function, fluid balance, acid-base balance, ECG, blood pressure.
Extravasation	Extravasation is likely to cause tissue damage due to high osmolarity (more likely with higher concentrations). Monitor the peripheral insertion site closely and resite at first signs of inflammation.
Additional Information	• Addiphos® contains potassium. The maximum infusion rate for Addiphos® is 10mmol potassium per hour. • Correction of phosphate with Addiphos® is unlicensed.

Information relates to Addiphos® manufactured by Fresenius Kabi.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications.
Further information is available from Pharmacy on 22146 or 22542

Adenosine

CAUTION: High Administration Risk Rating	
Form	6mg per 2mL vial
Reconstitution	Already in solution
Compatibilty and Stability	N/A
Administration	**IV Injection only** Rapid IV bolus over 2 seconds either directly into central or large peripheral vein or into an IV line. If given into an IV line, it should be injected as close to the cannulation site as possible. Follow by a rapid sodium chloride 0.9% flush.
Monitoring & Adverse Drug Reactions	• Adenosine should only be used where facilities for cardiac monitoring and cardiorespiratory resuscitation equipment exist. • The occurrence of angina, severe bradycardia, severe hypotension, respiratory failure, or asystole/cardiac arrest, should lead to immediate discontinuation of administration. • Side effects are generally short lived as half-life is less than 10 seconds. They include facial flushing, shortness of breath, nausea, heart block, dizziness, headache and hypotension.

Information provided relates to Adenocor® manufactured by Sanofi-Aventis.

Adrenaline (Epinephrine)

CAUTION: High Administration Risk Rating	
Form	1 in 10,000 (1mg per 10mL) prefilled syringe (Resuscitation trolley only) 1 in 1,000 (1mg per 1mL) ampoule
Reconstitution	Prefilled syringe: Already in solution Ampoule: Already in solution. • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **<u>Dilute further before IV administration.</u>**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**<u>IV injection</u>** Use 1 in 10,000 (1mg per 10mL) prefilled syringe where available. If the prefilled syringe is not available the 1 in 1,000 (1mg per 1mL) preparation should be diluted to 1 in 10,000. Dilute 1mL with 9mL Sodium Chloride 0.9% and mix well. Give by rapid IV injection. Administer via a central venous access device if already in place, or into a large peripheral vein. IV injection administered via a peripheral vein should be followed by a 20mL flush of Sodium Chloride 0.9% to aid entry into the central circulation. **<u>IM Injection</u>** Use 1 in 1,000 (1mg per 1 mL) ampoule. **<u>IV infusion</u>** Contact ITU/Pharmacy for guidance. Discoloured solutions or solutions containing precipitate should not be used.
Extravasation	Extravasation may cause tissue damage.
Additional Information	• Repeated local administration may produce necrosis at the sites of injection. • Intramuscular injections of Adrenaline into the buttocks should be avoided because of the risk of tissue necrosis. • See **PPG-CUH-NUR-21** - Medication Protocol for the Administration of Epinephrine (Adrenaline) Injection BP 1:1000 by IM injection nurses and midwives for the management of a patient with anaphylaxis.

Information provided relates to Adrenaline manufactured by MercuryPharma and prefilled syringes manufactured by Aurum.

Alfentanil

Potential SALAD Alfentanil is similar sounding to fentanyl		
CAUTION: High Administration Risk Rating		
Form & Storage	0.5 mg per mL (1mg/2mL), available as 1mg in 2mL amp 5mg in 10mL amp	Controlled Drug (CD): Must be stored in CD Press
Reconstitution	Already in solution • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Injection** No dilution required. Slow IV injection over 30 seconds. **SC Injection** Give required dose by SC injection. **Continuous SC Infusion** Dilute required dose with WFI or sodium chloride 0.9%.	
Extravasation	Extravasation may cause tissue damage due to low pH.	
Antidote	Naloxone should be kept in all areas where opioids are administered.	
Monitoring	Monitor blood pressure, heart rate and respiratory rate.	
Additional Information	• Prescribe and record in **mg** rather than **micrograms** (1mg = 1000 micrograms) • Alfentanil is an injectable strong opioid which is 30 times more potent than oral morphine. It is used, following specialist advice, for moderate to severe opioid responsive pain in palliative patients with stage 4-5 chronic kidney disease (eGFR <30ml/min/1.73m2), or severe acute renal impairment. It is administered as single subcutaneous injections or as a continuous subcutaneous infusion via a syringe pump. • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: • Contact the Pharmacy Department or Palliative care team for further guidance. • Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.	

Information provided relates to Rapifen® manufactured by Piramal Critical Care

Alteplase (Cathflo®)

Potential SALAD Actilyse Cathflo® is used for thrombolytic treatment of occluded central venous access devices. Do not confuse Actilyse Cathflo® with Actilyse® used for systemic thrombolysis.		
Form & Storage	2mg powder for solution for injection	Store in a refrigerator at 2–8°C
Reconstitution	Reconstitute with 2.2mL water for injections to give a concentration of 1mg in 1mL (2mg in 2mL). Swirl the vial gently to avoid foam formation until contents are completely dissolved.	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	The reconstituted preparation is a clear and colourless to pale yellow solution. Prior to administration it should be inspected visually for particles and colour. Instil the appropriate volume of reconstituted solution into the occluded central venous access device. **Device** / **Volume of Alteplase** PICC — 1mL Hickmann's — 1 - 2mL Port — 1 - 2mL • After at least 30 minutes of dwell time, assess catheter function by attempting to aspirate blood. If the catheter is still not functional, leave the alteplase in the catheter for a further 90 minutes (120 minutes total) and then try to aspirate blood and catheter contents. • If catheter function is not restored after the first dose, a second dose of equal amount may be instilled. Repeat the procedure. If after a second dose of alteplase the device remains dysfunctional seek specialist advice. • If catheter function has been restored, aspirate 4 - 5 mL of blood to remove alteplase and residual clot, and gently irrigate the catheter with Sodium Chloride 0.9%.	
Additional Information	• Actilyse® should not be administered to patients with a known hypersensitivity to Gentamicin (trace residue from manufacturing process).	

Information provided relates to Actilyse Cathflo® manufactured by Boehringer Ingelheim and Cathflo® Activase® manufactured by Genentech Inc

AmBisome® (Amphotericin-Liposomal B)

Ambisome® dosing is weight based; ensure accuracy of documented weight before administration	
Registered nurses and midwives are not authorized to administer the <u>test</u> dose of any intravenous medication that requires a test dose	
Restricted Antimicrobial Refer to CUH Antimicrobial Guidelines on Eolas for further information.	
CAUTION: High Administration Risk Rating	
Form	50mg vial of powder for concentrate for dispersion for infusion
Reconstitution	Add 12 mL WFI provided to each 50mg vial to give 4mg per mL solution. Shake vigorously for at least 30 seconds immediately after the addition of water. Do not use reconstituted solution if there is any evidence of precipitation of foreign matter. **Dilute further before administration**
Compatibility & Stability	**Glucose 5% ONLY** **From a microbiological point of view, should be used immediately**; however: • Reconstituted vials are single use only but may be stored at 2–8°C for 24 hours. • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.
Administration	**<u>IV Infusion</u>** • Flush IV lines with **Glucose 5%** prior to and after infusion. • Draw up from reconstituted vials into a syringe without the filter. • Use **5 micron filter** provided to add liposomal amphotericin to infusion fluid Dilute required dose with glucose 5% to give a final concentration of between 0.2mg/mL to 2 mg/mL. **Required Dose** / **Volume of Infusion Fluid** Less than 100mg / 100mL 100-500mg / 250mL 500-1000mg / 500mL Administer over 30 - 60 minutes, or over two hours for doses greater than 5mg/kg. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **Prior to the administration of the <u>first</u> dose, a test dose of 1mg should be administered** - **See next page**

AmBisome® (Amphotericin-Liposomal B)

Administration ctd	**Prior to the administration of the first dose, a test dose of 1mg should be administered** slowly over 10 minutes and the patient carefully observed for 30 minutes after. • Make up the dose for day 1. • Calculate the volume which contains 1mg • Set the pump at a rate which will deliver the 1mg dose over 10 minutes • It may be necessary to flush the line to ensure delivery of such a small dose. • Stop the infusion and observe the patient for 30 minutes. • If no severe allergy or adverse reactions develop, restart the infusion pump and administer the remainder of the dose over 30 - 60 minutes.
Monitoring	• Monitor hepatic and renal function, blood counts, and plasma electrolyte (including plasma-potassium and magnesium concentration). • Monitor pulmonary function.
Extravasation	Extravasation may cause tissue damage.
Additional Information	Product contains soya oil – not to be used if patient allergic to peanut or soya.

Information provided relates to AmBisome® manufactured by Gilead.

Amikacin

Amikacin dosing is weight based; ensure accuracy of documented weight before administration	
Restricted Antimicrobial Refer to CUH Antimicrobial Guidelines on Eolas for further information	
CAUTION: High Administration Risk Rating	
Form	500mg per 2mL vial
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Prepared infusions may be stored between 2 – 8 °C and infused within 24 hours
Administration	**IV Infusion** Dilute in 100mL of compatible fluid. Infuse over 30mins. **IM Injection (avoid if possible)** Give by deep IM injection.
Monitoring	Monitor renal function and plasma drug levels. Refer to CUH Antimicrobial guidelines on Eolas for further guidance.
Additional Information	• Patients should be well hydrated. • To avoid excessive dosage in obese patients (where Actual Body Weight is more than 120% of Ideal Body Weight), use Adjusted Bodyweight to calculate dose – see the CUH Antimicrobial Guidelines on Eolas for guidance.

Information provided relates to Amikacin manufactured by Caragen (licensed) and Normon (unlicensed).

Aminophylline

Aminophylline dosing is weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating	
Form	250mg per 10mL ampoule
Reconstitution	Already in solution • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules** Discard the ampoule if the contents are discoloured. **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**Intermittent IV infusion (Loading dose)** Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. The loading dose should be diluted in 100mL and administered over at least 30 minutes. The rate of administration should not exceed 25mg per minute. **Continuous Infusion (Maintenance dose)** Dilute to a concentration of 1mg in 1mL (e.g. 500mg aminophylline in 500mL). Fluid restriction: Can be given by a central venous access device at higher concentrations i.e. required dose in 50mL (or undiluted). The rate of administration should not exceed 25mg per minute.
Monitoring	• Serum theophylline levels should be monitored. • Monitor ECG, heart rate and blood pressure during administration. • Monitor serum potassium levels if therapy is on-going.
Extravasation	Extravasation likely to cause tissue damage.
Additional Information	• Aminophylline is usually prescribed as a **loading dose** followed by a **maintenance dose**. A loading dose is not normally given to patients taking oral theophylline or aminophylline; if considered necessary, defer treatment until a serum theophylline level is available. • Calculate dose on the basis of ideal body weight in obese patients to avoid excessive dosing. Refer to Ideal Body Weight calculator on Eolas. • Dose adjustment may be necessary if smoking started or stopped during treatment

Information provided relates to Aminophylline manufactured by MercuryPharma.

Amiodarone

Amiodarone dosing may be weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating	
Form	300mg per 10mL prefilled syringe (resuscitation trolley) 150mg per 3mL ampoule
Reconstitution	Already in solution • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	**Glucose 5% ONLY** Do not over-dilute. Solutions containing less than 300mg amiodarone in 500mL (i.e. less than 600 micrograms per mL) are unstable and should not be used. **Incompatible with PVC** A non-PVC infusion container (Baxter Viaflo®, Braun Ecoflac®) and a non-PVC infusion set should be used.
Administration	**Slow IV injection – extreme clinical emergency only** • Use 300mg per 10 mL prefilled syringe. Does not require further dilution. • If prefilled syringe is unavailable the 150mg in 3mL preparation can be used. **Dilute to 10mL** by adding 300mg (2 ampoules: 6mL) to 4mL glucose 5%. Give over a minimum of 3 minutes. Flush with 10mL of glucose 5%. This should not be repeated for at least 15 minutes. Patient must be closely monitored, e.g. in ICU/CCU/ED setting. **Intermittent IV infusion (Loading dose)** Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Dilute required dose in 250mL glucose 5% and infuse over one hour. **Continuous IV infusion** Add required amiodarone dose (usually 900mg, max 1200 mg) to 500mL glucose 5% and infuse using an electronically controlled pump over 23 – 24 hours (900mg) and 24 hours (1200mg). When repeated or continuous infusion is anticipated, administration via a central venous catheter is recommended. The maximum concentration for continuous infusion via peripheral veins is 2mg/mL.
Monitoring	• Blood pressure, heart rate and ECG must be monitored during administration. • Should only be administered where facilities exist for cardiac monitoring, defibrillation and cardiac pacing.
Extravasation	• Infusion site reactions may occur, monitor site closely. • Extravasation is likely to cause tissue damage. Repeated or continuous infusions should be given via central line.
Additional Information	• Amiodarone is often administered as a **loading dose** followed by a smaller **maintenance dose**.

Information provided relates to Cordarone® manufactured by Sanofi, Aurum and Hameln Pharmaceuticals.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Amoxicillin

This is a PENICILLIN	
Form	500mg vial
Reconstitution	**Intravenous** Add 10mL WFI to 500mg vial and shake vigorously. **Intramuscular** Add 2.5mL WFI to 500mg vial and shake vigorously. • Reconstituted vials should be used immediately. • Reconstituted solutions are normally a pale straw colour; however, a transient pink colour or slight opalescence may appear during reconstitution.
Compatibility & Stability	Sodium Chloride 0.9% (preferred fluid) – stable for 4 hours. Glucose 5% - stable for 20 mins. **From a microbiological point of view, should be used immediately**
Administration	**IV Injection**: **for doses less than or equal to 1g** Give slowly over 3 - 4 minutes. **Intermittent IV Infusion: for doses less than or equal to 2g** Dilute reconstituted vial to a volume of 50 - 100mL and give over 30 - 60 minutes. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **IM Injection** Do not inject more than 1 g of amoxicillin IM at one time.
Extravasation	• Amoxicillin has a high pH and may cause venous irritation and tissue damage in cases of extravasation
Additional Information	• Monitor for convulsions in patients with impaired renal function or receiving high doses. • Avoid skin contact as may cause sensitisation.

Information provided relates to Amoxil® manufactured by GlaxoSmithKline.

Andexanet

CAUTION: High Administration Risk Rating

Form & Storage	Powder for concentrate for solution for infusion. Each vial contains 200mg andexanet alfa	Store in a refrigerator (2°C - 8°C) in the original package to protect from light.

Reconstitution

- Add 20 mL water for injections, using a syringe with a 21-25 gauge needle, directing the liquid down the wall of the vial to avoid excessive foaming.
- Gently swirl the vial for at least 15 seconds. Do not shake vigorously or invert.
- Leave for 3- 5 minutes to allow foam to settle; the vial can be gently swirled occasionally during this time.
- **Low dose**: Reconstitute 5 vials
- **High Dose**: Reconstitute 9 vials
- The reconstituted solution is clear, colourless or slightly yellow.
- Reconstituted solution contains 200mg in 20mL (10mg/mL)

Compatibility & Stability

From a microbiological point of view, once reconstituted, the product should be used immediately.

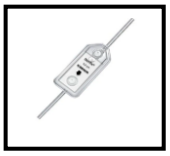
Administration Equipment

1) Syringe Driver

Administer using a Syringe Driver **capable of max rate 160mL/hr.**
All pumps in ED,GITU, CUMH are suitable, other wards/areas including CRC should request the syringe driver pump from the pump library
-Ring **08703523112**

2) 0.2 Micron in-line Filter

Attach a **0.2micron filter** to the end of the administration set, before it is connected to the patient. This filter (pictured) **B Braun Sterifix® 0.2µ Ref 4099303** is kept in Infusion unit, ED & 3A.



Administration

- **IV loading dose** followed by **maintenance dose** using an infusion pump syringe driver
- Withdraw the reconstituted solution from each vial into the large-volume (50mL) syringes (equipped with a 20-gauge or larger needle)
- It is recommended to split the solution intended for loading (bolus) and maintenance (continuous infusion) to ensure the correct administration rate

Low Dose – Reconstitute 5 x 200mg vials

Administration	Dose	Volume	Rate	Time to administer
IV Bolus (Loading)	400mg	40mL	160 mL/hr	15 min
IV Infusion (Maintenance)	480mg	48mL	24 mL/hr	120 min

High Dose – Reconstitute 9 x 200mg vials

Note: for high dose therapy, two syringes will be needed for the loading dose and two for the maintenance dose

Administration	Dose	Volume	Rate	Time to administer
IV Bolus (Loading)	800mg	80mL	160 mL/hr	30 min
IV Infusion (Maintenance)	960mg	96mL	48 mL/hr	120 min

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications.
Further information is available from Pharmacy on 22146 or 22542

<table>
<tr><td>Monitoring</td><td>Treatment monitoring should be based mainly on clinical parameters indicative of appropriate response (i.e. achievement of haemostasis), lack of efficacy (i.e., re-bleeding), and adverse events (i.e. thromboembolic events).</td></tr>
<tr><td>Adverse Drug Reactions</td><td>Common: Back pain; cerebrovascular insufficiency; chest discomfort; cough; dizziness postural; dry mouth; dyspnoea; feeling hot; fever; flushing; gastrointestinal discomfort; headache; hyperhidrosis; muscle spasms; nausea; palpitations; peripheral coldness; skin reactions; taste altered
Uncommon: Cardiac arrest; embolism and thrombosis; iliac artery occlusion; myocardial infarction</td></tr>
<tr><td>Dosing</td><td>

There are dosing regimens, depending on the specific direct factor Xa (FXa) inhibitor, last individual dose of FXa inhibitor and time since last FXa inhibitor dose

<table>
<tr><td colspan="4">Size and timing of last dose of apixaban or rivaroxaban taken determines whether high or low dose regimen is used.</td></tr>
<tr><td rowspan="2">FXa inhibitor</td><td rowspan="2">Last dose</td><td colspan="2">Timing of last dose before andexanet administration</td></tr>
<tr><td>< 8 hours or unknown</td><td>≥ 8 hours*</td></tr>
<tr><td rowspan="2">Apixaban</td><td>≤5mg</td><td>Low dose</td><td rowspan="2">Low dose</td></tr>
<tr><td>>5mg or unknown</td><td>High dose</td></tr>
<tr><td rowspan="2">Rivaroxaban</td><td>≤10 mg</td><td>Low dose</td><td rowspan="2">Low dose</td></tr>
<tr><td>>10 mg or unknown</td><td>High dose</td></tr>
<tr><td colspan="4">*Only patients who had acute major bleeding within 18 hours after administration of an FXa inhibitor were included in studies. Therefore it may NOT be clinically appropriate to administer andexanet alfa in patients where administration of an FXa inhibitor is greater than 18 hours as benefit in this patient cohort has not been demonstrated.</td></tr>
</table>

For patients on edoxaban or patients needing reversal for emergency surgery, please discuss treatment options with CUH haematology team.

</td></tr>
<tr><td>Contraindications and Cautions</td><td>

Andexanet alfa is not suitable for pre-treatment of urgent surgery
Interaction with heparin: Use of andexanet prior to heparinization e.g. during surgery should be avoided as andexanet causes unresponsiveness to heparin
Pro-coagulant factor treatments (e.g., 3- or 4-factor prothrombin complex concentrate (PCC)/activated PCC, recombinant factor VIIa, fresh frozen plasma) and whole blood should be avoided unless absolutely required, due to lack of data in combination with these treatments.
Consider the use of PCC in patients on apixaban or rivaroxaban requiring reversal of anticoagulation where andexanet alfa is contra-indicated or not clinically appropriate. Refer to local guidance for management of acute bleeding in patients on anticoagulation.

</td></tr>
<tr><td>Restarting Anticoagulant</td><td>

Manufacturer advises to consider re-starting anticoagulant therapy as soon as medically appropriate to reduce the risk of thrombosis.

</td></tr>
</table>

Information provided relates to Ondexxya® manufactured by or Astra Zeneca.

Anidulafungin

Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form & Storage	Vial containing 100mg dry powder	Store at 2–8°C in original packaging. Do not freeze.
Reconstitution	Reconstitute each vial with 30mL WFI and allow to stand for up to five minutes. **Dilute further before administration.**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Reconstituted vials may be stored at up to 25°C for 24 hours. • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours. Discard the solution if particulate matter or discoloration is present.	
Administration	**IV Infusion** **Loading dose 200mg (Day 1 only)**: Withdraw 50mL from 250mL infusion bag of compatible fluid and discard. Add 200mg (60mL) to remaining 200mL. Administer over 3 hours. **Maintenance dose 100mg**: Add 100mg (30mL) to 100mL of compatible fluid. Administer over 90 minutes. Final concentration of 0.77mg/mL. Recommended that rate of infusion does not exceed 1.1mg/min (1.4mL/min) when reconstituted and diluted as per instructions.	
Additional Information	• Infusion-related reactions have been reported with anidulafungin. Do not exceed the maximum infusion rate. • The product is stable for 96 hours at up to 25°C and may be returned to refrigerated storage after that time. • Anidulafungin is usually prescribed as a **Loading dose** followed by a **Maintenance dose**.	

Information provided relates to Ecalta® manufactured by Pfizer and Anidulafungin manufactured by Teva and Rowex.

Aprotinin (Trasylol®)

Restricted for use under Cardiothoracic Surgery in Cardiac Theatre and Cardiac Intensive Care (CITU)	
Form	Trasylol® 10,000 KIU/ml, solution for injection or infusion (50ml vial) (Aprotinin 10,000 KIU is also known as Kallikrein Inhibitor Units – KIU (Aprotinin 500,000 KIU in 50mls)
Reconstitution	Already in solution
Compatibility and Stability	N/A Already in solution
Indication	Prophylactic use to reduce blood loss and blood transfusion in adult patients who are high risk of major blood loss in cardiac surgery
Administration & Dosing	Aprotinin must only be given to patients in the supine position via a central venous catheter. The same lumen should not be used for the administration of other medicinal products. Owing to the risk of allergic/anaphylactic reactions a 1ml (10,000 KIU) test dose is administered to all patients at least 10 minutes prior to the remainder of the dose. Following the negative test dose the dosing regimen is -A loading dose of 2 million KIU (200ml) is administered as a slow intravenous injection or infusion over 20 – 30 minutes, in theatre only, after induction of anaesthesia and prior to sternotomy -A further 2 million KIU (200ml) should be added to the pump prime of the heart-lung machine -The initial bolus infusion is followed by the administration of a continuous infusion of 500,000 KIU per hour until the end of the operation, this infusion may be continued in CITU for a maximum period of 3 hours on the instructions of a consultant surgeon or anaesthetist to assist the control of bleeding. In general the total amount of aprotinin administered per treatment course should not exceed 7 million KIU (i.e. 14 vials or 700mls)
Monitoring	Hypersensitivity reactions including anaphylaxis or anaphylactoid reactions. These include hypotension, pruritus, rash, urticarial, bronchospasm and nausea. If allergic reactions occur administration should be stopped immediately.
Extravasation	No information available
Additional Information	Aprotinin is physically incompatible with heparin. To avoid physical incompatibility of aprotinin and heparin when adding to the pump prime solution, each agent must be added during recirculation of the pump prime to assure adequate dilution prior to admixture with the other component

Information provided relates to Trasylol® manufactured by Nordic Group B.V and local expert opinion

Artesunate

<table>
<tr><td colspan="2">Artesunate dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td>Form</td><td>Artesunate 60mg powder for injection</td></tr>
<tr><td>Reconstitution</td><td>Determine the number of vials needed
<table>
<tr><th>Weight</th><th><25 kg</th><th>26-50 kg</th><th>51-75 kg</th><th>76-100 kg</th><th>101-125kg</th></tr>
<tr><td>60mg vial</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
</table>

Draw up 1 mL of the supplied sodium bicarbonate solvent
Add to the artesunate powder.
Shake for several minutes until the powder is dissolved and the solution clear.
Discard the solution if it appears cloudy or a precipitate is present.

Dilute further before administration</td></tr>
<tr><td>Compatibility & Stability</td><td>Reconstituted solution should be used immediately</td></tr>
<tr><td>Administration</td><td>IV Injection (preferred) – do not administer as infusion

Draw up 5mL of the supplied sodium chloride 0.9% solvent
Add to the reconstituted artesunate solution, which yields a solution containing artesunate 10mg/mL. (60mg in 6mL)
Shake to mix well
Inject the desired volume (0.24 mL/kg) slowly over 1-2 minutes.

IM Injection

Draw up 2 mL of the supplied sodium chloride 0.9%
Add to the reconstituted artesunate solution, to yield a solution containing artesunate 20mg/mL. (60mg in 3mL)
Withdraw the required volume (0.12 mL/kg) from the vial and inject intramuscularly. If the total volume of solution to be injected is large, it may be preferable to divide the volume and inject it at several sites.
</td></tr>
<tr><td>Monitoring</td><td>Monitor blood pressure, heart rate, respiratory rate, signs of hypersensitivity and haemoglobin levels.
Monitor patients for 4 weeks after treatment for evidence of haemolytic anaemia.</td></tr>
<tr><td>Additional Information</td><td>
Give 2.4mg/kg IV/IM at 0, 12, 24 hours, then every 24 hours until oral treatment can be substituted e.g. 168mg in a 70kg patient
Dose adjustment is not required in renal or hepatic impairment
This is an Unlicensed medication in Ireland- please contact pharmacy to ensure adequate stock available.
Stock kept in ED and Pharmacy
Discuss all patients with ID
</td></tr>
</table>

Information provided relates to Artesun® manufactured by Fosun Pharma

Atropine

CAUTION: High Administration Risk Rating	
Form	Atropine 1mg/5mL (200microgram/mL) Prefilled Syringe (Critical care areas only) Atropine 600microgram/mL ampoule
Reconstitution	Already in solution • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**Rapid IV Injection** Use 1mg/5mL prefilled syringe where available. Give via a central venous access device if one is in place, otherwise use a large peripheral vein. In emergency situations where a peripheral line is used, give the injection rapidly and flush with 20mL sodium chloride 0.9%. **If the prefilled syringe is not available the 600micrograms/mL ampoule can be diluted.** To make a solution containing 100micrograms/mL Atropine: Dilute 1mL of 600microgram/mL Atropine with 5 mL Sodium Chloride 0.9% to give 6mL of 100microgram/mL Atropine.
Extravasation	Extravasation is likely to cause tissue damage as the pH is below 5.
Additional Information	May cause paradoxical bradycardia if given by slow IV injection.

Information provided relates to Atropine manufactured by Mercury Pharmaceuticals, and prefilled syringes manufactured by Aurum.

Aztreonam

Contains a PENICILLIN-LIKE structure May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration	
Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information	
Form	1g, 2g dry powder vial
Reconstitution	**IV Injection** Add 6 - 10mL WFI to each vial and shake well. **IV Infusion** IV infusion: Add at least 3mL WFI for each 1g of drug and shake well. **Dilute further before administration.** **IM Injection** IM injection: Add at least 3mL WFI or Sodium Chloride 0.9% for each 1g, and shake well.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% Reconstituted vials should be used immediately. **From a microbiological point of view, prepared infusions should be used immediately**; however, they may be stored at 2–8°C and infused (at room temperature) within 24 hours. Reconstituted solutions range from colourless to light straw to yellow. Solutions may develop a slight pink tint on standing without potency being affected.
Administration	**IV Injection** Give slowly over 3 - 5 minutes. **IV Infusion** Dilute each 1g with at least 50mL infusion fluid to give a solution not exceeding 20mg/mL. Infuse over 20 - 60 minutes.
Additional Information	Vials of reconstituted Azactam® are not intended for multi-dose use, and any unused solution from a single dose must be discarded.

Information provided relates to Azactam® manufactured by Bristol Myers Squibb.

Benzylpenicillin

This is a PENICILLIN	
Form	600mg vial
Reconstitution	**Intravenous** Add 4 - 10mL WFI or sodium chloride 0.9% to each 600mg vial. **Intramuscular** Add 1.6 - 2mL WFI to each 600mg vial. Use reconstituted vial immediately.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% Use reconstituted vials and prepared infusions immediately.
Administration Method	**IV Injection** Administer each 600mg vial by IV injection over at least 2 minutes (not faster than 300mg/min). **IV Infusion** After reconstitution, dilute total dose with 100mL infusion fluid and infuse over 30 - 60 minutes. **IM Injection** Maximum 1.2g as single dose.
Additional Information	• Benzylpenicillin is also referred as **Penicllin G** is some clinical guidelines. • One mega unit = 600mg. • For intravenous doses in excess of 1.2g (2 mega units) give slowly, taking at least one minute for each 300mg to avoid high levels causing irritation of the central nervous system and/or electrolyte imbalance. • Avoid skin contact as may cause sensitisation

Information provided relates to Crystapen® manufactured by Clonmel and Genus.

Brivaracetam

Form	10 mg/mL solution for injection/infusion
Reconstitution	Already in solution
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**IV bolus** • Use undiluted. • Give required dose over 3 minutes **IV infusion** • Dilute required dose with infusion fluid (50 - 100ml) and administer over 15 minutes
Adverse Drug Reactions	**Acute reactions:** anxiety, insomnia, irritability, dizziness, somnolence, drowsiness, fatigue, vertigo, cough, nausea, vomiting, pain at injection site.
Additional Information	• If switching between oral therapy and intravenous therapy (for those temporarily unable to take oral medication), the total daily dose and the frequency of administration should be maintained.

Information provided relates to Briviact® manufactured by UCB Pharma.

Bumetanide

Form	1mg in 4mL vial
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Administer dose over 1 - 2 minutes. **IV Infusion** Dilute dose in 500mL, final concentration no greater than 25microgram/mL, give over 30-60 minutes. Discard infusion if cloudiness appears. **IM Injection** No dilution required.
Additional Information	• Monitor serum electrolytes and renal function. • This medication is unlicensed in Ireland.

Information provided relates to Bumetanide manufactured by Hospira.

Calcium Gluconate

CAUTION: High Administration Risk Rating	
Form	Ampoules containing calcium gluconate 10% (2.2mmol of calcium in 10mL) This is equivalent to 0.22mmol of calcium in 1mL.
Reconstitution	Already in solution Only use the ampoule if the solution is clear.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**<u>IV injection</u>** In an emergency can be given undiluted by a slow IV injection. Administer each 10mL ampoule over a minimum of 3 - 5 minutes. **<u>Intermittent & Continuous IV Infusion</u>** Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Dilute 100mL of Calcium Gluconate 10% in 1L of compatible fluid. Give at an initial rate of 50mL/hour adjusted according to response. Rates of administration may vary with indication
Monitoring	Monitor ECG, blood pressure and plasma-calcium levels during administration.
Extravasation	Calcium salts are highly irritant. Extravasation is likely to cause tissue damage. The infusion site must be monitored regularly to ensure extravasation injury has not occurred.
Additional Information	• Because of the risk of aluminium exposure, calcium gluconate injection packed in small-volume glass containers should not be used for repeated or prolonged treatment in children < 18 years or in patients with renal impairment • This medication is unlicensed in Ireland.

Information provided relates to Calcium Gluconate 10% manufactured by Braun.

Caspofungin

Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Caspofungin dosing is weight based; ensure accuracy of documented weight before administration		
Form & Storage	50mg dry powder vial 70mg dry powder vial	Vials should be stored in fridge.
Reconstitution	Allow the vial to reach room temperature. Add 10.5 mL of WFI and mix gently. The concentrations of the reconstituted vials will be: 5 mg/mL (50 mg vial) or 7 mg/mL (70 mg vial). Withdraw 10mL to provide the full 50mg or 70mg dose. **Dilute further before administration**	
Compatibility & Stability	Sodium Chloride 0.9% **ONLY** **From a microbiological point of view, should be used immediately**; however: • Reconstituted vials may be stored at 2–8°C for 24 hours. • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours. Check that the solution is clear before use. Do not use if the solution is cloudy or has precipitated.	
Administration	**IV infusion** Add the required amount of the reconstituted solution to 250mL of compatible fluid, and infuse over a period of one hour. For doses of 50mg or less, 100mL can be used in fluid restriction if required.	
Monitoring	Monitor LFTs, U&Es, urinalysis and FBCs	
Additional Information	Caspofungin is usually prescribed as a **loading dose** followed by a **maintenance dose** .Refer to CUH Antimicrobial Guidelines on Eolas for further guidance.	

Information provided relates to Caspofungin manufactured by Wockhardt.

CeFAZolin

SALAD **Contains a PENICILLIN-like structure** May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration		
Restricted Antimicrobial Please contact Microbiology/ID/Antimicrobial pharmacist for further information		
Form & Storage	1g and 2g dry powder for injection vials	Protect vials from light
Reconstitution	Reconstitute vial using 5mL WFI. **Shake well.**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Injection** May be diluted further to a convenient volume to aid slow administration. Give by slow injection over 3 - 5 minutes. **IV Infusion** Further dilute reconstituted solution with 50 - 100mL of compatible fluid and infuse over 30 - 60 minutes. Solution should be protected from light	
Additional Information	Unlicensed medication in Ireland.	

Information provided relates to CeFAZolin manufactured by HIKMA, and Mylan.

CefTAZidime

SALAD
Contains a PENICILLIN-like structure
May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration

Restricted Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information

Form

500mg, 1g and 2g dry powder vial

Reconstitution

Vial	IV Injection	IM Injection
500mg	Add 5mL WFI	Add 1.5mL WFI
1g	Add 10mL WFI	Add 3mL WFI
2g	Add 10mL WFI	N/A

After adding WFI (which may be pulled in by the vacuum in the vial), remove the syringe needle and shake the vial. Carbon dioxide is released and a clear, light yellow to amber solution will be obtained in 1 - 2 minutes.

Compatibility & Stability

Sodium Chloride 0.9%
Glucose 5%

From a microbiological point of view, should be used immediately; however:

- Reconstituted vials may be stored 2–8°C for 24 hours.
- Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.

Administration

Solutions range in colour from light yellow to amber depending on concentration, diluents and storage conditions used. Product potency is not adversely affected by such colour variations.

IV Injection
Invert the vial. With the syringe piston depressed, insert the needle into the solution. Withdraw the total volume of solution into the syringe, ensuring needle remains in solution.
Does not require further dilution.
Give required dose by slow IV injection over 3 - 5 minutes.

IV Infusion
After reconstitution, insert a second needle to relieve internal pressure in the vial. Withdraw the required dose and dilute further in 50 - 100mL of compatible infusion fluid.
Mix well and infuse over 20 - 30 minutes.

IM Injection
Invert the vial. With the syringe piston depressed, insert the needle into the solution. Withdraw the total volume of solution into the syringe, ensuring needle remains in solution.
Does not require further dilution.
Give by IM injection into a large muscle such as the gluteus or the lateral aspect of the thigh. Rotate injection sites for subsequent injections.

Additional Information

Intramuscular administration should only be considered when the intravenous route is not possible or less appropriate for the patient. May be reconstituted with Lidocaine 0.5% or 1% for IM administration.

Information provided relates to CefTAZidime manufactured by Wockhardt and GlaxoSmithKline.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications.
Further information is available from Pharmacy on 22146 or 22542

Ceftazidime-Avibactam
(Zavicefta®)

SALAD **Contains a PENICILLIN-like structure** May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration	
Restricted Antimicrobial Please contact Microbiology/ID/Antimicrobial pharmacist for further information	
Form	Ceftazidime-avibactam 2g/0.5g powder for concentrate
Reconstitution	Reconstitute each 2g/0.5g vial with 10mL sterile WFI This results in approximate concentration of 167.3 / 41.8mg/mL. • For dose of 2g/0.5g: use total reconstituted volume. • For dose of 1g/0.25g: use 6mL of reconstituted volume • For dose of 0.75g/0.1875g: use 4.5mL of reconstituted volume **Dilute further before administration**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5% The total time interval between starting reconstitution and completing preparation of the intravenous infusion should not exceed 30 minutes.
Administration	**IV infusion** • Inspect visually for particulate matter prior to administration. • Dilute reconstituted solution immediately in 100mL of compatible fluid. • Administer over 2 hours.
Additional Information	Manufacturer advises patients and carers should be counselled on the effects on driving and performance of skilled tasks—risk of dizziness.

Information provided relates to Zavicefta® manufactured by Pfizer.

Ceftolozane-Tazobactam (Zerbaxa®)

<table>
<tr><td colspan="3">SALAD
Contains a PENICILLIN-like structure
May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration</td></tr>
<tr><td colspan="3">Restricted Antimicrobial
Please contact Microbiology/ID/Antimicrobial pharmacist for further information</td></tr>
<tr><td>Form</td><td>Vial contains ceftolozane 1g and tazobactam 500 mg.
Prescribed as combination i.e. 1g/0.5g, 2g/1g etc</td><td>Store vials at 2–8°C in fridge</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Add 10mL water for injections or sodium chloride 0.9% to each 1g ceftolozane/500mg tazobactam vial and shake gently.
The final volume of each vial is approximately 11.4mL

Dilute further prior to administration</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Sodium chloride 0.9%
Glucose 5%</td></tr>
<tr><td>Administration</td><td colspan="2">IV infusion
• Any required dose to 100ml infusion fluid
• Administer over 60 minutes
<table><tr><th>Dose of Ceftolazone/tazobactam</th><th>Volume of reconstituted injection</th></tr><tr><td>2g/1g</td><td>22.8ml (two vials)</td></tr><tr><td>1.5g/0.75g</td><td>17.1ml</td></tr><tr><td>1g/0.5g</td><td>11.4ml (one vial)</td></tr></table></td></tr>
<tr><td>Monitoring</td><td colspan="2">Monitor: Blood pressure, heart rate.
Hypersensitivity reactions including anaphylaxis, nausea, abdominal pain headache, dizziness, anxiety, fever, hypotension, tachycardia, rash, infusion site reactions, dyspnoea.</td></tr>
<tr><td>Additional Information</td><td colspan="2">Manufacturer advises ceftolozane with tazobactam may influence driving and performance of skilled tasks—increased risk of dizziness.</td></tr>
</table>

Information provided relates to Zerbaxa® manufactured by Merck Sharp & Dohme

CefTRIAXone

<table>
<tr><td colspan="2">SALAD
Contains a PENICILLIN-like structure
May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration</td></tr>
<tr><td>Form</td><td>1g dry powder vial</td></tr>
<tr><td>Reconstitution</td><td><u>IV Administration</u>: Add 10mL WFI to 1g vial.

<u>IM Administration</u> add 3.5mL Lidocaine 1% to 1g vial.</td></tr>
<tr><td>Compatibility & Stability</td><td>Sodium Chloride 0.9%
Glucose 5%
Incompatible with calcium-containing solutions. See Additional Information.

<u>From a microbiological point of view, should be used immediately</u>; however:
Reconstituted vials may be stored at 2–8°C for 24 hours. Protect from light.
Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours. Protect from light.</td></tr>
<tr><td>Administration</td><td>The reconstituted solution should be clear. Do not use if particles are present.
<u>IV Injection:</u>
Slow IV injection 5 minutes preferably via a large vein.

<u>IV Infusion:</u> Preferred
Step 1: Reconstitute dry powder vial as per guidance above
Step 2: Discard Volume from 50mL infusion bag as per table below
Step 3: Add reconstituted dose to infusion bag to achieve a final concentration of 50mg/mL.

Administer over at least 30 minutes.
<table>
<tr><th>Volume discarded from 50mL bag</th><th>Volume left in 50mL bag</th><th>Dose to be added</th><th>Final Volume for infusion</th></tr>
<tr><td>40mls</td><td>10mL</td><td>1g (in 10mL WFI)</td><td>20mL</td></tr>
<tr><td>30mls</td><td>20mL</td><td>2g (in 20mL WFI)</td><td>40mL</td></tr>
</table>
<u>IM Injection:</u>
Withdraw the required dose.
For intramuscular injection, doses over 1g must be divided between more than one site.</td></tr>
<tr><td>Additional Information</td><td>CefTRIAXone and calcium-containing solutions (compound sodium lactate (Hartmann's solution), Ringer’s solution and total parenteral nutrition) must not be mixed or administered simultaneously, even via different infusion lines, because of the risk of precipitation.
CefTRIAXone and calcium-containing solutions may be administered sequentially, one after the other, if infusion lines at different sites</td></tr>
</table>

	are used or if the infusion line is flushed or replaced between infusions. • Manufacturer advises patients and carers should be counselled on the effects on driving and performance of skilled tasks—risk of dizziness.

Information provided relates to Rocephin manufactured by Roche, CefTRIAXone manufactured by Pinewood and Kalceks, and Medaxonum(unlicensed medicine) manufactured by Medochemie Ltd.

CeFURoxime

SALAD **Contains a PENICILLIN-like structure** May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration	
Form	250mg, 750mg and 1.5 g dry powder vials
Reconstitution	**Intravenous** Add at least 2mL WFI to 250mg vial. Add at least 6mL WFI to 750mg vial. Add at least 15mL WFI to 1.5g vial. **Intramuscular** Add 1mL WFI to 250mg vial. Add 3mL WFI to 750mg vial.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Reconstituted vials may be stored at 2–8°C for 24 hours. • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.
Administration	**IV Injection** Give slowly over 3 - 5 minutes. **IV Infusion** After reconstitution, dilute required dose in 50 - 100mL of compatible fluid. Infuse over 30 - 60 minutes. **IM injection** Not more than 750 mg should be injected at one site. For doses greater than 1.5 g intravenous administration should be used.

Information provided relates to Cefuroxime manufactured by Fresenius Kabi and GlaxoSmithKline.

Chloramphenicol

Chloramphenicol dosing is weight based; ensure accuracy of documented weight before administration	
Form	1g dry powder vial as Chloramphenicol Sodium Succinate
Reconstitution	Add 9.2mL of WFI to each vial to give 100mg per mL solution.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** (Preferred method) Give over at least 1 minute. **IV Infusion** Further dilute the reconstituted solution in 50 - 100mL of compatible fluid. Give over 20 - 30 minutes.
Monitoring	• Plasma level monitoring recommended. • Check full blood count at baseline and approximately every two days during therapy.
Additional Information	Unlicensed medication in Ireland.

Information provided relates to Kemicetine® manufactured by Pfizer and Chloranic® by Norma.

Chlorphenamine

Form	10mg in 1mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9%
Administration	**IV injection** Give by slow IV injection over at least one minute. May be diluted further with 10mL of infusion fluid to aid administration. **SC injection** No dilution required. **IM injection** No dilution required.

Information provided relates to Chlorphenamine manufactured by Archimedes.

Ciclosporin

CAUTION: High Administration Risk Rating	
Form	Concentrate for solution for infusion contains 50 mg/mL
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **Dilute further before administration**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5% **Incompatible with PVC** A non-PVC infusion container (Baxter Viaflo®, Braun Ecoflac®) and a non-PVC infusion set should be used.
Administration	**IV Infusion – Intermittent** Dilute required dose 1:20 (2.5mg/mL) to 1:100 (500 micrograms/mL) with suitable diluent and give as a slow intravenous infusion over 2 to 6 hours. The infusion should be prepared and administered with PVC free administration sets. **IV Infusion (Continuous - unlicensed)** Dilute required dose 1:20 (2.5mg/mL) to 1:100 (500 micrograms/mL) with suitable diluent and give as a continuous infusion. The infusion should be prepared and administered with PVC free administration sets. Administration via central venous access device is not essential but may be preferable if infusing at the highest recommended concentration, to avoid potential venous irritation due to high osmolarity.
Monitoring	• Observe patient for signs of anaphylaxis for the first 30 minutes of the infusion and at frequent intervals thereafter. • Monitor BP, U&Es, LFTs, serum Magnesium, Potassium, Lipid profile, ciclosporin levels.
Extravasation	Extravasation is likely to cause tissue damage, as the preparation contains alcohol. At the high end of the concentration range diluted for infusion the preparation has a high osmolarity, which may further contribute to tissue damage on extravasation.
Additional Information	The recommended dose of Sandimmun concentrate for solution for infusion is approximately one-third of the corresponding oral dose and it is recommended that patients be switched to oral therapy as soon as possible.

Information provided relates to Sandimmun® manufactured by Novartis.

Ciprofloxacin

Form & Storage	200mg per 100mL infusion bag or bottle 400mg per 200mL infusion bag or bottle	Unopened bottles of ciprofloxacin should always be stored in outer container as infusion solution is photosensitive.
Reconstitution	Already in solution	
Compatibility & Stability	• Ciprofloxacin infusions should NOT be refrigerated. • The opened ciprofloxacin preparation should be used immediately.	
Administration	**IV Infusion** Only clear solutions, free from particles, should be used. Infuse 200mg over 30 minutes, 400mg over 60 minutes. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.	
Extravasation	Extravasation may cause tissue damage due to pH 3.9-4.5.	
Additional Information	• Ciprofloxacin has excellent oral bioavailability. Consider the oral route from the onset, or a rapid IV to oral switch as appropriate. See CUH Antimicrobial Guidelines on Eolas for further information. • Patient should be well hydrated to prevent crystalluria. • Fluoroquinolones (FQ) are associated with serious adverse effects affecting muscles, tendons, bones and the nervous system. See CUH Antimicrobial Guidelines on Eolas for further information https://www.hpra.ie/docs/default-source/publications-forms/newsletters/hpra-drug-safety-newsletter-edition-91.pdf?sfvrsn=7	

Information provided relates to Ciprofloxacin manufactured by Gerard and Noriderm.

Clarithromycin

Form & Storage	500mg dry powder vial	Store vials in original container to protect from light.
Reconstitution	Add 10mL WFI to 500mg vial. **Dilute further before administration.**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **<u>From a microbiological point of view, should be used immediately</u>**; however: • Reconstituted vials may be stored at 2–8°C for 24 hours. • Prepared infusions (2 mg/mL) may be stored at 2–8°C and infused (at room temperature) within 24 hours.	
Administration	**<u>IV Infusion (ONLY)</u>** Add 10mL from reconstituted 500mg vial to 250mL of compatible infusion fluid to give a concentration of approximately 2mg/mL. Give over at least 60 minutes via large proximal vein. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.	
Extravasation	• Extravasation may cause tissue damage. • Monitor injection site for inflammation or phlebitis.	
Additional Information	Clarithromycin has excellent oral bioavailability. Consider IV to oral switch, if appropriate. See CUH Antimicrobial Guidelines on Eolas for further information.	

Information provided relates to Clarithromycin manufactured by Amdipharm and Mylan.

Clindamycin

<table>
<tr><td>Form</td><td>600mg per 4mL ampoule</td></tr>
<tr><td>Reconstitution</td><td>Already in solution
• Draw up using a 5 micron filter needle
• Use gloves when opening ampoules

Dilute further before administration.</td></tr>
<tr><td>Compatibility & Stability</td><td>Sodium chloride 0.9%
Glucose 5%

From a microbiological point of view, should be used immediately; however, prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.</td></tr>
<tr><td>Administration</td><td><u>IV Infusion</u>
Doses 300 – 900mg: add to 50mL of infusion fluid.
Dose> 900mg: add to 100mL of infusion fluid.

The concentration of clindamycin, once diluted, should not exceed 18mg in 1mL.

Administer at a maximum rate of 30mg/minute.

<table><tr><th>Dose</th><th>Administration time</th></tr><tr><td>300mg</td><td>10 minutes</td></tr><tr><td>600mg</td><td>20 minutes</td></tr><tr><td>900mg</td><td>30 minutes</td></tr><tr><td>1.2g</td><td>60 minutes</td></tr></table>
<u>IM injection</u>
Intramuscular administration is indicated when intravenous infusion is not possible for any reason.
For intramuscular administration Clindamycin should be used undiluted.
Single IM injections of greater than 600 mg are not recommended.</td></tr>
<tr><td>Additional Information</td><td>Administration of more than 1.2g in a single 1 hour infusion is not recommended.</td></tr>
</table>

Information provided relates to Clindamycin manufactured by Fresenius Kabi.

Clonidine

Form	150 micrograms per 1mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**Slow IV Injection** Give by slow IV injection over 10 - 15 minutes. May be diluted to 10mL to facilitate slow administration. **Intermittent IV infusion** Dilute required dose in 50 - 100mL of compatible infusion fluid and administer over 15 minutes.
Notes	• Transient hypertension may precede hypotension if IV injection is given too rapidly. • Monitor BP and pulse.

Information provided relates to Catapres® manufactured by Boehringer Ingelheim.

Co-amoxiclav

Contains a PENICILLIN		
Form & Storage	600mg & 1.2g dry powder vial	Keep vials in outer carton to protect from light.
Reconstitution	Add 10mL WFI to 600mg vial. Add 20mL WFI to 1.2g vial. Co-amoxiclav should be used within 20 minutes of reconstitution.	
Compatibility & Stability	Sodium Chloride 0.9% Use reconstituted vials and prepared infusions immediately (within 20 minutes).	
Administration	A transient pink colour may appear during reconstitution in some preparations. Reconstituted solutions are normally colourless or a pale straw colour. **IV Injection** Give slowly over 3 - 4 minutes. **IV Infusion** Add total volume of reconstituted 600mg vial to 50mL infusion fluid. Add total volume of reconstituted 1.2g vial to 100mL infusion fluid. Infuse over 30 - 40 minutes. Solutions for intravenous infusion should be administered in full within 60 minutes of preparation.	

Information provided relates to Co-Amoxiclav manufactured by Teva and Wockhardt.

Co-trimoxazole

Co-trimoxazole dosing may be weight based; ensure accuracy of documented weight before administration	
Form	400mg Sulphamethoxazole and 80mg Trimethoprim per 5 mL ampoule
Reconstitution	Already in solution **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% Use prepared infusions immediately. Do not refrigerate. Crystallisation or turbidity may develop at any time; inspect during infusion and discard if present.
Administration	**IV infusion** Dilute each 5mL ampoule with 125mL of compatible fluid e.g. 1 ampoule (480mg in 5mL) in 125mL 2 ampoules (960mg in 10mL) in 250mL 3 ampoules (1440mg in 15mL) in 500mL 4 ampoules (1920mg in 20mL) in 500mL 5 ampoules (2400mg in 25mL) in 1000mL After adding co-trimoxazole to the infusion solution, shake thoroughly to ensure complete mixing. Administer over 60 - 90 minutes. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **Fluid restricted patients:** Each 5mL injection may be diluted with at least 75mL of glucose 5% and administered over 1 hour.
Extravasation	• Extravasation may cause tissue damage. Monitor injection site for signs of phlebitis. • Pain, local irritation, inflammation, and rarely thrombophlebitis may occur with IV use especially if extravasation occurs.
Additional Information	Co-trimoxazole is a mixture of trimethoprim and sulfamethoxazole in the proportions of 1 part to 5 parts (i.e. trimethoprim to sulfamethoxazole 16 mg : 80 mg/mL)

Information provided relates to Co-trimoxazole manufactured by Aspen (Septrin®) or Merckle (Cotrim - ratiopharm® unlicensed).

Colistimethate Sodium

Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information	
Form	1 million international units (IU) dry powder vial
Reconstitution	**IV** Reconstitute each vial with 5mL WFI or sodium chloride 0.9%. Roll in the hand to aid reconstitution. Do not shake to avoid foam formation. **Inhalation** Reconstitute each vial with 3mL of WFI or sodium chloride 0.9%. Roll in the hand to aid reconstitution. Do not shake.
Compatibility & Stability	Sodium Chloride 0.9% Reconstituted vials, nebulised solutions and prepared infusions should be used immediately.
Administration	**Slow IV injection** Patients fitted with a totally implantable venous access device (e.g. Portacath®) may be given a bolus injection of up to 2 million units in 10mL, over a minimum of 5 minutes. **IV infusion** Dilute reconstituted vial further to 50mL and administer over 30 - 60 minutes. **Inhalation via nebuliser** Reconstitute as above, and administer via nebuliser.
Additional Information	• 1mg colistimethate sodium is equivalent to approximately 12,500 units. • Monitor renal function for signs of toxicity when given via the IV route.

Information provided relates to Colomycin® manufactured by Teva.

Cyclizine

Form	50mg per 1mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Water for Injection Glucose 5% Sodium Chloride 0.9% - less stable
Administration	Immediately after dilution, and again just before injection, check the solution for signs of precipitation. Discard if there is any cloudiness or haze formation. **IV Injection** Dilute solution with an equal volume of WFI and give slowly over at least 3 - 5 minutes. **IM injection** No dilution required. **Continuous SC Infusion(unlicensed)** Dilute with **WFI only** to required volume
Extravasation	Extravasation is likely to cause tissue damage due to low pH.
Additional Information	Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: • Contact the Pharmacy Department or Palliative care team for further guidance. • Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.

Information provided relates to Valoid® manufacturered by Amdipharm.

Cyclophosphamide

Use in non-Oncology patients in CUH

Do not handle if pregnant or breastfeeding		
Cytotoxic: Follow guidelines for handling cytotoxic agents - see PPG-CUH-CUH-266		
CAUTION: High Administration Risk Rating		
Form & Storage	Bag prepared in Pharmacy	Store in a fridge at 2 - 8°C
Reconstitution	N/A	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	Always refer to the relevant protocol before administration- see **PPG-CUH-CUH-243** Policy Procedure and Guidelines for management of patients attending CUH infusion unit for intravenous therapy See **PPG-CUH-CUH-266** Policy and Procedure for the handling of cytotoxic intravenous medications for non-oncology patients in Cork University Hospital	
Extravasation	**PPG-CUH-CUH-138** Policy and Procedure on the Management of Infiltration of Non-Vesicant and the Extravasation of Vesicant Cytotoxic Intravenous Medications in Cork University Hospital Group	
Disposal	Follow guidelines for handling and disposal of cytotoxic agents see **PPG-CUH-CUH-266** Policy and Procedure for the handling of cytotoxic intravenous medications for non-oncology patients in Cork University Hospital	

Additional Information	• See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for management of patients attending CUH infusion unit for intravenous therapy for different administration protocols
	  ○ Renal Protocol
	  ○ Respiratory Protocol
	  ○ Rheumatology Protocol
	  ○ Neurology Protocol
	• Haemorrhagic cystitis, pyelitis, ureteritis and haematuria have been reported. Pre and post hydration and Uromitexan® (Mesna) may be used to reduce this risk depending on dose and protocol used.	

Information provided relates to Endoxana® manufactured by Baxter.

Dalbavancin

<table>
<tr><td colspan="2">Restricted antimicrobial
Please contact Microbiology/ID/Antimicrobial pharmacist for further information</td></tr>
<tr><td>Form</td><td>500mg per vial dry powder for concentrate for solution for infusion.</td></tr>
<tr><td>Reconstitution</td><td>• Slowly add 25 mL water for injection to each vial
• Do not shake.
• To avoid foaming, alternate between gentle swirling and inversion of vial until contents dissolved completely (approx. 5 minutes).

Dilute further before administration</td></tr>
<tr><td>Compatibility & Stability</td><td>Glucose 5% ONLY</td></tr>
<tr><td>Administration</td><td>IV Infusion

Administer as an intravenous infusion over 30 minutes.

<table><tr><th>Required Dose</th><th>Volume of Glucose 5%</th></tr><tr><td>1500mg (3 vials)</td><td>500mL</td></tr><tr><td>1000mg (2 vials)</td><td>250mL</td></tr><tr><td>500mg (1 vial)</td><td>100-250mL</td></tr></table>
Infusion concentration should be between 1-5 mg/mL.</td></tr>
<tr><td>Monitoring</td><td>Rapid administration can cause reactions including flushing of the upper body, urticaria, pruritis and/or rash. Stopping or slowing the infusion may result in cessation of these reactions.</td></tr>
<tr><td>Extravasation</td><td>Dalbavancin has a low pH and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation.</td></tr>
<tr><td>Additional Information</td><td>• If a common intravenous line is being used to administer other drugs in addition to dalbavancin, the line should be flushed before and after each dalbavancin administration with glucose 5% solution for infusion.
• Do not mix dalbavancin with any other medicinal products or intravenous solutions.</td></tr>
</table>

Information provided relates to Dalbavancin (Xydalba®) manufactured by AbbVie.

Dantrolene

Form	20mg dantrolene powder for solution for injection
Reconstitution	➢ Add 60mL **sterile water for injection** and shake until solution dissolved ➢ Using the filter device provided, draw up the reconstituted solution into a syringe ➢ Remove the filter device before attaching the syringe to an IV cannula or giving set
Compatibility & Stability	No further dilution permitted
Administration	**Use a new filtration device with every vial of Dantrium® IV. Administer Dantrium® IV immediately upon filtration.** **Bolus intravenous injection** Management of malignant hyperthermia crisis, or neuroleptic malignant syndrome (unlicensed) ➢ Administer an initial dose: 2.5 mg/kg body weight intravenously (9 vials for a 70 kg adult). ➢ If there is no response after 5 minutes repeat a dose of 1 mg/kg. Further doses can be given every 5 minutes to a maximum of 10 mg/kg in 24 hours. ➢ The required dose to be given as a bolus intravenous injection ➢ Bolus injections may be administered rapidly (over at least one minute)
Monitoring	Monitor blood pressure, respiratory rate, pulse, temperature, pH, pCO_2, K^+
Extravasation	Dantrolene sodium has a high pH and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation
Additional Information	• For a 70kg patient, if a cumulative dose of 10mg/kg is needed this will amount to approximately **36 vials** • Due to the potential for undissolved crystals/particles to appear in the re-constituted product and the subsequent potential risk of exacerbation of injection site reactions/tissue necrosis from crystals within affected vials, use of the **filtration device** when drawing up the solution is required at all times. • Each vial of Dantrium IV contains **3g mannitol** (for adjustment of isotonic solutions). This amount should be considered if mannitol is used to prevent and treat renal complications related to malignant hyperthermia. • Caution should be exercised if **hyperkalaemia** symptoms occur (muscular paralysis, ECG changes, bradycardic arrhythmias) or in cases of pre-existing hyperkalaemia (renal insufficiency, digitalis intoxication etc.), as an increase in serum potassium has been demonstrated in animal trials as a result of dantrolene. • **Liver damage** may occur during dantrolene therapy. This is dependent on the dosage and duration of therapy and may run a lethal course. • **Stock** kept in ED Antidote press, Theatres, MH Theatre

Information provided relates to Dantrium® manufactured by Norgine pharmaceuticals.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Daptomycin

Daptomycin dosing is weight based; ensure accuracy of documented weight before administration		
Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form & Storage	350mg or 500mg dry powder vial	Store at 2–8°C vials in fridge
Reconstitution	Reconstitute 350mg vial with 7mL or 500mg vial with 10mL sodium chloride 0.9% to give a final concentration of 50mg per 1mL. Inject the diluent slowly down the side of the vial. Rotate the vial to completely wet the powder and allow to stand for 10 minutes. Gently swirl the vial for a few minutes to obtain a clear reconstituted solution. Do not shake as this will cause foaming of the product. The product takes approximately 15-20 minutes to dissolve. The reconstituted solution ranges in colour from pale yellow to light brown.	
Compatibility & Stability	Sodium chloride 0.9% **ONLY** **From a microbiological point of view, should be used immediately.**	
Administration	**IV Injection** After reconstitution, give by slow IV injection over 2 minutes. **IV Infusion** After reconstitution, dilute the required reconstituted dose into 50mL compatible fluid. Infuse over 30 minutes. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely.	
Monitoring	Creatinine phosphokinase (CPK) should be monitored at baseline and at least once weekly during therapy (more frequently if GFR less than 30mL/min). Any patient that develops unexplained muscle pain, tenderness, weakness or cramps should have CPK levels monitored every 2 days.	
Extravasation	Extravasation is likely to cause tissue damage due to low pH.	
Additional Information	Cases of interference between daptomycin and a reagent used in some assays of prothrombin time (PT) and INR have led to an in-vitro prolongation of PT and elevation of INR. To minimise this risk, PT or INR samples should be taken immediately prior to the time of the daptomycin dose.	

Information provided relates to Cubicin® manufactured by MSD and Daptomycin manufactured by Accord.

Desmopressin acetate (DDAVP)

Desmopressin dosing may be weight based; ensure accuracy of documented weight before administration		
Form & Storage	4 microgram in 1 mL vial	Store at 2–8°C in original packaging.
Reconstitution	Already in solution	
Compatibility & Stability	Sodium chloride 0.9%	
Administration	**IV Infusion** Add required dose to 50 mL of Sodium Chloride 0.9% Infuse over 20-30 minutes, choose a large vein and monitor infusion site closely. **IV Injection** Withdraw required dose Give slowly over 3-5 minutes using a large vein. **IM Injection** Allow to reach room temperature before giving by IM injection. Withdraw required dose. Administer undiluted. Small doses e.g. 400nanograms (0.1mL) or less may be diluted in sodium chloride 0.9% for ease of administration. **SC Injection** Withdraw required dose Give by SC injection	
Monitoring	Monitor BP and pulse continuously during IV Infusion Body weight (or plasma sodium or osmolality) to check for fluid overload with repeated administration	
Extravasation	Extravasation, is likely to cause tissue damage because of the pH of the solution.	
Additional Information	• It is recommended to maintain fluid and electrolyte balance. Treatment without concomitant reduction of fluid intake may lead to fluid retention and/or hyponatremia with or without accompanying warning signs and symptoms. • When used for diagnostic purposes the fluid intake must be limited to a maximum of 0.5 L to quench thirst from 1 hour before until 8 hours after administration. • Oral, intranasal, intravenous, subcutaneous and intramuscular doses are expressed as desmopressin acetate; sublingual doses are expressed as desmopressin base. • Desmopressin acetate 1 microgram approx equal to desmopressin 0.9 microgram.	

Information provided relates to DDAVP® manufactured by Ferring Pharmaceuticals Ltd

Dexamethasone Sodium Phosphate

Form	8mg per 2mL vial (contains 8mg Dexamethasone Sodium Phosphate, equivalent to 6.6mg Dexamethasone Base)
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	Only use if solution is clear and free of particles. **Slow IV Injection** Give over a minimum of 3 minutes. May be diluted further to facilitate slow administration. **IV Infusion** Add the required dose to 100mL of compatible infusion fluid and administer over 15 minutes. **IM Injection** Administer the required dose by deep IM injection into the gluteal muscle.
Additional Information	• Approximate Conversion: Dexamethasone sodium phosphate 8mg IV is approximately equivalent to Dexamethasone 6mg PO. • Rapid IV injection of large doses of dexamethasone may cause cardiovascular collapse, so administer slowly.

Information provided relates to Dexamethasone Sodium Phosphate manufactured by Wockhardt or Hospira.

Diazepam Emulsion

CAUTION: High Administration Risk Rating	
Form	10mg per 2mL ampoule (Diazemuls) Oil in water emulsion
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Glucose 5% **ONLY** **Incompatible with PVC**: A non-PVC infusion container (Baxter Viaflo®, Braun Ecoflac®) and infusion set must be used.
Administration	Solutions must be used within 6 hours of preparation **Slow IV Injection (Preferred)** Administer at a maximum rate of 5mg (1mL) per minute, into a large vein. **IV Infusion** Add to glucose 5% to achieve a final concentration of 0.1 - 0.4mg per mL (i.e. add 10 - 40mg diazepam emulsion to 100mL). If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely. **IM Injection** Administer via deep intramuscular injection. Can result in low and erratic absorption.
Antidote	Flumazenil is a specific benzodiazepine antagonist and must be available to rapidly reverse respiratory depression when administering diazepam.
Monitoring	Monitor respiratory rate, heart rate and blood pressure.
Extravasation	Extravasation may cause tissue damage.
Additional Information	• Diazepam emulsion for injection contains soya oil, which may contain soya protein. Diazepam emulsion for injection can provoke allergic reactions, presumably only in patients who are particularly sensitive to peanuts or soya. • Diazepam emulsion for injection contains fractionated egg phospholipid; contraindicated in patients with egg allergy.

Information provided relates to Diazemuls® manufactured by Accord.

Diclofenac

Form	Diclofenac sodium 25mg/mL 3mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
	Must be diluted for IV Infusion Buffer the sodium chloride 0.9% or glucose 5% solution with **sodium bicarbonate** injectable solution (0.5 mL of 8.4%), **before** adding the diclofenac ampoule.
	Intravenous infusions should be initiated immediately after preparing the infusion solutions. The infusions should not be stored.
Administration	**IV Infusion** Buffer 100-500mL infusion fluid with 0.5mL of 8.4% sodium bicarbonate **before** adding diclofenac. Dependent on the indication, dilute and infuse as a loading dose or continuously over a period of 15 minutes to 120 minutes For intermittent infusion give 25–50 mg over 15–60 minutes or 75 mg over 30–120 minutes. For continuous infusion give at a rate of 5 mg/hour. **IM Injection** 25mg/mL solution to be injected by deep intragluteal injection into the upper outer quadrant.
Monitoring	Monitor renal function in patients with impaired cardiac or renal function, hypertension, the elderly or those receiving nephrotoxic medications
Additional Information	• Impaired female fertility: diclofenac injection 75mg/3mL may impair female fertility and is not recommended in women attempting to conceive. In women who have difficulties conceiving or who are undergoing investigation of infertility, withdrawal of diclofenac should be considered

Information provided relates to Diclac manufactured by Rowex.

Digoxin

CAUTION: High Administration Risk Rating	
Form	500 micrograms per 2mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Infusion** Add required dose to 50 - 100mL infusion fluid. (Maximum concentration of 62.5 micrograms/mL). Digoxin has a high osmolarity and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely. **Loading dose** As a single dose: Infuse over at least 2 hours. As divided doses: Give half the total dose as the first dose and further fractions (e.g. 25%, 25%) of the total dose at intervals of 4 - 8 hours. Give each dose over a minimum of 20 minutes. **Maintenance dose** Infuse over at least 2 hours.
Antidote	An antidote (Digifab) is available for suspected toxicity, information can be obtained via TOXBASE.
Monitoring	• Digoxin therapeutic drug monitoring: Take the sample at least six hours after the dose. • Monitor heart rate, blood pressure and ECG. • Monitor serum K^+
Extravasation	Extravasation is likely to cause tissue damage.
Additional Information	• Dose needs to be reduced by 33% when converting from the oral to IV route. • IM and SC routes should not be used as absorption is erratic and can cause severe local irritation. • Digoxin is often administered as a **loading dose** followed by a smaller **maintenance dose**.

Information provided relates to Lanoxin® manufactured by Aspen.

Disodium Pamidronate

<table>
<tr><th colspan="2">Caution: Administration differs depending on indication</th></tr>
<tr><td>Form</td><td>3mg/mL Concentrate for solution for infusion
1 ampoule (10mL) contains 30mg disodium pamidronate</td></tr>
<tr><td>Reconstitution</td><td>Already in solution
Dilute further before administration</td></tr>
<tr><td>Compatibility & Stability</td><td>Sodium Chloride 0.9%
Glucose 5%</td></tr>
<tr><td>Administration</td><td>
IV Infusion

Dilute with compatible fluid to a concentration not exceeding 90mg in 250mL.E.g. dilute 30-60mg in 250mL and 90mg in 500mL.
In patients with multiple myeloma, tumour-induced hypercalcaemia and in those with established or suspected renal impairment, the infusion concentration should not exceed 90mg in 500mL
Give through a large vein at a maximum rate of 60mg per hour. (1mg/minute).
A single dose of 90mg is usually given over 2 hours.
In patients with suspected or established renal failure, administer at a rate of not more than 20mg/hour.
In patients with multiple myeloma and with tumour induced hypercalcaemia, it is recommended not to exceed 90mg in 500mL over 4 hours.

Tumour-induced hypercalcaemia

Patients should be rehydrated with sodium chloride 0.9% PRIOR to treatment
The total dose per treatment course depends on the patient's initial serum calcium level

<table>
<tr><th>Corrected serum calcium (millimol/L)</th><th>Recommended total dose</th></tr>
<tr><td>< 3</td><td>15 - 30mg</td></tr>
<tr><td>3.0 - 3.5</td><td>30 - 60mg</td></tr>
<tr><td>3.5 - 4.0</td><td>60 - 90mg</td></tr>
<tr><td>Greater than 4.0</td><td>90mg</td></tr>
</table>

The total dose may be administered either as a single infusion or in divided doses over two to four consecutive days
The maximum dose per treatment course is 90mg for both initial and repeat courses

Osteolytic lesions and bone pain in bone metastases associated with breast cancer and multiple myeloma

Give 90mg as a single dose, every four weeks

</td></tr>
</table>

	➢ The dose may be administered at three-weekly intervals to coincide with chemotherapy if desired **Predominantly lytic bone metastases and multiple myeloma** ➢ Give 90mg every four weeks ➢ The dose may be administered at three-weekly intervals to coincide with chemotherapy if desired **Pagets disease of bone** ➢ Add each dose of 30 mg to a minimum of 100 mL sodium chloride 0.9%; add each dose of 60–90 mg to a minimum of 250 mL sodium chloride 0.9%. ➢ Infuse slowly at a rate no faster than 60mg in one hour. Use in Infusion unit is for Paget's disease of bone –See **PPG-CUH-CUH-243** *Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy for more information.*
Monitoring	Monitor serum electrolytes, calcium and phosphate—possibility of convulsions due to electrolyte changes. Assess renal function before each dose
Extravasation	In order to minimise local reactions at the infusion site, the cannula should be inserted carefully into a relatively large vein.
Additional Information	**Renal impairment** Pamidronate should not be administered to patients with severe renal impairment (eGFR less than 30ml/min/1.73m^2), unless in life-threatening tumour-induced hypercalcaemia where the benefit outweighs the potential risks. A maximum rate of 20mg/hour should not be exceeded in patients with renal impairment As pamidronate has been associated with renal toxicity, serum creatinine should be checked prior to each dose of the drug

Information provided relates to Disodium Pamidronate by Mylan and Hospira.

Doxapram

Form	100mg per 5mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** May be administered undiluted. Give over at least 30 seconds. Can be repeated at hourly intervals if required. **IV Infusion** Dilute required dose to a concentration of 2mg/mL. Maximum rate of infusion is 4mg/minute (i.e. 2mL per minute).
Monitoring	• Frequent monitoring of respiratory rate, arterial blood gas and pH is required to ensure correct dosage during treatment. • Monitoring of blood pressure and deep tendon reflexes is recommended as hypertension and skeletal muscle hyperactivity are signs of overdose.
Extravasation	Extravasation may cause tissue damage.
Additional Information	An adequate airway is essential and airway protection should be considered since doxapram may stimulate vomiting.

Information provided relates to Doxapram manufactured by Mercury and Anpharm.

Doxycycline

Form & Storage	100mg in 5mL ampoules	Refrigerate unopened vials at 2 - 8°C & protect from light.
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **IV Injection** Give each 100mg (5mL) by slow IV injection over at least 2 minutes. In the elderly, weak or very sick patients and in patients with cardiac arrhythmias, give each 100mg (5mL) by slow IV injection over at least 3 minutes. **IV Infusion** Dilute with a compatible diluent and give over 1 to 4 hours. 100mg should be given over a minimum of 1 hour and 200mg over a minimum of 2 hours	
Extravasation	Extravasation may cause tissue damage. IV use is associated with local irritation and can cause inflammation of the vein, so a change to oral treatment with doxycycline should be made as soon as possible	
Additional Information	• Due to the magnesium content doxycycline is contra-indicated in myasthenia gravis because of the risk of neuromuscular block • Unlicensed medication in Ireland.	

Information provided relates to Doxycycline manufactured by Ratiopharm.

Eptifibatide

Recommended dosing restricted for use under **Stroke Department in Radiology and ED**		
Indication periprocedural use in mechanical thrombectomy for acute ischaemic stroke where intra- and/or extra-cranial stenting was required		
Please note: A different regime for Eptifibatide is used in Cardiology **Refer to CCU & CathLab for guidelines on use in Cardiology**		
If feasible, review **baseline** prothrombin time (PT), aPTT, serum creatinine, platelet count, haemoglobin, haematocrit and liver functions to identify pre-existing haemostatic abnormalities.		
Form	There are **two strengths** of this drug. **Read vial and check carefully.** • Eptifibatide 20mg in 10ml vial (For loading dose) • Eptifibatide 75mg in 100ml infusion (for maintenance)	Store vials at 2–8°C in fridge
Reconstitution	Already in solution	
Compatibility & Stability	Not required – already in solution	
Dose	• Please note patients will have been administered the LOADING dose (i.e., 135mcg/kg) in **Radiology Department**, therefore, a LOADING dose is NOT to be administered on the ward. • **MAINTENANCE** dose infusions will be administered on the ward at 1.0 microgram/kg/minute. See table below for dosing guidance.	
Equipment	• A **Baxter EVO IQ** infusion pump labelled specifically for eptifibatide infusions is kept on the **Hyperacute stroke unit**. This pump is set in **DOSE** mode and has eptifibatide dosing option i.e., 1mcg/kg/min preset on the pump. • Select eptifibatide from the drug library on the pump. • Select correct dose as specified on the kardex i.e. 1mcg/kg/min on the pump. • Enter the patient's weight i.e., kgs on the pump. Estimated weights are used if no actual weight available. • Cross check the rate i.e., ml/hr calculated on the pump against the dosage guidance table provided.	
Monitoring	• Check platelet count, haemoglobin, and haematocrit **6 hours after starting Eptifibatide maintenance infusion** and then at least once daily thereafter (monitor more often if evidence of a marked reduction in platelet count). • Monitor liver function as Eptifibatide is contraindicated in severe liver impairment. • Monitor for signs of bleeding especially groin puncture sites.	

Administration

Bolus intravenous injection (Loading)
(**Radiology department ONLY**, loading dose NOT to be given on ward)

- Administer required dose over 1 to 2 minutes

Continuous intravenous infusion (Maintenance)
Eptifibatide maintenance infusion to be administered for up to 48hours or until it is felt safe to initiate dual antiplatelet regime.
Eptifibatide is not be stopped without instruction from Consultant Interventional Neuroradiologist.

MAINTENANCE DOSE 1 microgram/kg/min	
Weight (kg)	**Infusion rate (mL/hr)**
45	**3.6**
50	**4.0**
55	**4.4**
60	**4.8**
65	**5.2**
70	**5.6**
75	**6.0**
80	**6.4**
85	**6.8**
90	**7.2**
95	**7.6**
100	**8.0**
105	**8.4**
110	**8.8**
115	**9.2**
120	**9.6**
125	**10.0**
130	**10.4**
135	**10.8**
140	**11.2**

Additional Information

Bridging Eptifibatide to Dual Anti-Platelet Therapy (DAPT)

- At the first interval CT scan performed at 24 hours, if a decision is made to start DAPT, after prescribing DAPT, the nursing staff member responsible for the patient's care is to inform the team when the doses of DAPT have been administered.
- The team must set the eptifibatide infusion to stop 4 hours following the dose of DAPT and the nursing staff must stop the infusion at this time point.
- Please ensure there is enteral access with a nasogastric tube if the patient has an unsafe swallow as DAPT must still be administered at the appropriate time point even if NBM.
- Please ensure DAPT maintenance is prescribed for the following day with Proton Pump Inhibitor (PPI) cover in the form of lansoprazole 15-30mg once daily.

	• In certain cases, IV Aspirin will be administered in addition to IA Eptifibatide during stenting procedure (mainly renal impairment). In this instance an infusion will not be required. • Individualised medication regimes will be decided by Consultants (Stroke or Radiologist) in relation to timing of antiplatelet medication, and this will be documented in clinical notes.

Information provided relates to Eptifibatide manufactured by Kensington Pharma.

Ertapenem

Contains a PENICILLIN-LIKE structure May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration	
Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information	
Form	1g dry powder vial
Reconstitution	Reconstitute the contents of a 1 g vial with 10 mL of WFI or sodium chloride 0.9 %. Shake well to dissolve. Use immediately after reconstitution. • The reconstituted solutions should be inspected visually for particulate matter and discolouration prior to administration. • Solutions of Ertapenem can range from colourless to pale yellow. Variations of colour within this range do not affect potency.
Compatibility & Stability	Sodium Chloride 0.9% **From a microbiological point of view, should be used immediately;** however: • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.
Administration	**IV Infusion ONLY** For a 1g dose, transfer contents of reconstituted solution to 50 mL of sodium chloride 0.9%. Infuse over a period of 30 minutes.

Information provided relates to Invanz® manufactured by Merck Sharp & Dohme.

Erythromycin

Erythromycin dosing may be weight based; ensure accuracy of documented weight before administration	
Form	1g dry powder vial
Reconstitution	Add 20mL WFI to each 1g vial to give 50mg/mL solution. **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% **From a microbiological point of view, should be used immediately; however**: Prepared infusions should be used within 8 hours of preparation to ensure potency.
Administration	**IV Infusion ONLY** Add 250 - 500mg of erythromycin to 100mL of infusion fluid and infuse over 1 hour. Add 1g of erythromycin to 250mL of infusion fluid and infuse over 1 hour. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Extravasation	Erythromycin is an irritant and may cause thrombophlebitis and tissue damage.
Additional Information	• Erythromycin is not first line for most infections in CUH – seek advice from pharmacy/micro/ID if not for gastro-intestinal stasis. • Erythromycin may be used for gastro-intestinal stasis, but it is not licensed for this indication. • Erythromycin has excellent oral bioavailability. Consider IV to oral switch, if appropriate. • A longer period of infusion should be used in patients with risk factors or previous evidence of arrhythmias. • See CUH Antimicrobial Guidelines on Eolas for further information.

Information provided relates to Erythrocin® manufactured by Amdipharm.

Fentanyl

CAUTION: High Administration Risk Rating		
Form & Storage	100 micrograms per 2mL (50 microgram/mL) 500 micrograms per 10mL (50 microgram/mL) ITUs & Theatres only	Controlled Drug (CD): Must be stored in CD Press
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Injection** No dilution required. Slow IV injection over 1 - 2 minutes. **IV Infusion:** Refer to ITU/Pharmacy for guidance. **IM Injection** No dilution required. **SC Injection** Give required dose by SC injection. **Continuous SC Infusion** Dilute required dose with sodium chloride 0.9%.	
Antidote	Naloxone should be kept in all areas where opioids are administered.	
Monitoring	Monitor blood pressure, heart rate and respiratory rate.	
Additional Information	Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: • Contact the Pharmacy Department or Palliative care team for further guidance. • Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.	

Information provided relates to Fentanyl injection manufactured by Mercury and Piramal.

Flucloxacillin

This is a PENICILLIN	
Form	250mg, 500mg and 1g dry powder vials
Reconstitution	IV Administration: Reconstitute 250mg with 5mL, 500mg with 10mL and 1g with 20mL WFI. IM Administration: Reconstitute 250mg with 1.5mL, 50mg with 2mL WFI
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Reconstituted vials may be stored at 2–8°C for 24 hours. • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.
Administration	**IV Injection** Give by slow IV injection over 3 - 4 minutes. Give 2g dose over 6 - 8 minutes. **IV Infusion (preferred for doses over 1g)** Following reconstitution, dilute the required dose in 100mL of compatible infusion fluid and infuse over 30 - 60 minutes. **IM Injection** Give by IM injection into a large muscle such as the gluteus or the lateral aspect of the thigh. Rotate injection sites for subsequent injections.

Information provided related to Flucloxacillin injection manufactured by Actavis and Ibigen.

Fluconazole

Form	200mg per 100mL bag (2mg/mL)
Reconstitution	Already in solution
Compatibility & Stability	N/A
Administration	**IV Infusion** Further dilution is unnecessary. Infuse at a maximum rate of 10mL per minute (e.g. 200mg over 10 minutes).
Additional Information	• A **loading dose** may be used in some clinical situations. • Fluconazole has excellent oral bioavailability – consider oral route from the onset, or a rapid IV to oral switch as appropriate. See CUH Antimicrobial Guidelines on Eolas for further information.

Information provided relates to Fluconazole manufactured by B Braun.

Flumazenil

CAUTION: High Administration Risk Rating	
Form	500 microgram (0.5mg) per 5mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Administer slowly over 15 seconds into a large vein. **Continuous IV Infusion** Dilute 2.5mg flumazenil (5 x 5mL ampoules) to 50mL with compatible infusion fluid in a 50mL syringe (50 microgram/mL solution). Administer at a rate of 100 - 400 micrograms per hour depending on response. Stop infusion every 6 hours to check whether re-sedation occurs. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Extravasation	Extravasation is likely to cause tissue damage because of extreme pH (less than 5).
Additional Information	• Flumazenil should only be administered by, or under the direct supervision of, personnel experienced in its use. • Half-life is very short (40-80 minutes), therefore an infusion may be necessary if drowsiness returns after a single dose.

Information provided relates to Anexate® manufactured by Cheplapharm Arzneimittel GmbH.

Foscarnet

Reduce direct handling to a minimum and wear appropriate personal protective equipment	
CAUTION: High Administration Risk Rating	
Form	24mg/mL; 250mL bottle containing 6g foscarnet
Reconstitution	Already in solution
Compatibility & Stability	Sodium chloride 0.9% Glucose 5% **Incompatible with** calcium containing solutions and preparations
Administration	**IV Infusion – central** May be given undiluted via a central venous access device. Give doses of <60mg/kg over at least one hour and doses >60mg/kg over 2 hours using an infusion pump. **IV Infusion – peripheral** Discuss with Pharmacy
Monitoring	Monitor electrolytes, particularly calcium and magnesium. Monitor serum creatinine every second day during induction and every week during maintenance.
Additional Information	• Contact with the skin or eye may cause local irritation and a burning sensation. Rinse the affected area with water. • Ensure the patient is well hydrated before and during treatment. • Foscavir® is considered high in sodium – 60mmol sodium per 250mL bottle • Unlicensed medication in Ireland

Information provided relates to Foscavir® manufactured by Clinigen Healthcare .

Fosfomycin

Restricted Antimicrobial Seek advice from Micro/ID/Antimicrobial pharmacist	
Form	Fosfomycin 40mg/mL powder for solution for infusion
Reconstitution	Reconstitute 2g or 4g vials with 20mL of compatible fluid. Reconstitute 8g vial with 40mL of compatible fluid. A slight degree of warming occurs when the powder is dissolved **Dilute further before administration.**
Compatibility & Stability	Water for Injection Glucose 5% Glucose 10%
Administration	Before administration the reconstituted solution should be inspected visually. Only clear solutions should be used. **IV infusion** • Transfer the reconstituted contents of **2 g vial**s into an infusion container with further **30 mL** of solvent (total volume 50mL) and administer over at least 15 minutes. • Transfer the reconstituted contents of **4 g vials** into an infusion container with further **80 mL** of solvent (total volume 100mL) and administer over at least 30 minutes. • Transfer the reconstituted contents of **8 g vials** into an infusion container with further **160 mL** of solvent (total volume 200mL) and administer over at least 60 minutes.
Monitoring	Monitor electrolytes and fluid balance.

Information provided relates to Fomicyt® manufactured by Infectopharm.

Furosemide

Form	20mg per 2mL 50mg per 5mL
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**
Administration	Do not use infusion if it has becomes discoloured/yellow. **IV Injection** Can be administered undiluted or to aid slow administration can be diluted to any suitable volume. Doses of up to 50mg may be given via slow IV injection at a maximum rate of 4mg/min (2.5mg/min in patients with severe renal impairment). **Intermittent IV Infusion** Can be administered undiluted or to aid slow administration can be diluted to any suitable volume. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Administer slowly using an infusion pump at a maximum rate of 4mg/min (2.5mg/min in patients with severe renal impairment). **Continuous IV Infusion** (preferred as may be more effective) Can be administered undiluted or to aid slow administration can be diluted to any suitable volume. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Administer slowly using an infusion pump at a maximum rate of 4mg/min (2.5mg/min in patients with severe renal impairment). **IM Injection** Use restricted to exceptional cases only where the oral and IV routes are unavailable. Maximum IM dose is 50mg.
Monitoring	Monitor blood pressure, fluid balance, electrolytes (sodium and potassium), blood glucose, LFTs and creatinine.
Extravasation	May cause tissue damage due to high pH.
Additional Information	• Infusion at a rate greater than 4mg/min may result in ototoxicity which may not be reversible. • Maximum infusion rate in patients with severe renal impairment is 2.5mg/min to reduce the likelihood of ototoxicity. • IM use is not suitable for the treatment of acute conditions such as pulmonary oedema.

Information provided relates to Furosemide injection manufactured by Claris and Mercury.

Ganciclovir

Pregnant women or women who think they may be pregnant should not handle Ganciclovir

Follow guidelines for handling cytotoxic agents - see PPG-CUH-CUH-266

Ganciclovir dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form & Storage	Baxter: Ganciclovir **500mg in 110mL** single dose bag	Baxter: Store at room temperature
	CUH: Dose required made in Pharmacy	CUH: Store in the fridge
Reconstitution	N/A	
Compatibility & Stability	N/A	
Administration	• Leave bag in overwrap until use. • Not to be used unless the solution is clear. • Gentle shaking should re-dissolve any crystals that may have formed during transportation. **IV infusion only** – Administer at a constant rate over one hour. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **NB: If the patient requires a dose of Ganciclovir of less than 500mg, the infusion pumps should be set to deliver the appropriate portion of the total volume in the container. The remainder should be discarded once the required dose has been administered.** This volume (vol) is calculated with the formula below: Vol to be given = Dose prescribed(mg) / 500mg X 110mL Vol to be given = ____mL	
Handling and Disposal	• This medication is potentially teratogenic and carcinogenic- procedures for proper handling and disposal of cytotoxic drugs should be carried out. See **PPG-CUH-CUH-266** Policy and Procedure for the handling of cytotoxic intravenous medication for Non-Oncology patients in Cork University Hospital for more information • Dispose of any equipment used to administer Ganciclovir (infusion bag, giving sets etc.) in a purple-lidded waste bin. Partially used bags of Ganciclovir should also be placed in a purple-lidded waste bin. • Refer to **Guidelines on the Safe Prescribing, Handling and Administration of Ganciclovir**.	
Extravasation	Extravasation is likely to cause tissue damage due to extreme pH.	
Additional Information	Ganciclovir should only be infused into veins with adequate blood flow to permit rapid dilution and distribution.	

Information provided relates to Ganciclovir 500mg infusion manufactured by Baxter and Cymeven® manufactured by Roche.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Gentamicin

Gentamicin dosing is weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating	
Form	80mg per 2mL vial
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** (not suitable for once daily dosing) IV bolus over 3 - 5 minutes undiluted. **IV Infusion** Add the total dose of gentamicin to 100mL of infusion fluid and administer over 20 minutes. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **IM Injection** Withdraw the required dose. Give by IM injection into a large muscle such as the gluteus or the lateral aspect of the thigh. Volumes >4 mL should be distributed between two or more injection sites.
Monitoring	• Drug level monitoring required. Refer to CUH Antimicrobial Guidelines on Eolas for further guidance. • Monitor renal function before starting and during treatment. • Monitor auditory and vestibular function during treatment.
Extravasation	Extravasation is likely to cause tissue damage because of the low pH of the injection.
Additional Information	• To avoid excessive dosage in obese patients (where Actual Body Weight is more than 120% of Ideal Body Weight), use Adjusted Body Weight to calculate dose – see the CUH Antimicrobial Guidelines on Eolas for guidance. • Dose should be rounded to the nearest vial. • Duration should be kept as short as possible (usual maximum duration 5-7 days) to minimise risk of otoxoticity and nephrotoxicity.
NB: HPRA UPDATE 9/11/2017	• The HPRA has been made aware that some batches of gentamicin may contain higher than expected levels of histamine • Patients should be monitored closely for potential adverse reactions associated with increased levels of histamine, which may cause anaphylactoid or hypotensive reactions, and increased heart rate. Heart rate and blood pressure should be monitored throughout administration. • Caution should be exercised when administering gentamicin concomitantly with medicines known to cause histamine release (e.g. opioids and muscle relaxants).

	• Paediatric patients and patients with severe renal impairment may be more susceptible to the effects of exogenous histamine and should be closely monitored.

Information provided relates to Gentamicin manufactured by Wockhardt.

Granisetron

Granisetron dosing may be weight based; ensure accuracy of documented weight before administration	
Form	1mg/mL solution for injection
Reconstitution	N/A • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection – Dilute before Use** Withdraw the required dose and dilute each 1 mg (1 mL) to 5 mL with sodium chloride 0.9% in the syringe. The solution should be clear and colourless. Inspect visually for particulate matter or discoloration prior to administration and discard if present. Give by IV injection over a minimum of 30 seconds. **IV Infusion** Intravenous infusion diluted in 20 to 50 mL of compatible infusion fluid and administered over 5 minutes.

Information relates to Kytril manufactured by Atnahs Pharma.

Haloperidol

Form	5mg per mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	See below
Administration Method	**IM Injection** Give required dose by IM injection To facilitate the administration of small doses, each 5 mg (1 mL) of haloperidol injection may be diluted to **a minimum** of 10 mL with sodium chloride 0.9%. Cap the syringe and mix well to give a solution containing500 micrograms/mL. **SC Injection** Give required dose by SC injection **Continuous SC Infusion** Concentration < 1mg/mL: Dilute with sodium chloride 0.9% Concentration >1mg/mL: Dilute with WFI
Monitoring	• A baseline ECG is recommended before intramuscular dosing. • Monitor electrolyes, LFTs, renal function, TFTs
Additional Information	• Not licensed in palliative care. • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.

Information provided relates to Haloperidol manufactured by Mercury.

Heparin (Unfractionated)

Potential SALAD Ensure correct unfractionated heparin concentration is selected when preparing & administering unfractionated heparin	
CAUTION: High Administration Risk Rating	
Form	5000 units per 5 mL vial (1000 units per mL)
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	N/A
Administration	**Loading Dose: IV Injection** Give slowly over 5 minutes **Continuous IV Infusion** • Refer to Unfractionated Heparin Guideline on QPulse. • Rate is adjusted according to Activated Partial Thromboplastin Time ratio (APTT ratio)
Antidote	If rapid reversal of the effects of unfractionated heparin is required **Protamine sulphate** is a specific antidote.
Monitoring	• Measure the APTT ratio regularly and adjust the rate of continuous infusion accordingly. Refer to Unfractionated Heparin Guideline on QPulse. • Monitor platelets before, during and after treatment due to risk of heparin-induced thrombocytopenia: • Measure plasma-potassium concentration in patients at risk of hyperkalaemia before starting heparin and monitored regularly thereafter.
Additional Information	• Unfractionated heparin for systemic anticoagulation is usually prescribed as a **loading dose** followed by a **maintenance dose**.

Information provided relates to Heparin manufactured by Wockhardt.

Hydrocortisone (Solu-Cortef®)

Form	100mg dry powder vial as Hydrocortisone Sodium Succinate
Reconstitution	Add 2mL WFI to each 100mg vial. Parenteral drug products should be inspected visually for particulate matter and discolouration prior to administration. Use solution only if it is clear. Reconstituted solution should be used immediately.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration Method	**IV Injection** Give over 1 - 10 minutes. **IV Infusion** Add reconstituted solution to at least 100mL of compatible fluid. Give over 20 - 30 minutes. **IM Injection** No further dilution of reconstituted solution required.
Monitoring	Monitor serum Na, K, Ca.
Additional Information	• Central serous chorioretinopathy is a retinal disorder that has been linked to the systemic use of corticosteroids. Patients should be advised to report any blurred vision or other visual disturbances with corticosteroid treatment.

Information provided relates to Solu-Cortef® manufactured by Pfizer.

Hyoscine BUTYLbromide

Potential SALAD Two hyoscine preparations are available - Hyoscine BUTYLbromide and Hyoscine HYDRObromide Check carefully when you are using this monograph to ensure that you are using it appropriately The information in this monograph is specific to **Hyoscine BUTYLbromide**	
Form	20mg per mL ampoule
Reconstitution	Ready diluted • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Give by slow injection over 3 - 5 minutes. May be diluted to a convenient volume with a compatible fluid. **IM Injection(see note below)** Withdraw the required dose. Inject into a large muscle such as the gluteus or the lateral aspect of the thigh **SC Injection** Withdraw required dose. Give by SC injection. **Continuous SC Infusion** Dilute with sodium chloride 0.9%
Monitoring	• Monitor blood pressure, heart rate and for signs of anaphylaxis. • Patients with underlying cardiac disease such as heart failure, coronary heart disease, cardiac arrhythmia or hypertension should be carefully monitored.
Extravasation	Hyoscine BUTYLbromide has a low pH and may cause venous irritation and tissue damage in cases of extravasation.
Additional Information	• Patients should seek urgent ophthalmological advice if they develop a painful, red eye with loss of vision after administration. • Should not be given by intramuscular injection to patients being treated with anticoagulant drugs since intramuscular haematoma may occur • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.

Information provided relates to Buscopan® manufactured by Sanofi.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Hyoscine HYDRObromide

Potential SALAD Two hyoscine preparations are available - Hyoscine BUTYLbromide and Hyoscine HYDRObromide Check carefully when you are using this monograph to ensure that you are using it appropriately The information in this monograph is specific to **Hyoscine HYDRObromide**	
Form	600 microgram per mL ampoule
Reconstitution	Ready diluted • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**SC Injection** Withdraw required dose. Give by sc injection. **Continuous SC Infusion** Dilute with sodium chloride 0.9% **IM Injection (see note below)** Withdraw the required dose. Inject into a large muscle such as the gluteus or the lateral aspect of the thigh
Monitoring	• Monitor blood pressure, heart rate and for signs of anaphylaxis. • Patients with underlying cardiac disease such as heart failure, coronary heart disease, cardiac arrhythmia or hypertension should be carefully monitored.
Extravasation	Hyoscine HYDRObromide has a low pH and may cause venous irritation and tissue damage in cases of extravasation.
Additional Information	• Patients should seek urgent ophthalmological advice if they develop a painful, red eye with loss of vision after administration. • Should not be given by intramuscular injection to patients being treated with anticoagulant drugs since intramuscular haematoma may occur[1] • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.

Information provided relates to Hyoscine HYDRObromide manufactured by Martindale

Idarucizumab (Praxbind®)

This is a monoclonal antibody. Reduce direct handling to a minimum and wear appropriate protective clothing.		
CAUTION: High Administration Risk Rating		
Form & Storage	Praxbind (2.5g/50mL)	Store at 2–8°C in original packaging. Do not freeze.
Reconstitution	Already in solution	
Compatibility & Stability	Compatible fluids not needed, already in solution **From a microbiological point of view, should be used immediately**; Inspect for particulate matter and discolouration prior to administration.	
Administration	Praxbind (2 vials of 2.5 g/50 mL) is administered intravenously as two consecutive infusions over 5 to 10 minutes each or as a bolus injection over 3-5 minutes. **IV Infusion (preferred)** Administer a 5g dose as two consecutive infusions of 2.5g per 50ml **over 5 to 10 minutes each** (two bottles of 2.5g administered one immediately after another) using a **vented administration line.**  To prevent possible air embolism, bottles must be vented in one of two ways: directly by means of a filter needle into the bottle which goes through the rubber stopper and opens into the air, or using a vented administration line. **IV bolus** May be given by iv bolus over 3-5 minutes, infusion preferred due to volume (100mL per dose)	
Documentation Requirements	In order to improve the traceability of biological medicinal products, **the name and batch number of the administered product should be clearly recorded**	
Additional Information	• The recommended dose is 5 g idarucizumab (2 vials of 2.5 g/50 mL) • Administration of a second 5 g dose of idarucizumab may be considered in the following situations: - recurrence of clinically relevant bleeding together with prolonged clotting times, or - if potential re-bleeding would be life-threatening and prolonged clotting times are observed, or - patients require a second emergency surgery/urgent procedure and have prolonged clotting times. **Restarting Antithrombotic therapy** • Pradaxa (dabigatran etexilate) treatment can be re-initiated 24 hours after administration of idarucizumab, if the patient is clinically stable and adequate haemostasis has been achieved.	

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

	• After administration of idarucizumab, other antithrombotic therapy (e.g. low-molecular weight heparin) can be started at any time, if the patient is clinically stable and adequate haemostasis has been achieved. • Absence of antithrombotic therapy exposes patients to the thrombotic risk of their underlying disease or condition.

Information provided relates to Praxbind® manufactured by Boehringer Ingelheim

Iloprost

Potential SALAD
Do not confuse iloprost with its analogue epoprostenol

Iloprost dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	100 microgram per 1 mL ampoule
Reconstitution	Already in solution. • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules** **Dilute further prior to administration.** Each 1 ml ampoule (100 micrograms = 100,000 nanograms) to be diluted in 500mL infusion fluid. This provides a final concentration of 200 nanograms per mL
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Infusion** Iloprost is administered after dilution (with an infusion pump) over 6 hours daily via a peripheral vein or a central venous catheter. • The dose is adjusted according to individual tolerability within the range of 0.5 to 2 nanograms iloprost/kg body weight/min. • During the first 2 - 3 days, the individually tolerated dose is established. • For this purpose, treatment should be started at an infusion rate to deliver 0.5 nanogram/kg/min for 30 minutes. • The dose should then be increased at intervals of about 30 minutes in steps of 0.5 nanogram/kg/min up to 2 nanogram/kg/min. • The exact infusion rate should be calculated on the basis of body weight to effect an infusion within the range of 0.5 to 2 nanogram/kg/min. • Depending on the occurrence of side effects such as headache and nausea or an undesired drop of blood pressure, the infusion rate should be reduced until the tolerable dose is found. • If the side effects are severe, the infusion should be interrupted. The following table can be used to calculate the dose to be infused.

Body weight (kg)	**Dose (nanogram/kg/min)**			
	0.5	**1**	**1.5**	**2**
	Infusion rate(mL/hr) (using 100 microgram per 500ml solution)			
40	6	12	18	24
50	7.5	15	22.5	30
60	9	18	27	36
70	10.5	21	31.5	42
80	12	24	36	48

Iloprost

Administration ctd

IV Infusion

Body weight (kg)	Dose (nanogram/kg/min) 0.5	1	1.5	2
	Infusion rate(mL/hr) (using 100 microgram per 500ml solution)			
90	13.5	27	40.5	54
100	15	30	45	60
110	16.5	33	49.5	66

Additional Information

- Monitor blood pressure and heart rate at the start of the infusion and after each dosage increase.
- If excessive hypotension occurs, the dose should be reduced or discontinued.
- This is an unlicensed medicine in Ireland.

Information relates to Ilomedin manufactured by Bayer

Immunoglobulin, human normal – Flebogamma® DIF 10%

First-line IVIG for use in CUH is Kiovig®

Flebogamma® DIF dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	Bottles containing Normal Human Immunoglobulin (IVIg) **100mg/mL**: 5g in 50mL, 10g in 100mL, 20g in 200mL
Reconstitution	Already in solution
Compatibility & Stability	N/A
Administration	The solution should be clear or slightly opalescent. Do not use solutions that are cloudy or have deposits. **IV Infusion** Initial rate 0.6mL/kg per hour for 30 minutes. If tolerated, increase to 1.2mL/kg per hour for a further 30 minutes. If the patient tolerates the infusion well, additional increments of 1.2mL/kg/hour may be made at 30 minute intervals up to a maximum of 4.8mL/kg/hour. Use an infusion pump. Infusion rates based on a range of body weights:

Prescribed rate in mL/kg/hr	Patient's weight (kg)						
	40	50	60	70	80	90	100
	Infusion rate in mL/hour						
0.6	24	30	36	42	48	54	60
1.2	48	60	72	84	96	108	120
2.4	96	120	144	168	192	216	240
3.6	144	180	216	252	288	324	360
4.8	192	240	288	336	384	432	480

Documentation Requirements	This is a blood product, therefore batch and expiry should be recorded in patient's notes.
Adverse Drug Reactions	Infusion related reactions: In case of adverse reaction, either the rate of administration must be reduced or the infusion stopped.
Monitoring	• Monitor BP, heart rate, oxygen saturation, respiratory rate and temperature during initial rate, hourly during infusion, for one hour after initial infusion and for 20 minutes after subsequent infusions. • Monitor urine output and serum creatinine levels.
Additional Information	• In all patients, IVIg administration requires: - adequate hydration prior to the initiation of the infusion of IVIg - avoidance of concomitant use of loop diuretics. • Patients with rare hereditary problems of fructose intolerance must not take this medicine. Each mL of this medicinal product contains 50 mg of sorbitol. • Prescriber should round dose down to nearest whole vial size to minimise waste. • Refer to **Adult Intravenous Immunoglobulin (IVIG) Prescription and Administration Record**

Information relates to Flebogamma® DIF manufactured by Grifols.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Immunoglobulin, human normal – Kiovig®

First-line IVIG for use in CUH is Kiovig®

Kiovig® dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	Bottles containing Normal Human Immunoglobulin (IVIg) **100mg/mL**: 2.5g in 25mL, 5g in 50mL, 10g in 100mL, 20g in 200mL, 30g in 300mL
Reconstitution	Already in solution
Compatibility & Stability	Dilution not generally required but KIOVIG may be diluted with glucose 5% solution to a final concentration of 50 mg/mL (5% immunoglobulin).
Administration Method	The solution should be clear or slightly opalescent and colourless or pale yellow. Do not use solutions that are cloudy or have deposits. **<u>IV Infusion</u>** Initial rate 0.5mL/kg per hour for 30 minutes. If the patient tolerates the infusion well, the dose may be increased at 30 minute intervals up to a maximum of 6ml/kg/hour. Use an infusion pump. Infusion rates based on a range of body weights:

Prescribed rate in mL/kg/hr	Patient's weight (kg)						
	40	**50**	**60**	**70**	**80**	**90**	**100**
	Infusion rate in mL/hour						
0.5	20	25	30	35	40	45	50
1	40	50	60	70	80	90	100
2	80	100	120	140	160	180	200
4	160	200	240	280	320	360	400
6	240	300	360	420	480	540	600

Documentation Requirements	This is a blood product, therefore batch and expiry should be recorded in patient's notes.
Adverse Drug Reactions	Infusion related reactions: <u>In case of adverse reaction, either the rate of administration must be reduced or the infusion stopped.</u>
Monitoring	• Monitor BP, heart rate, oxygen saturation, respiratory rate and temperature during initial rate and hourly during infusion. • Monitor urine output and serum creatinine levels.
Additional Information	• In all patients, IVIg administration requires: - adequate hydration prior to the initiation of the infusion of IVIg - avoidance of concomitant use of loop diuretics • Prescriber should round dose down to nearest whole vial size to minimise waste. • Refer to **Adult Intravenous Immunoglobulin (IVIG) Prescription and Administration Record**

Information relates to Kiovig® manufactured by Shire.

Infliximab

Reduce direct handling to a minimum and wear appropriate protective clothing.	
Infliximab dosing is weight based; ensure accuracy of documented weight before administration	
Always administer the brand prescribed There are several biosimilars of infliximab available in CUH. Biosimilars must be prescribed by brand (Remicade®, Remsima®, Infectra®) and they are not interchangeable**.**	
CAUTION: High Administration Risk Rating	
Form	**Remicade®** 100 mg powder for concentrate for solution for infusion **Remsima®** 100 mg powder for concentrate for solution for infusion **Infectra®** 100 mg powder for concentrate for solution for infusion
Reconstitution	• Reconstitute each vial with 10mL water for injections, using a syringe equipped with a 21-gauge (0.8mm) or smaller needle to produce a solution containing infliximab 10mg in 1mL. Direct the stream of water for injections to the glass wall of the vial. • Gently swirl the solution by rotating the vial to dissolve the lyophilised powder until the solution is clear. Avoid prolonged or vigorous agitation. **Do not shake** to avoid foam formation. Foaming of the solution on reconstitution is not unusual. • Allow the reconstituted solution to stand for 5 minutes. The reconstituted solution should be colourless to light yellow and opalescent. The solution may develop a few fine translucent particles, as infliximab is a protein. Do not use if opaque particles, discolouration, or other foreign particles are present. • The reconstituted solution **requires further dilution before administration**.
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**
Administration	**IV Infusion** **Doses < 1000mg**: Dilute the required dose of the reconstituted infliximab solution to 250mL with sodium chloride 0.9%. Withdraw a volume of 0.9% sodium chloride from the 250mL infusion bag equal to the calculated volume of reconstituted infliximab. Add the required volume of reconstituted infliximab to the bag. **Doses ≥ 1000mg**: Dilute the required dose of the reconstituted infliximab solution to 500mL with sodium chloride 0.9%. Withdraw a volume of 0.9% sodium chloride from the 500mL infusion bag equal to the calculated volume of reconstituted infliximab Add the required volume of reconstituted infliximab to the bag. • Add the reconstituted dose slowly and gently mix. • Check that the solution is colourless to light yellow and opalescent. The solution may develop a few fine translucent particles, as infliximab is a protein. Do not use if opaque particles, discolouration, or other foreign particles are present. • Connect administration set and **0.2-micron filter** and set pump to required rate. This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores • First 3 infusions (induction) administer over 2 hours In **carefully selected adult patients** who have tolerated **at least three initial 2-hour infusions** of Infliximab (induction phase) and are receiving maintenance

	therapy, consideration may be given to administering subsequent infusions over **a period of not less than 1 hour**. If an infusion reaction occurs in association with a shortened infusion, a slower infusion rate may be considered for future infusions if treatment is to be continued.
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	Acute infusion reactions including anaphylactic reactions may develop during (within seconds) or within a few hours following infusion. If acute infusion reactions occur, the infusion must be interrupted immediately. Emergency equipment, such as adrenaline, antihistamines, corticosteroids and an artificial airway must be available.
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.
Additional Information	See **PPG-CUH-CUH-243 Policy Procedure and Guidelines for management of patients attending CUH infusion unit** for intravenous therapy for different administration protocols.

Information provided relates to Remicade®, Remsima®, Inflectra®.

Insulin (soluble)

CAUTION: High Administration Risk Rating		
Form & Storage	Human Actrapid 100 units/mL **Note:** 10 units of insulin is contained in 0.1mL	Store between 2 to 8°C until the vial has been opened.
Reconstitution	Already in solution. • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **Dilute further before administration.**	
Compatibility & Stability	Sodium Chloride 0.9% - for use in IV insulin infusion to achieve glycaemic control in diabetes. Glucose 50% - for treatment of hyperkalaemia. Prepared syringes should be used immediately.	
Administration	An insulin syringe must always be used to draw up and prepare insulin (soluble). **IV Injection (hyperkalaemia only)** Add required dose to 50mL glucose 50% and administer centrally or into a LARGE vein over 5 - 15 minutes. **IV Infusion** Dilute 50 units insulin with 49.5mL of sodium chloride 0.9% to produce a 1unit/ml solution. Give as a continuous intravenous infusion using a syringe pump.	
Monitoring	Monitor blood glucose levels.	
Additional Information	• Insulin multi-dose vials are designated for SINGLE PATIENT USE only. On removing the cap on an unopened insulin vial, complete the **SINGLE PATIENT USE ONLY LABEL** attached by writing date first opened and affixing patient addressograph on the reverse side of the label. • Once opened, the product should be kept at room temperature in the designated Insulin Storage Box; refer to PPG CUH CUH 265 **Policy and Procedure on Labelling and Storage of Insulin Products at Cork University Hospital**. Keep the vial in the outer carton to protect from light. • A new insulin infusion should be prepared at least every 24 hours for immediate use.	

Information provided relates to Actrapid® manufactured by Novo Nordisk.

Intralipid® 20%

Administration guidance is for Intralipid used in treatment of local anaesthetic toxicity	
Form	Intralipid® 20% w/v 500mL bag Emulsion for intravenous infusion – Purified soybean oil
Reconstitution	N/A
Compatibility & Stability	N/A
Administration	**Immediately** **Give IV bolus** Give 1.5mL/kg over 2-3 mins (~100mL for a 70kg adult) **Start IV infusion** Start an iv infusion of lipid emulsion at 15 mL/kg/h (17.5 ml/min for a 70 kg adult) At 5 and 10 minutes: Give a repeat bolus (same dose) if: ○ cardiovascular stability has not been restored or ○ an adequate circulation deteriorates At any time after 5 minutes: Double the rate to 30 ml/kg/h if: ○ cardiovascular stability has not been restored or ○ an adequate circulation deteriorates Do not exceed maximum cumulative dose 12 ml/kg (70 kg: 840 ml)
Additional Information	• Continue CPR throughout treatment with lipid emulsion • Recovery from LA-induced cardiac arrest may take >1 h • The biofine bag consists of an inner bag (primary package) with an overpouch • An oxygen absorber and an integrity indicator (Oxalert) are placed between the inner bag and the overpouch. The integrity indicator (Oxalert) will react with free oxygen and change colour if the overpouch is damaged. If the indicator is black, oxygen has penetrated the overpouch and the product must be discarded

Information provided relates to Intralipid® manufactured by Fresenius Kabi.

Iron as Ferric Carboxymaltose (Ferinject®)

Ferinject® dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	1000mg in 20ml vial (50mg/ml)
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**
Administration	**IV Infusion - Preferred** • Administer via a largest possible suitable vein using a small gauge cannula, e.g. 24G (or 22G if 24G unavailable) **and monitor the injection site closely.** Suggested dilution for intravenous infusion. **Volume of Ferinject® required** / **Equivalent Iron dose** / **Max volume of sterile sodium chloride 0.9%** / **Minimum administration time** 2-4ml / 100-200mg / 50ml / No minimum time >4-10ml / >200-500mg / 100ml / 6 minutes >10-20ml / >500-1000mg / 250ml / 15 minutes **IV Injection – choose a large vein** May be administered by iv injection using undiluted solution. **Volume of Ferinject® required** / **Equivalent Iron dose** / **Administration rate/Minimum administration time** 2-4ml / 100-200mg / No minimum time >4-10ml / >200-500mg / 100mg iron/minute >10-20ml / >500-1000mg / 15 minutes
Monitoring	Patient should be observed for adverse effects for at least 30 minutes following each administration.
Adverse Drug Reactions	**Hypersensitivity Reactions** Parenterally administered iron preparations can cause hypersensitivity reactions including serious and potentially fatal anaphylactic/anaphylactoid reactions; cardio respiratory resuscitation facilities and equipment should be available. Hypersensitivity reactions have also been reported after previously uneventful doses of parenteral iron complexes. If hypersensitivity reactions or signs of intolerance occur the treatment must be stopped immediately. The risk is enhanced for patients with: • known allergies including drug allergies, patients with a history of severe asthma, eczema or other atopic allergy. • immune or inflammatory conditions (e.g. systemic lupus erythematosus, rheumatoid arthritis). **Hypophosphataemic Ostomalacia** Symptomatic hypophosphataemia leading to osteomalacia and fractures requiring clinical intervention including surgery has been reported in the post marketing setting. Patients should be asked to seek medical advice if they experience worsening fatigue with myalgias or bone pain. Serum phosphate should be monitored in patients who receive multiple administrations at higher doses or long-term treatment, and those with existing risk factors for hypophosphaemia.

Extravasation	Extravasation at the injection site may lead to irritation of the skin and potentially long lasting brown discolouration. In case of extravasation, the administration of ferric carboxymaltose must be stopped immediately.
Additional Information	Maximum dose for single administration is 1000mg (dose should not exceed 20mg/kg body weight for administration by intravenous infusion and dose should not exceed 15mg/kg body weight for administration by intravenous injection). Maximum cumulative dose is 1000mg per week. Use IBW if patient is overweight.

Information provided relates to Ferinject® manufactured by Vifor.

Iron Sucrose (Venofer®)

Venofer® dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	100mg/5mL
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**
Administration	**IV Infusion – Preferred** • Administer via a largest possible suitable vein using a small gauge cannula, e.g. 24G (or 22G if 24G unavailable) **and monitor the injection site closely.** Suggested dilution for IV infusion **Volume of Venofer® required** / **Equivalent Iron dose** / **Maximum amount of sterile sodium chloride 0.9%** / **Minimum administration time** 5ml / 100mg / 100mL / 15 minutes 10ml / 200mg / 200mL / 30 minutes **IV Injection - Choose a large vein** No further dilution necessary, each 100mg dose must be given over at least 5 minutes.
Monitoring	Patient should be observed for adverse effects for at least 30 minutes following each administration.
Adverse Drug Reactions	Parenterally administered iron preparations can cause hypersensitivity reactions including serious and potentially fatal anaphylactic/anaphylactoid reactions; cardio respiratory resuscitation facilities and equipment should be available. Hypersensitivity reactions have also been reported after previously uneventful doses of parenteral iron complexes. The risk is enhanced for patients with: • known allergies including drug allergies, including patients with a history of severe asthma, eczema or other atopic allergy. • immune or inflammatory conditions (e.g. systemic lupus erythematosus, rheumatoid arthritis).
Extravasation	Extravasation must be avoided because leakage of Venofer® at the site of injection may lead to pain, inflammation, tissue necrosis and brown discolouration of the skin.
Additional Information	The maximum single dose (by IV injection or infusion) is 200mg iron (10mL Venofer®).

Information provided relates to Venofer® manufactured by Vifor.

Labetalol

CAUTION: High Administration Risk Rating	
Form	100mg per 20mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** The solution should be clear and colourless. Inspect visually for particulate matter or discoloration prior to administration and discard if present
Compatibility & Stability	Glucose 5% Sodium Chloride 0.9%
Administration	**IV Injection** Emergency use only. Use undiluted at a maximum rate of 50mg/min. Usual maximum total dose 200mg. **IV infusion** Withdraw and discard 10 mL from a 250 mL infusion bag containing compatible infusion fluid. Withdraw 300 mg (60 mL) of labetalol injection solution from three ampoules using a syringe and add to the remaining 240 mL of infusion fluid and mix well. This gives a solution containing approximately 1 mg/mL Infuse the prescribed dosage using a rate-controlled infusion pump.
Monitoring	Monitor blood pressure, heart rate, ECG, respiratory function.
Extravasation	Extravasation may cause tissue damage. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely. Re-site cannula at first signs of inflammation.
Additional Information	• See UpToDate for Dosage Guidance **For obstetric patients refer to CUMH guidelines or the Pharmacy Department** Patient should avoid upright position during and for 3 hours after intravenous administration.

Information provided relates to Trandate® manufactured by RPH Pharmaceuticals.

Lacosamide

Form	200mg per 20mL ampoule
Reconstitution	Already in solution
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	Product with particulate matter or discolouration should not be used. **IV Infusion** Can be given undiluted, or add required dose to 100 - 250mL of compatible fluid, and administer over 15 - 60 minutes. Give doses greater than 200mg over at least 30 minutes.
Additional Information	Conversion to or from oral and intravenous administration can be done directly without titration. The total daily dose and twice daily administration should be maintained.

Information provided relates to Vimpat® manufactured by UCB Pharmaceuticals.

Levetiractem

Form	500mg per 5mL vial
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	Product with particulate matter or discolouration should not be used. **IV infusion** Add required dose to 100mL compatible infusion fluid and administer over 15 minutes.
Monitoring	Monitor renal function and LFTs.
Additional Information	Conversion to or from oral and intravenous administration can be done directly without titration. The total daily dose and frequency of administration should be maintained.

Information provided relates to Keppra® manufactured by UCB Pharma.

Levofloxacin

Form	500mg in 100mL bottle
Reconstitution	Already in solution
Compatibility & Stability	N/A
Administration	Only clear solutions, free from particles, should be used. Solution may be greenish-yellow in colour. **IV Infusion** Administer 250mg over at least 30 minutes and 500mg over at least 60 minutes. Perforated bottles/bags should be used immediately (within 3 hours of perforation of rubber stopper/bag).
Monitoring	Monitor blood pressure during infusion. If a noticeable drop in blood pressure occurs, the infusion must be stopped immediately.
Additional Information	• Levofloxacin has excellent bioavailability. Consider oral route from the onset, or a rapid IV to po switch as appropriate. See CUH Antimicrobial Guidelines on Eolas for further information. • Fluoroquinolones (FQ) are associated with serious adverse effects affecting muscles, tendons, bones and the nervous system. See CUH Antimicrobial Guidelines on Eolas for further information https://www.hpra.ie/docs/default-source/publications-forms/newsletters/hpra-drug-safety-newsletter-edition-91.pdf?sfvrsn=7

Information provided relates to Tavanic® manufactured by Sanofi Aventis, and Levofloxacin by Fresenius Kabi.

Levomepromazine

Form	25mg per 1mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9%
Administration	The solution should be clear and colourless. Inspect visually for particulate matter or discoloration prior to administration and discard if present. **IV Injection** Dilute 1mL injection with an equal volume of sodium chloride 0.9% and give slowly over 3 - 5 minutes. **IM Injection** No dilution required. **SC Injection** Give required dose by sc injection **Continuous SC Injection** Required dose should be diluted with sodium chloride 0.9% to the largest practical volume.
Additional Information	• Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility. • CSCI syringes and lines must be protected from light to prevent degradation of levomepromazine and must be discarded if a yellow/pink/purple colour occurs.

Information provided relates to Nozinan® manufactured by Sanofi.

Lidocaine

Potential SALAD
Check **strength**. Also available as Lidocaine 1%

CAUTION: High Administration Risk Rating

Form	Lidocaine 2% (100mg per 5 mL) ampoules
Reconstitution	Already in solution
Compatibility & Stability	Glucose 5% Sodium Chloride 0.9%
Administration	**IV Injection** Give 50 - 100mg over 2 minutes and flush immediately with 20mL sodium chloride 0.9%. **IV Infusion** Infusions of 2mg/mL generally used, but up to 8mg/mL if fluid restricted. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Monitoring	ECG monitoring is required.
Extravasation	Extravasation is likely to cause tissue damage due to acidic pH (<5).
Additional Information	Lidocaine products containing adrenaline or preservatives **must not** be given by IV injection.

- **For 2mg/mL solution (1g in 500mL)**

Add 50mL of 2% Lidocaine to 450mL of compatible infusion fluid to give 500mL of a solution containing 2mg/mL Lidocaine.

Dose mg/min	Rate mL/hour
1	30
2	60
3	90
4	120

- **For 4mg/ml solution (2g in 500mL)**

Add 100mL of 2% Lidocaine to 400mL of compatible infusion fluid to give 500mL of a solution containing 4mg/mL Lidocaine.

Dose mg/min	Rate mL/hour
1	15
2	30
3	45
4	60

- **For 8mg/ml solution (400mg in 50mL)**

Add 20mL of 2% Lidocaine to 30mL of compatible infusion fluid to give 50mL of a solution containing 8mg/mL Lidocaine. This may be used with a syringe pump in fluid restricted patients.

Dose mg/min	Rate mL/hour
1	7.5
2	15
3	22.5
4	30

Information provided relates to Lidocaine Mini-Plasco® manufactured by B Braun.

Linezolid

Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form & Storage	600mg in 300mL infusion bag	Protect from light in protective overwrap until required for use.
Reconstitution	Already in solution	
Compatibility & Stability	N/A	
Administration	Solution should be visually inspected prior to use and only clear solutions without particles should be used. **<u>IV infusion</u>** Administer by IV infusion over 30 - 120 minutes.	
Monitoring	Monitor blood counts weekly (including haemoglobin levels, platelets and differentiated leucocyte counts).	
Additional Information	Linezolid has excellent bioavailability (approximately 100%). Consider oral route from the onset, or a rapid IV to oral switch as appropriate. See CUH Antimicrobial guidelines on Eolas app for further information.	

Information provided relates to Zyvox® manufactured by Pfizer.

Lorazepam

CAUTION: High Administration Risk Rating		
Form & Storage	Lorazepam 4mg per 1mL ampoule	Ampoules are stored in the fridge.
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **Dilute further before administration.**	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	**IV Injection(preferred)** Dilute with an equal volume of compatible fluid. In status epilepticus administer by rapid injection. For other indications, give slowly over 3 - 5 minutes. **IM injection only use when oral and iv routes not possible** Dilute with an equal volume of compatible fluid.	
Antidote	Flumazenil is a specific benzodiazepine antagonist and must be available to rapidly reverse respiratory depression when administering lorazepam.	
Extravasation	IV injection should be performed with extreme care to avoid inadvertent intra-arterial injection, which can cause arteriospasm possibly resulting in gangrene.	
Additional Information	Patients should remain under observation for at least 8 hours after administration.	

Information provided relates to Ativan® manufactured by Pfizer.

Magnesium Sulphate

Magnesium sulphate dosing may be weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	1g (4mmol) per 2mL ampoule (50% w/v) equivalent to 2mmol Magnesium per 1mL
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **MUST be further diluted before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** 1-2g (4-8mmol) diluted to 10mL. Dose typically given over 10 -15 minutes, rate not exceeding 0.6mmol/min. **IV Infusion – preferred method** Max concentration 100mg/mL = 0.4mmol/mL=10% Infuse via a volumetric infusion device at a rate appropriate to the indication (usually 4–8 mmol/hour). Use lowest possible rate to avoid ADRs
Monitoring	• Monitor BP, respiratory rate and urinary output. • Use lowest possible rate to avoid bradycardia, flushing and hypotension. Rapid infusion may precipitate hypotension. Monitor for signs of overdose- loss of patellar reflexes, weakness, nausea, sensation of warmth, flushing, drowsiness, double vision, and slurred speech.
Extravasation	Extravasation is likely to cause tissue damage due to high osmolarity.
Additional Information	**For obstetric patients refer to CUMH guidelines or the Pharmacy Department** • Up to 40g given over a period of 5 days may be necessary, however this is difficult to quantify as up to 50% of an IV dose is excreted in the urine. • 1 mmol = 2 mEq = 24 mg of elemental magnesium = 240 mg magnesium sulphate

Dose	Volume	Dilute in at least	Infusion time
1-2g (4-8mmol)	2-4mL	50mL	1-2 hours
2-4g (8-16mmol)	4-8mL	100mL	4-12 hours
4-8g (16-32mmol)	8-16mL	250mL	12-24 hours

Information provided relates to Magnesium Sulphate manufactured by Aurum Pharmaceuticals and Ethypharm.

Meropenem

Contains a PENICILLIN-LIKE structure May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration	
Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information	
Form	500mg and 1g vials
Reconstitution	Add 10mL WFI to 500mg vial Add 20mL WFI to 1g vial Use immediately after reconstitution.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view the product should be used immediately**. Chemical and physical in-use stability: • 3 hours at up to 25°C • 12 hours under refrigerated conditions (2-8°C).
Administration	The solution should be shaken before use. **IV Injection** Doses up to 1g can be given as IV bolus over 5 minutes. Not recommended for dose of 2g. **IV Infusion** Add required dose to 50 - 250mL of compatible infusion fluid. Infusion concentration should not exceed 20mg/mL fluid. Administer over 15 - 30 minutes.
Monitoring	Manufacturer advises monitor liver function—risk of hepatotoxicity

Information provided relates to Meropenem by Fresenius Kabi.

Methylprednisolone (Solu-Medrone®)

Potential SALAD Methylprednisolone as Depo-Medrone® is **NOT** for IV administration	
Form	Solu-Medrone® (preservative free) 500mg vial Solu-Medrone® (preservative free) 1g vial Solu-Medrone® 40mg Act-O-Vial Solu-Medrone® 125mg Act-O-Vial
Reconstitution	**500mg and 1g vial** Use diluents (WFI) provided. **40mg and 125mg Act-O-Vial reconstitution** • Press down on plastic activator to force diluent into the lower compartment. • Gently agitate to produce a solution. • Remove plastic tab. • Sterilise top of stopper with an alcohol swab. • Insert needle squarely through the centre of the plunge-stopper until the tip is just visible. • Invert vial and withdraw the dose.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Use reconstituted solution. Doses of up to 250mg may be given by slow IV injection over 5 minutes. **IV infusion** Dilute reconstituted solution. Add doses over 250mg to 50-100mL infusion fluid and give over 30 - 60 minutes.
Monitoring	• Manufacturer advises monitor blood pressure and renal function (serum creatinine) routinely in patients with systemic sclerosis—increased incidence of scleroderma renal crisis. • Rapid IV administration of large doses is associated with cardiovascular collapse.

Information provided relates to Solu-Medrone® manufactured by Pfizer.

Metoclopramide

Metoclopramide dosing may be weight based; ensure accuracy of documented weight before administration		
Form & Storage	10mg per 2mL ampoule	Store in original box away from light.
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	If inadvertent exposure to light occurs, ampoules showing a yellow discolouration must be discarded. **IV Injection** Give slowly over at least 3 minutes. **IM injection** No dilution required. **Continuous SC Infusion** Dilute with sodium chloride 0.9%	
Adverse Drug Reactions	• Extrapyramidal disorders may occur, particularly in children and young adults, and/or when high doses are used. Metoclopramide should be discontinued immediately in the event of extrapyramidal symptoms. • Increased risk of dystonic reactions (including oculogyric crises) in elderly and in young patients, particularly girls and young women, use of metoclopramide should be restricted to those situations for which there is no safer alternative. Lower doses should be used in these patient groups (maximum 500 micrograms/kg for high-dose therapy).	
Additional Information	• In order to avoid overdose, a minimal interval of 6 hours between two administrations is to be respected, even in case of vomiting or rejection of the dose. • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.	

Information provided relates to Metoclopramide manufactured by Mercury Pharmaceuticals.

Metoprolol

CAUTION: High Administration Risk Rating	
Form	5mg in 5mL
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Reconstitution	Already in solution • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules**
Administration	**IV Injection** Inject slowly at a maximum rate of 1 - 2mg/minute. **IV Infusion (unlicensed)** Contact pharmacy
Monitoring	Monitor ECG and blood pressure.

Information provided relates to Betaloc® manufactured by Astra Zeneca.

Metronidazole

Form & Storage	500mg/100mL infusion bottle	Keep container in outer carton to protect from light.
Reconstitution	Already in solution	
Compatibility & Stability	N/A	
Administration	**IV Infusion** Administer over at least 20 minutes. The infusion rate should not exceed 5mL/minute. The opened bottle should be used immediately.	
Additional Information	Metronidazole has excellent oral bioavailability. Consider oral route from the onset, or a rapid IV to oral switch as appropriate. See CUH Antimicrobial Guidelines on Eolas for further information.	

Information provided relates to Metronidazole manufactured by B Braun.

Midazolam

Potential SALAD Ensure selection of the correct **strength** of midazolam ampoule	
CAUTION: High Administration Risk Rating	
Form	10mg per 2mL ampoule (5mg/mL) 10mg per 5mL ampoule (2mg/mL)
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Administer at a rate of 2mg/min. **IV Infusion** Refer to ITU guideline. **SC Injection** Give required dose by SC injection **Continuous SC Infusion (Unlicensed)** Use 10mg per 2mL ampoule and dilute with sodium chloride 0.9%.
Antidote	Flumazenil is a specific benzodiazepine antagonist and must be available to rapidly reverse respiratory depression when administering midazolam.
Extravasation	Midazolam has a low pH and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely. Re-site cannula at first signs of inflammation.
Additional Information	• Unlicensed for use in palliative care. • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.

Information provided relates to Hypnovel® manufactured by Cheplapharm

Morphine Sulphate

Potential SALAD Use separate storage locations within the controlled drug cupboard such as different shelves for low strength products used for bolus administration and high strength products used to prepare infusions.		
CAUTION: High Administration Risk Rating		
Form & Storage	10mg per 1mL ampoule 30mg per 1 mL ampoule 60mg per 1 mL ampoule	Controlled Drug (CD): Must be stored in CD Press
Reconstitution	Already in Solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Injection** Administer over 4 - 5 minutes (2mg/min) May be further diluted in 4 - 5ml compatible fluid to aid administration by slow injection. **IV Infusion** Refer to ITU guideline. **IM Injection** No dilution required. **SC Injection** No dilution required. **Continuous SC Infusion** Dilute required dose with sodium chloride 0.9%	
Antidote	Naloxone should be kept in all areas where opioids are administered.	
Monitoring	Blood pressure and pulse, LFTs, pain score, renal function: U, Cr, CrCl (or eGFR, respiratory rate.	
Notes	• Prefilled syringes containing 90mg in 45 ml sodium chloride 0.9% for use in patient controlled analgesia are available from Pharmacy and must be ordered in a Controlled Drugs book. If commenced out of hours, Theatre Recovery or 4B may have a supply. For further information contact the Pain Nurse. • IV doses of morphine have a greater analgesic effect than oral, IM or SC doses. Approximate Conversion: 1mg IV = 1 - 1.5mg IM/SC = 2 - 3mg PO. • Administration via syringe driver is unlicensed and may increase the administration risk rating. To mitigate these risks: ○ Contact the Pharmacy Department or Palliative care team for further guidance. ○ Consult the Palliative Care Formulary accessible on www.medicinescomplete.com or the Syringe Driver Survey Database (SDSD) (available after registration on www.palliativedrugs.com) for guidance on syringe driver compatibility.	

Information provided relates to Morphine Sulphate manufactured by Mercury Pharmaceuticals.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Moxifloxacin

Not first-line in CUH. Contact ID/Micro/Antimicrobial Pharmacist for advice	
Form	400mg in 250mL bottle
Reconstitution	Already in solution
Compatibility & Stability	N/A
Administration	**IV Infusion only** Administer over 1 hour. Do NOT administer as rapid IV injection.
Additional Information	• Fluoroquinolones are associated with serious adverse effects affecting muscles, tendons, bones and the nervous system. See CUH Antimicrobial Guidelines on Eolas for further information https://www.hpra.ie/docs/default-source/publications-forms/newsletters/hpra-drug-safety-newsletter-edition-91.pdf?sfvrsn=7 • Duration of infusion should not be less than 60 minutes to reduce risk of QT interval prolongation. • Patients must be adequately hydrated and asked to drink fluids liberally. • Moxifloxacin has excellent oral bioavailability. Consider oral to IV switch if appropriate. See CUH Antimicrobial Guidelines on Eolas for further information.

Information provided relates to Avelox® manufactured by Bayer.

Naloxone

CAUTION: High Administration Risk Rating	
Form	400 microgram per 1mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Preferred in emergencies due to rapid onset of action. Administer undiluted. May be diluted to a convenient volume with compatible fluid. **IV Continuous Infusion** Add 2mg (5mL) of Naloxone to 495mL of infusion fluid to give a 4 microgram per mL solution. Rate of infusion should be titrated in accordance with the patient's response. Must be infused using a volumetric infusion pump. **IV Infusion –In fluid restricted patients or if higher dose required** Add 10mg (25mL) to 25mL of compatible infusion fluid and infuse using a syringe pump. Rate of infusion should be titrated in accordance with the patient's response.
Extravasation	Naloxone is likely to cause extravasation leading to tissue damage due to its low pH. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely. Re-site cannula at first signs of inflammation.
Additional Information	• Duration of action of many opioids exceeds that of naloxone, therefore patients must be monitored in case of relapse. A continuous infusion may be indicated. • Naloxone may precipitate acute withdrawal syndrome in opioid-dependent patients. • Naloxone should be kept in all areas where opioids are administered.

Information provided relates to Naloxone manufactured by Mercury Pharmaceuticals.

Natalizumab

Reduce direct handling to a minimum and wear appropriate protective clothing		
CAUTION: High Administration Risk Rating		
Form & Storage	Concentrate for solution for infusion	Refrigerate unopened vials at 2°C - 8°C and protect from light.
Reconstitution	Already in Solution	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	Natalizumab solutions should be inspected visually prior to dilution and administration, and should be discarded if there are visible particles and/or discoloration. The liquid should be clear to slightly opalescent. **IV Infusion** • Add the contents of the vial (15mL) to 100mL bag of sodium chloride 0.9%, Invert gently to mix completely and to avoid foaming. Do not shake. • The total volume to be administered is 115ml. Administer over approximately 1 hour at a rate of approximately 2mL per minute. See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Adverse Drug Reactions	Medicinal products for the treatment of hypersensitivity reactions, e.g. adrenaline, oxygen, antihistamines and corticosteroids should be available for immediate use in the event of an allergic reaction during administration of all infusions.	
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.	

Information provided relates to Tysabri manufactured by Biogen

Octreotide

Potential SALAD Do not confuse with Sandostatin LAR® which is a depot octreotide preparation that can only be given IM	
Form	50 microgram per 1mL ampoule 100 microgram per 1 mL ampoule 500microgram per 1mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9%
Administration	**SC Injection (preferred route)** Allow the injection to reach room temperature before administration. Withdraw the required dose, and give by SC injection. **IV Injection (for use only when rapid response required)** Dilute each 1mL octreotide with 1 - 9mL sodium chloride 0.9%. Give slowly over 3 - 5 minutes. **Intermittent IV Infusion (unlicensed)** Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Add required dose to 50 - 100mL infusion fluid and administer over 15 - 30 minutes or at a rate of 25-50microgram/hour, depending on indication. **Continuous IV Infusion (bleeding varices)** Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. Add 500 microgram to 50mL infusion fluid (giving a solution of 10microgram/mL) and administer at a rate of 25 – 50 microgram/hour.
Monitoring	• ECG and blood pressure monitoring required for IV doses. • Monitor blood glucose levels.
Extravasation	• Local discomfort may be reduced by allowing the solution to reach room temperature before injection, or by injecting a smaller volume using a more concentrated solution • Extravasation is likely to cause tissue damage due to low pH.
Additional Information	• Give all doses between meals or before bedtime to reduce flatulence, abdominal pain and bloating.

Information provided relates to Sandostatin® manufactured by Novartis.

Ondansetron

Form	4mg in 2mL ampoule 8mg in 4mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Administer over 3 - 5 minutes. **Intermittent IV Infusion** Add required dose to 50 - 100mL compatible fluid and infuse over 15 minutes. **Continuous IV Infusion** Add dose to 50 - 100mL compatible fluid and administer at a rate of 1 mg/hour for up to 24 hours.
Additional Information	• Ondansetron may cause QT prolongation. • Hypokalaemia and hypomagnesemia should be corrected prior to administration of ondansetron.

Information provided relates to Ondansetron 2mg/mL manufactured by Gerard.

Pabrinex® (Vitamins B & C)

Form	Vitamin B and C (paired ampoules) 2 x 5ml Each No. 1 ampoule (5mL) contains: Thiamine Hydrochloride 250mg Riboflavin (as Phosphate Sodium) 4mg Pyridoxine Hydrochloride 50mg Each No. 2 ampoule (5mL) contains: Ascorbic acid 500mg Nicotinamide 160mg Glucose (as monohydrate) 1000mg
Reconstitution	Already in solution • **Draw up using a 5micron filter needle** • **Use gloves when opening ampoules** **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**Intermittent IV infusion** Draw up contents of two ampoules/one pair (1&2) into the same syringe, mix and add to 100mL infusion fluid. Infuse over at least 30 minutes. Up to three pairs of ampoules may be added to one bag. (One pair = Ampoule 1 + Ampoule 2) Administer immediately after the addition of ampoules to infusion fluid.
Additional Information	Risk of anaphylaxis is greatly reduced if Pabrinex® is given over at least 30 minutes. Facilities for treating anaphylaxis should be available.

Information provided relates to Pabrinex® manufactured by Archimedes Pharmaceuticals.

Pantoprazole

Form	40mg dry powder vial
Reconstitution	Add 10mL sodium chloride 0.9% to vial.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	The appearance of the product after reconstitution is a clear yellowish solution. Discard any product which appears cloudy or where precipitate has formed. **IV Injection** Give over at least 2 minutes. **Intermittent IV Infusion** Dilute reconstituted vial in 100mL of compatible fluid, and infuse over 15 minutes. **Continuous IV Infusion (unlicensed)** • Reconstitute **two** 40mg vials, each with 10mL sodium chloride 0.9% taken from the same 100mL bag. Return the reconstituted vials to the bag to give an 80mg in 100ml infusion solution. • Give at a rate of 10ml/hour (8mg/hour). • Use infusion within 12 hours.

Information provided relates to Protium® manufactured by Takeda UK.

Paracetamol

Paracetamol dosing is weight based; ensure accuracy of documented weight before administration	
Form	1g per 100mL vial of solution for infusion
Reconstitution	Already in solution
Compatibility & Stability	N/A
Administration	**<u>IV Infusion</u>** 1g dose: Use the 100mL vial without further dilution. < 1g dose: Remove excess solution from the 100mL vial/bottle before starting administration of the calculated dose. Administer over 15 minutes.
Additional Information	• For patients ≤ 50kg, dosing is reduced to 15mg/kg every 4-6 hours, maximum 60mg/kg/day. • Check that no other medicines containing paracetamol are being administered. • Consider PO/PR/NG administration before administering IV paracetamol.

Information provided relates to Paracetamol manufactured by Accord.

Parecoxib Sodium

Form	Dynastat® (Parecoxib sodium) 40mg Powder for solution for injection
Reconstitution	Reconstitute each vial with 2mL Sodium Chloride 0.9% or Glucose 5%. The use of WFI is not recommended for reconstitution, as the resulting solution is not isotonic. Dissolve the powder completely using a gentle swirling motion until the solution is clear. The reconstituted solution must not be used if discoloured/cloudy or if particulate matter is observed. After reconstitution, the entire contents of the vial should be withdrawn for a single administration. If a dose lower than 40mg is required, excess medicine should be discarded.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% Precipitation may occur when Parecoxib is combined in solution with other medicinal products and therefore must not be mixed with any other drug, either during reconstitution or injection. In those patients where the same IV line is to be used to inject another medical product, the line must be adequately flushed prior to and after Parecoxib injection with a solution of known compatibility. Reconstituted vials should be used immediately.
Administration	**IV injection** The IV bolus injection may be given rapidly and directly, over 3 minutes into a vein or existing IV line. **IM injection** The IM injection should be given slowly and deeply into the muscle.
Monitoring	Monitor blood pressure, heart rate, signs of hypersensitivity, rash or cardiovascular events.
Additional Information	• Parecoxib sodium is a selective COX-2 inhibitor. Contraindicated in patients with a history of hypersensitivity to aspirin or any other NSAID—which includes those in whom attacks of asthma, angioedema, urticaria or rhinitis have been precipitated by aspirin or any other NSAID.(BNF) • Therapy to be reviewed on a daily basis for a maximum of 3 days. • Dose adjustment recommended in patients with renal impairment, hepatic impairment, in elderly patients (≥65 years) who weigh <50kg and when co-administered with fluconazole.

Information provided relates to Dynastat® manufactured by Pfizer.

Phenobarbital (Phenobarbitone)

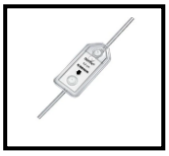
Form	30mg/mL 1mL amp 60mg/mL 1mL amp
Reconstitution	Already in solution **Draw up using a 5 micron filter needle** **Dilute further prior to administration**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**IV Injection** Dilute each 1mL of the required dose to 10mL with water for injections Give slowly at a rate no faster than 100mg per minute **IV Infusion** Dilute each 1mL of the required dose to 10mL with water for injections Give slowly at a rate no faster than 100mg per minute using an infusion pump.
Extravasation	Phenobarbital sodium has a high pH and contains propylene glycol. May cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely
Monitor	Sedation score, blood pressure, heart rate, respiratory rate and injection site.
Caution	• Avoid in acute porphyrias; children; debilitated; elderly (in adults); history of alcohol abuse; history of drug abuse; respiratory depression (avoid if severe); seizures (may be exacerbated) • Phenobarbital may exacerbate seizures in patients with absence seizures, Dravet syndrome, and Lennox-Gastaut syndrome
Additional Information	Phenobarbitone has many interactions. See BNF for more information.

Information provided relates to Phenobarbitone manufactured by Martindale.
This product is unlicensed.

Phenytoin

Phenytoin dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

Form	250mg in 5mL vial
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**
Administration	**IV Infusion (Loading Dose & Maintenance Dose)** Dilute required dose in sodium chloride 0.9% to a maximum of 10mg/mL. The infusion must be prepared immediately before use and infused within one hour using an **in-line filter** (0.2micron). Attach a **0.2micron filter** to the end of the administration set, before it is connected to the patient. This filter (pictured) **B Braun Sterifix® 0.2µ Ref 4099303** is kept in Infusion unit, ED & 3A.  Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **Required Dose** / **Volume of Infusion Fluid** Less than 500mg — 50mL 500mg – 1000mg (loading doses) — 100mL Greater than 1000mg (loading doses) — 250mL Final concentration of phenytoin should not exceed 10mg/mL Administer at a rate not exceeding 50mg per minute, e.g. 1g can be given over 20 minutes. Rate of 25 mg/minute or lower may be more appropriate in some patients (including the elderly and those with heart disease). Stability of the diluted solution is limited and precipitates may form. **IV Injection (Maintenance doses)** Phenytoin should be injected **slowly** into a large vein at a rate not exceeding 50mg per minute. Rate of 25 mg/minute or lower may be more appropriate in some patients (including the elderly and those with heart disease).
Monitoring	• Continuous monitoring of ECG and blood pressure is essential. The patient should be observed for signs of respiratory depression. Monitor for signs of cardiovascular collapse and CNS depression. • Phenytoin has a narrow therapeutic range; the usual total plasma-phenytoin concentration for optimum response is 10-20mg/L (or 40-80 micromol/L). Monitor levels twice weekly while on IV phenytoin or more frequently if needed. Phenytoin levels need to be corrected for albumin/renal failure
Extravasation	May cause tissue damage due to high pH. Flush pre and post each dose with sodium chloride 0.9% to prevent phlebitis.
Additional Information	• Phenytoin is often administered as a **loading dose** (based on weight) followed by a smaller **maintenance dose**. Double check the correct dose has been prescribed. • Hypotension usually occurs with rapid IV administration of phenytoin. • There are numerous drug interactions with phenytoin – check BNF.

Information provided relates to Epanutin® manufactured by Pfizer.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Phytomenadione (Vitamin K)

Form	10mg in 1mL ampoule 2mg in 0.2mL (Konakion MM Paediatric®)
Reconstitution	Already in Solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Glucose 5% **ONLY** Store in the original package to protect from light
Administration	**IV Injection** Give the required dose by slow injection over 3-5 minutes. **IV Infusion (unlicensed**) Using 10mg in 1mL preparation; add required dose to a 50mL bag and administer over 15 - 30 minutes.
Adverse Drug Reactions	• Hypersensitivity reactions have been reported. Facilities for treating anaphylaxis must be available. • Too rapid intravenous administration of vitamin K has caused reactions, including flushing of the face, sweating, a sense of chest constriction, cyanosis and peripheral vascular collapse.
Additional Information	• See PPG-CUH-CUH-242 **Policy and Procedure for the management of patients presenting with excessive anticoagulation (INR>5.0) while on Vitamin K antagonists e.g. warfarin at the Cork University Hospital Group.** • For patients with prosthetic heart valves caution should be taken to avoid over correction of anti-coagulation below therapeutic range. • The undiluted injection can be given orally.

Information provided relates to Konakion MM® manufactured by Cheplapharm.

Piperacillin/Tazobactam

Contains a PENICILLIN	
Form	4.5g dry powder vial
Reconstitution	Add 20mL WFI or sodium chloride 0.9% to 4.5g vial. Shake until dissolved. Reconstitution generally occurs within 10 minutes.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Infusion** Dilute reconstituted solution to a final volume of at least 50mL with compatible fluid. Infuse over 30 minutes.

Information provided relates to Piperacillin/Tazobactam manufactured by Gerard and Fresenius Kabi.

Posaconazole

Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
CAUTION: High Administration Risk Rating		
Form & Storage	300mg in 16.7ml	Vials should be stored in a fridge (2°C-8°C)
Reconstitution	Already in solution	
Compatibilty and Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV Infusion** Add 16.7ml of posaconazole solution to 250ml of compatible infusion fluid and administer over 90 minutes via a central line or PICC. Concentration range 1-2mg/ml **Note:** If a central line is unavailable a single infusion can be given peripherally via a large vein: Add 16.7ml of posaconazole solution to 133ml of compatible infusion fluid (by removing 117ml from a 250ml bag) and administer over 30 minutes (concentration 2mg/ml) **Note: In clinical studies, multiple peripheral infusions given through the same vein resulted in infusion site reactions** Prepared infusions should be used immediately, if not used immediately prepared infusions can be stored for 24 hours in a fridge between 2-8°C Review to switch to oral route of administration as soon as the patient's condition allows. Consult Eolas for dosing-tablets and liquid available. Note: oral formulations are not interchangeable	
Extravasation	Extravasation may cause tissue damage due to a low pH	
Monitoring & Adverse Drug Reactions	• Posaconazole is usually prescribed as a **loading dose** (first 24 hours) followed by a **maintenance dose** (after first 24 hours) • **Never** administer posaconazole as an IV bolus • Posaconazole given peripherally can result in infusion site reactions/phlebitis, monitor site of injection • Adverse effects include: fever, arrhythmias, thrombosis, infusion site reactions, hypersensitivity and allergic reactions • **Monitor** blood pressure, heart rate, temperature, ECG (in high risk patients) • The excipient betadex sulfobutyl ether sodium may accumulate in patients with moderate to severe renal impairment (eGFR <50ml/min). Monitor renal function and review route of administration regularly	

Information provided relates to Noxafil manufactured by MSD

Potassium Chloride

The following pre-mixed potassium chloride solutions are available for use in CUH and should be used where possible.
Ampoules should ONLY be used when there is no alternative available.

CAUTION: High Administration Risk Rating

Form & Storage

Pre-mixed bags (use whenever possible)

Potassium Chloride Content	Volume	Fluid	Code
20mmol	500mL	**Sodium Chloride 0.9%**	FE1983
20mmol	1000mL	**Sodium Chloride 0.9%**	FKE1764
40mmol	1000mL	**Sodium Chloride 0.9%**	FKE1984
20mmol	500mL	**Glucose 5%**	FE1263
20mmol	1000mL	**Glucose 5%**	FE1134
40mmol	1000mL	**Glucose 5%**	FE1264
20mmol	500mL	**Sodium Chloride 0.18% & Glucose 4%**	FE1723J
20mmol	1000mL	**Sodium Chloride 0.18% & Glucose 4%**	FE1704
40mmol	500mL	**Sodium Chloride 0.9%**	3117456

For fluid restricted patients only –
Order from Pharmacy on Potassium Chloride Ordering Form

Ampoules: Potassium Chloride 15% w/v strong ampoules containing 2mmol potassium and 2mmol chloride per ml (20mmol potassium and 20mmol chloride per 10mL ampoule)
Order from Pharmacy on Potassium Chloride Ordering Form

Use premixed bags whenever possible

Concentrated potassium ampoules must be stored in the Controlled Drug press.

Reconstitution

Premixed bags: Already in Solution
Ampoules: Already in solution.
MUST be further diluted before administration. Bolus injection can be **fatal**.

Compatibility & Stability

Sodium Chloride 0.9%
Glucose 5% (may cause a decrease in the plasma-potassium concentration)

Administration

IV Infusion ONLY

All potassium infusions must be thoroughly mixed before administration.
If adding concentrated potassium to an infusion bag, it is essential to ensure careful and thorough mixing by inverting repeatedly to avoid inadvertent administration of a toxic bolus. Potassium chloride solution is 'heavier' than the infusion fluid.

- Administer via central venous access device or large peripheral vein.
- Concentration: Maximum concentration is 40mmol potassium in 1L.
  Fluid Restricted patients: Max conc 40mmol in 500mL
- Rate:
  - Rate control is essential. Administer using a rate-controlled infusion pump.
  - Usual maximum infusion rate is 10mmol potassium per hour.
  - If cardiac monitoring is in situ, rate can be increased to 20mmol per hour.
  - DO NOT EXCEED a rate of 20mmol per hour due to risk of asystole.

Monitoring

- Cardiac monitoring required when: 1) rate of potassium >10mmol per hour,

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications.
Further information is available from Pharmacy on 22146 or 22542

	2) serum potassium ≤2.5mmol/L. • Baseline ECG required if serum potassium < 3mmol/L.
Extravasation	Because of risk of thrombophlebitis, solutions containing >30mmol/L should be given via the largest vein available.
Additional Information	• Higher rates and concentrations may be used in ITU with increased monitoring. REFER TO ITU FOR GUIDANCE. • See CUH Guidelines for the Management of HypoKALAEMIA in Adults • Use **Potassium Chloride ordering Form** to order -Potassium Chloride 40mmol in 500mL Sodium Chloride 0.9% (fluid restricted patients) -Concentrated Potassium Chloride (20mmol/10mL) ampoules for Potassium Chloride infusion not available in required concentration.

Potassium Phosphate

CAUTION: High Administration Risk Rating		
Form & Storage	20mL ampoule containing 1mmol potassium and 0.6mmol phosphate per mL (each ampoule contains 20mmol potassium, 12mmol phosphate)	Concentrated potassium ampoules must be stored in the Controlled Drug press.
Reconstitution	Already in solution **Further dilution is essential before administration**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	

Administration	**IV Infusion ONLY**
	
	20mL ampoule must be diluted with at least 500mL of compatible fluid, and **mixed well**.
	
	• Administer via central venous access device or large peripheral vein.
	• Concentration: Maximum concentration is 40mmol potassium in 1L.
	• Rate:
	  ○ Usual maximum infusion rate is 10mmol Potassium (6mmols Phosphate) per hour.
	  ○ Administer over at least 2 hours.	

Monitoring	Monitor ECG, plasma potassium, phosphate and calcium concentrations closely when rate of intravenous potassium exceeds 20mmol per hour. REFER TO ITU FOR GUIDANCE.	
Extravasation	• Venous irritation or phlebitis may occur at injection site where solutions contain more than 30mmol of potassium per litre. • Particular care should be taken to ensure that infusion is intravenous, since paravenous administration can lead to indurations and chalky deposits in the subcutaneous tissue.	
Additional Information	Higher rates and concentrations may be used in ITU.	

Information provided relates to Potassium Phosphate manufactured by B Braun.

Prochlorperazine

Form	12.5mg/mL solution for injection
Reconstitution	Already in solution • **Use gloves when opening ampoules** • **Draw up using a 5 micron filter needle**
Compatibility & Stability	N/A
Administration	**IM injection only** Give by deep intramuscular injection
Monitoring	Monitor closely patients with epilepsy or a history of seizures, as prochlorperazine may lower the seizure threshold Monitor blood pressure and heart rate with elderly and volume depleted patients who are particularly susceptible to postural hypotension. Monitor ECG particularly if cardiovascular risk factors or if the patient is being admitted as an inpatient. Also see below • tachycardia, atrioventricular (A-V) block, cardiac arrest • Type I hypersensitivity reactions: angioedema, urticaria • respiratory depression • local pain or nodule formation • risk of extrapyramidal reactions
Additional Information	Stemetil should be avoided in patients with hepatic or renal dysfunction, Parkinson's disease, hypothyroidism, cardiac failure, phaeochromocytoma, myasthenia gravis, and prostate hypertrophy. It should be avoided in patients with a history of narrow angle glaucoma or agranulocytosis.

Information provided relates to Stemetil® manufactured by Sanofi

Procyclidine

Form	10mg in 2mL
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9%
Administration	**IV injection** Give the required dose undiluted as a slow IV injection over 3 - 5 minutes. **IM injection** Give undiluted.
Additional Information	Unlicensed medication in Ireland.

Information provided relates to Procyclidine manufactured by Auden McKenzie.

Protamine Sulphate

Form	50mg per 5mL vial, corresponding to 1400 anti-heparin International Units/mL
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% **ONLY** Diluted solutions should be used immediately as they contain no preservative.
Administration	**IV Injection** Slow IV injection via a large peripheral vein over 10 minutes. Maximum rate of 5mg/min. **IV Infusion** Dilute the required dose in a compatible infusion fluid and give at a rate not exceeding 5mg/min using an infusion pump. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Monitoring	Monitor activated partial thromboplastin time ratio (APTTr) or other appropriate blood clotting parameters.
Adverse Drug Reactions	Administration of protamine sulphate can cause anaphylactic reactions and therefore facilities for resuscitation and treatment of shock should be available.
Extravasation	Extravasation is likely to cause tissue damage due to low pH.
Notes	• Do not give more than 50mg per course. • Caution in fish sensitivity and vasectomised men (increased risk of allergic reactions)

Information provided relates to Protamine Sulphate manufactured by LEO Pharma.

Quinine Dihydrochloride

Quinine dihydrochloride dosing is weight based; ensure accuracy of documented weight before administration	
Form	300mg in 10mL ampoule
Reconstitution	Already in solution **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% (in pregnancy)
Administration	**IV infusion ONLY** Preferably administer centrally to avoid irritation as the preparation has a low pH. If given peripherally, choose a large vein and monitor for injection site closely for phlebitis. Dilute the required dose with compatible fluid to a concentration of 2mg/mL, and administer over 4 hours.
Monitoring	• Monitor ECG in elderly patients or in cardiac disease. • Monitor blood glucose and electrolytes.
Extravasation	Extravasation is likely to cause tissue damage.
Additional Information	• Unlicensed medication in Ireland. • Use glucose 5% in pregnancy. Quinine is associated with severe and recurrent hypoglycaemia in late pregnancy.

Information provided relates to Quinine Dihydrochloride manufactured by the Ipswich Hospital.

Rasburicase

Rasburicase dosing is weight based; ensure accuracy of documented weight before administration		
Form & Storage	1.5mg/mL powder and Solvent for Concentrate for Solution for Infusion	Store in a fridge at 2°C - 8°C
Reconstitution	Rasburicase must be reconstituted with the entire volume of the supplied solvent ampoule. Reconstitute each 7.5mg vial with 5mL of solvent provided. Reconstitute each 1.5mg vial with 1mL of solvent provided. Swirl gently without shaking to dissolve. **Dilute further before administration.**	
Compatibility & Stability	Sodium Chloride 0.9% The reconstituted solution contains no preservative. Therefore the diluted solution should be infused immediately.	
Administration	The solution should be clear and colourless. Inspect visually for particulate matter or discoloration prior to administration and discard if present. **IV infusion** Withdraw the required dose and add to 50mL sodium chloride 0.9%. Give over 30 minutes.	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Monitoring	• Monitor plasma uric levels periodically to ensure treatment is effective. • Monitor Creatinine and U&Es to check for signs of tumour lysis syndrome.	
Adverse Drug Reactions	Monitor patients closely for hypersensitivity.	

Information provided relates to Fasturtec® manufactured by Sanofi.

Remdesivir

Remdesivir Intravenous (IV) Administration Protocol

Indication: Remdesivir is a prodrug of a nucleoside analogue that has broad spectrum activity against members of the filoviruses (e.g. EBOV, MARV), CoVs (e.g. SARS-CoV, MERS-CoV) and paramyxoviruses (e.g. respiratory synctial virus [RSV], Nipah virus [NiV], and Hendra virus).

Presentation: Remdesivir powder for injection, 100mg vial, is a single-use, preservative-free, white to off-white or yellow, lyophilized solid containing 100mg of remdesivir.

Drug Supply & Access: Remdesivir is available on compassionate access from Gilead for the treatment of Covid-19. Please liaise with an Infectious Diseases consultant to access.

Storage: Store the powder vials at room temperature, i.e. below 30°C. After reconstitution and/or dilution with NaCl 0.9%, the total storage time before administration should not exceed 4 hours at room temperature (below 30°C) or 24 hours at refrigerated temperature (2°C to 8°C)

Dose: The recommended **adult** dosing and duration of remdesivir for injection is 200mg stat dose on day 1, followed by 100mg once daily on days 2-10.

Reconstitution and dilution

Wear gloves and apron when preparing remdesivir. Use aseptic non-touch technique as per CUH IV Administration Guidelines.

1. Reconstitute remdesivir 100mg powder for injection with 19mL sterile water for injection using a 21G needle to give a 5mg/mL concentrated solution. Immediately shake the vial for 30 seconds. Allow the contents of the vial to settle for 2 to 3 minutes. The solution should be clear.
2. Remove and discard the required volume of NaCl 0.9% from a 250mL infusion bag (see **table 1**).
3. Withdraw the required volume of reconstituted solution containing remdesivir for injection i.e. 20mL (100mg) or 40mL (200mg). As each vial of reconstituted solution containing remdesivir for injection will contain overfill, it is common for residual solution to remain in the vial after withdrawing the required amount. Only withdraw the exact volume of reconstituted solution containing remdesivir for injection. Discard any unused reconstituted solution containing remdesivir for injection.
4. Inject the appropriate volume of reconstituted solution containing remdesivir for injectioin slowly into the NaCl 0.9% infusion bag and invert the bag 20 times to obtain a uniform mixture.

Dose (mg) and number of Remdesivir 100mg vials	Infusion bag volume to be used (mL)	Volume to be withdrawan and discarded from NaCl 0.9% bag (mL)
200mg (2 vials)	250mL	40mL
100mg (1 vial)	250mL	20mL

Table 1: Dilution instructions for remdesivir IV infusion

5. If a patient is **fluid restricted NaCl 0.9% 100ml can be used** following the diluation instructions in **table 2**

Dose (mg) and number of Remdesivir 100mg vials	Infusion bag volume to be used (mL)	Volume to be withdrawan and discarded from NaCl 0.9% bag (mL)
200mg (2 vials)	100mL	40mL
100mg (1 vial)	100mL	20mL

Table 2: Dilution instructions for remdesivir IV infusion for fluid restricted patients

Administration

- Administer the IV infusion over 30 minutes. The infusion time may be extended up to 60 minutes in situations where 30 minutes is not operationally feasible
- When the administration of remdesivir solution is complete, flush the line with at least 30mL of NaCl 0.9% to ensure that all the remdesivir solution has been administered

Disposal: Any remaining reconstituted remdesivir for injection and / or diluted remdesivir solution for infusion should be disposed of in a purple lided sharps bin.

References

1. Gilead. Investigator's Brochure. REMDESIVIR (GS-5734TM) – EBOLA VIRUS DISEASE, MARBURG VIRUS DISEASE, CORONAVIRUS DISEASE. Edtion 5. 21 February 2020
2. Gilead. Instructions for Prepation and Administration of Remdesivir (GS-5734) for injection, 100mg Version 1.0, 15 February 2020

Reslizumab

Reduce direct handling to a minimum and wear appropriate protective clothing		
Reslizumab dosing is weight based; ensure accuracy of documented weight before administration		
CAUTION: High Administration Risk Rating		
Form & Storage	Concentrate for solution for infusion	Refrigerate unopened vials at 2°C - 8°C and protect from light.
Reconstitution	Already in solution	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	The concentrate must not be used if coloured (except slightly yellow) or if foreign particles are present. **IV Infusion** • A suitable injection syringe should be used to withdraw the required amount of the concentrate from the vial(s). • Slowly add the contents of the syringe(s) into an infusion bag containing 50 mL of sodium chloride 0.9% solution for infusion. Gently invert the bag to mix the solution. • Administer over 20-50 minutes through a 0.2 micron **in-line filter**. See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information.	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Monitoring	Monitor blood pressure, pulse, respiratory rate and temperature frequently during the infusion. Monitor for hypersensitivity reactions during and for at least 20 minutes post-infusion.	
Adverse Drug Reactions	Medicinal products for the treatment of hypersensitivity reactions, e.g. epinephrine (adrenaline), oxygen, antihistamines and corticosteroids should be available for immediate use in the event of an allergic reaction during administration of all infusions.	
Disposal	Any unused medicinal product or waste material should be disposed of in a purple-lidded bin.	
Additional Information	The concentrate is clear to slightly hazy opalescent, colourless to slightly yellow. Proteinaceous particles may be present in the concentrate that appear as translucent to white, amorphous particles, some of which may look fibrous. This is not unusual for proteinaceous solutions.	

Information provided relates to Cinqaero® by Teva.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Rifampicin

Rifampicin dosing may be weight based; ensure accuracy of documented weight before administration	
Form	600mg powder and 10mL Solvent for Concentrate for Solution for Infusion
Reconstitution	Add the 10 mL vial of diluent provided to the vial of 600mg powder. Swirl the vial gently until powder is completely dissolved. The resultant solution is red in colour.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Dilutions are stable up to 6 hours at room temperature and should be prepared and used within this time. • If not used immediately in-use storage times and conditions prior to use are the responsibility of the user and would normally be no longer than 24 hours at 2-8 °C
Administration	**IV infusion** Dilute required volume of reconstituted solution with 500mL of compatible infusion fluid and administer over 2 - 3 hours.
Monitoring	Monitor LFTs, renal function, FBCs.
Extravasation	Avoid extravasation during injection; local irritation and inflammation due to extravascular infiltration of the infusion have been observed. If these occur, the infusion should be discontinued and restarted at another site.
Additional Information	• Will colour all secretions orange/red, may discolour contact lenses. • Rifampicin has excellent oral bioavailability. Consider IV to PO switch if appropriate. See CUH Antimicrobial Guidelines on Eolas for further information.

Information provided relates to Rifadin® manufactured by Sanofi Aventis.

Rituximab

Reduce direct handling to a minimum and wear appropriate protective clothing.		
CAUTION: High Administration Risk Rating		
Form & Storage	Prepared in Pharmacy Aseptic Unit	Store in a fridge at 2 - 8°C
Reconstitution	N/A	
Compatibility & Stability	Follow storage instructions provided by pharmacy.	
Administration	See **Rituximab Prescription and Administration Record** and **PPG-CUH-PHA-21 Prescribing, Administration & Monitoring Guidelines for Adult Patients Receiving Rituximab for Renal/Respiratory/Rheumatology/Neurology indications** for information on Administration	
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.	

Information provided relates to MabThera® and manufactured by Roche and Ruxience manufactured by Pfizer

Salbutamol

CAUTION: High Administration Risk Rating when administered as **INFUSION**	
Form	Ampoule containing 500 micrograms in 1mL **Solution for Injection** Ampoule containing 5mg in 5mL **Solution for Infusion (ITU only)**
Reconstitution	Already in Solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** **Dilute further prior to administration**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection:** using 500micrograms in 1mL injection preparation. Withdraw 0.5mL (250micrograms) from ampoule and dilute to 5mL with WFI, give over 3 - 5 minutes. **IV Infusion:** using 5mg in 5mL solution for infusion preparation. Draw up the contents of two ampoules (10mg) into a syringe and dilute to 50mL with compatible fluid. This gives a 200microgram/mL solution (Unlicensed dilution). Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely. **IM injection** Use 500 microgram/mL strength. No dilution required. **SC injection** Use 500 microgram/mL strength. No dilution required.
Monitoring	• Monitor potassium levels (decrease in serum potassium which increases the risk of arrhythmias). • Monitor blood glucose and lactate levels, especially in patients with diabetes. • ECG monitoring is required when a patient is on salbutamol infusion.
Adverse Drug Reactions	Hypersensitivity reactions including angioedema, urticaria, bronchospasm, hypotension and collapse: monitor blood pressure.
Extravasation	Extravasation is likely to cause tissue damage due to low pH.
Additional Information	**For obstetric patients refer to CUMH guidelines or the Pharmacy Department**

Information provided relates to Ventolin® manufactured by GlaxoSmithKline

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Sodium Bicarbonate

CAUTION: High Administration Risk Rating	
Form	8.4% w/v Sodium Bicarbonate in 100mL bottle containing 1mmol/mL sodium bicarbonate.
Reconstitution	Already in solution **May dilute further prior to administration.**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	Do not use if the solution is unclear or contains precipitate. **IV bolus** Emergency use only. Immediately follow by sodium chloride 0.9% flush. **Intermittent or continuous IV infusion** Peripheral Dilute to a concentration of 1.26% w/v or less. • To prepare a 500mL solution of 1.26% sodium bicarbonate, remove 75mL from a 500mL bag of suitable infusion fluid, add 75mL of sodium bicarbonate 8.4% to the remaining 425mL in the bag. Mix well by inverting the bag several times. Central Concentrations greater than 1.26% w/v should be given via central line.
Monitoring	Patient monitoring should include regular checks of acid-base balance, serum electrolyte concentrations and water balance.
Extravasation	Extravasation of higher strength solutions (more than 2.74% w/v) is likely to cause tissue damage, due to high osmolarity.
Additional Information	Hypokalaemia or hypocalcaemia should be corrected before beginning alkalinising therapy.

Information provided relates to 8.4% w/v Sodium Bicarbonate Intravenous Infusion manufactured by B Braun.

Sodium Phosphate

Sodium phosphate dosing is weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating	
Form	20mL ampoule containing 1mmol sodium and 0.6mmol phosphate per mL (each ampoule contains 20mmol sodium, 12mmol phosphate)
Reconstitution	Already in solution **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Infusion** • Dilute required dose of sodium phosphate (max 50mL) in 250mL compatible fluid • Administer over 6-12 hours. Maximum infusion rate is 20mmol phosphate per hour. **Central IV Administration** Refer to ITU for guidance.
Monitoring	Serum phosphate, calcium and sodium should be regularly monitored.
Extravasation	Particular care should be taken to ensure that infusion is intravenous, since paravenous administration can lead to indurations and chalky deposits in the subcutaneous tissue.
Additional Information	Unlicensed medication in Ireland.

Information provided relates to Natrium Phosphat® manufactured by B Braun.

Sodium Valproate

Sodium valproate dosing may be weight based; ensure accuracy of documented weight before administration	
Form	400mg dry powder vial & 4mL solvent
Reconstitution	Add 4mL WFI provided. • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules** The concentration of reconstituted sodium valproate is 100 mg/mL. Solution should be used immediately.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Give up to 10mg/kg slowly over 3 to 5 minutes. **Intermittent infusion** After reconstitution as above, dilute with at least 50mL of compatible fluid and administer over 60 minutes. Infusion rate should not exceed 20mg/minute. Maximum dose 2.5g in 24 hours.
Extravasation	Tissue injury due to extravasation is unlikely due to the near neutral pH but may cause tissue damage when given as an IV injection at doses greater than 600mg due to high osmolality.
Additional Information	• Do not infuse with other medicines. • Intravenous dose is the same as the oral dose. • Contraindicated in Pregnancy unless no alternative. • Contraindicated in women of child-bearing potential unless conditions of Pregnancy Prevention Programme are met. • Contraindicated in active liver disease. • There are numerous drug interactions with sodium valproate – check BNF.

Information provided relates to Epilim® manufactured by Sanofi.

Solvito N®

Form	Dry powder vial Solivito N® contains thiamine, riboflavin, nicotinamide, pyridoxine, pantothenic acid, biotin, folic acid, cyanocobalamin, vitamin C.
Reconstitution	Dissolve with 10mL of water for injection and shake vigorously **Dilute further before administration.**
Compatibility & Stability	Glucose 5% (See notes below for compatibility with sodium chloride 0.9%)
Administration Method	**Peripheral or central IV route** Add reconstituted solution to 100mL Glucose 5% and infuse over a minimum period of 2-3 hours.
Additional Information	**For obstetric patients refer to CUMH guidelines or the Pharmacy Department** • Solivito N® is normally administered with Parenteral Nutrition. • For patients prescribed Additrace®, Solivito N®, and Vitlipid N Adult®, or a combination of these, they can be infused together in 100mL glucose 5% or sodium chloride 0.9% over 2-3 hours.

Information provided relates to Solvito N® manufactured by Fresenius Kabi.

Sotrovimab

Reduce direct handling to a minimum and wear appropriate protective clothing		
CAUTION: High Administration Risk Rating		
Form & Storage	Sotrovimab 62.5mg in 1mL concentrate, solution for infusion Available as 500mg in 8mL vials	Refrigerate unopened vials at 2°C - 8°C and protect from light.
Reconstitution	Already in Solution Visually inspect the vial to ensure it is free from particulate matter and that there is no visible damage to the vial. The solution should be clear, colourless or yellow to brown and free from visible particles. Allow the vial to equilibrate to ambient room temperature, protected from light, for approximately 15 minutes. **Requires further dilution before administration**	
Compatibility & Stability	Sodium Chloride 0.9% or Glucose 5% The diluted solution should be administered **immediately.**	
Administration	**IV Infusion only** • Gently swirl the vial several times before use without creating air bubbles. • **Do not shake or vigorously agitate the vial.** • Withdraw 8 mL from the vial of sotrovimab. • Inject the 8 mL of sotrovimab into a 50mL or 100mL infusion bag. • Discard any unused portion left in the vial. The vial is single-use only and should only be used for one patient. • Prior to the infusion, gently rock the infusion bag back and forth 3 to 5 times. • **Do not invert the infusion bag. Avoid forming air bubbles. Do not shake.** • Administer with a 0.2-µm in-line filter. This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores • Give over 30 minutes using an infusion pump. • The entire infusion solution in the bag should be administered to avoid underdosage.	
Documentation Requirements	Document batch number and expiry date of vial in medical notes.	
Adverse Drug Reactions	The most common adverse reactions are hypersensitivity reactions. The most serious adverse reaction is anaphylaxis. Medicinal products for the treatment of hypersensitivity reactions, e.g. adrenaline, oxygen, antihistamines and corticosteroids should be available for immediate use in the event of an allergic reaction during administration.	

Monitoring	Monitor for signs of hypersensitivity reactions during and for at least one hour after infusion. Hypersensitivity reactions, including serious and/or life-threatening reactions such as anaphylaxis, have been reported following infusion of sotrovimab. Hypersensitivity reactions typically occur within 24 hours of infusion. Signs and symptoms of these reactions may include nausea, chills, dizziness (or syncope), rash, urticaria and flushing. If signs and symptoms of severe hypersensitivity reactions occur, administration should be discontinued immediately and appropriate treatment and/or supportive care should be initiated. If mild to moderate hypersensitivity reactions occur, slowing or stopping the infusion along with appropriate supportive care should be considered.
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.

Information provided relates to Xevudy manufactured by GlaxoSmithKline.

Tacrolimus

<table>
<tr><th colspan="2">CAUTION: High Administration Risk Rating</th></tr>
<tr><td>Form</td><td>5mg in 1mL ampoule</td></tr>
<tr><td>Reconstitution</td><td>Already in solution
• Draw up using a 5 micron filter needle
• Use gloves when opening ampoules
Dilute further before administration.</td></tr>
<tr><td>Compatibility & Stability</td><td>Sodium chloride 0.9%
Glucose 5%

Incompatible with PVC
Tacrolimus is absorbed by PVC plastics. A non-PVC infusion container (Baxter Viaflo®, Braun Ecoflac®) and infusion set should be used.</td></tr>
<tr><td>Administration</td><td><u>IV Infusion</u>
Dilute the required dose to 48mL with compatible fluid and infuse at 2mL/hour over 24 hours.

<table>
<tr><th>Total oral daily dose (mg)</th><th>Daily dose for IV infusion (mg)</th><th>Volume of concentrate (5mg/mL)</th><th>Total Volume of infusion fluid (mL)</th><th>Rate (mL/hour)</th></tr>
<tr><td>2mg</td><td>0.4mg</td><td>0.08mL</td><td>48mL</td><td>2</td></tr>
<tr><td>2.5mg</td><td>0.5mg</td><td>0.1mL</td><td>48mL</td><td>2</td></tr>
<tr><td>3mg</td><td>0.6mg</td><td>0.12mL</td><td>48mL</td><td>2</td></tr>
<tr><td>3.5mg</td><td>0.7mg</td><td>0.14mL</td><td>48mL</td><td>2</td></tr>
<tr><td>4mg</td><td>0.8mg</td><td>0.16mL</td><td>48mL</td><td>2</td></tr>
<tr><td>4.5mg</td><td>0.9mg</td><td>0.18mL</td><td>48mL</td><td>2</td></tr>
<tr><td>5mg</td><td>1mg</td><td>0.2mL</td><td>48mL</td><td>2</td></tr>
</table>
</td></tr>
<tr><td>Extravasation</td><td>Extravasation may cause tissue damage due to the low pH of the solution.</td></tr>
<tr><td>Additional Information</td><td>• The concentration of a solution for infusion should be within the range 0.004 - 0.1 mg/mL.
• The total volume of infusion during a 24-hour period should be in the range 20 – 500mL.
• Switching between tacrolimus brands and routes of administration requires careful supervision and therapeutic monitoring by an appropriate specialist.
• The daily intravenous dose is one-fifth of the total oral daily dose, and subsequent dose adjustment is based on plasma levels of tacrolimus.
• Tacrolimus should be given IV for no more than 7 days.
• IV administration carries a risk of anaphylaxis and should be reserved for patients who cannot tolerate the oral route.</td></tr>
</table>

Information provided relates to Prograf® manufactured by Atellas Pharma.

Teicoplanin

Teicoplanin dosing is weight based; ensure accuracy of documented weight before administration	
Not first-line in CUH. Contact ID/Micro/Antimicrobial Pharmacist for advice	
Form	200mg and 400mg vial with diluent
Reconstitution	Slowly add entire contents of diluent provided to powder vial. Roll gently to dissolve powder. Do NOT shake. If the solution foams, allow stand for 15 minutes until the froth subsides. Only clear and yellowish solutions should be used. A calculated excess is included in each vial so when reconstituted as above, withdraw 3mL from 200mg vial to obtain 200mg, or 3mL from 400mg vial to obtain 400mg.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Reconstituted vials may be stored at 2–8°C for 24 hours. • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.
Administration	**IV Injection** (Preferred route) Give slowly over 3-5 minutes. **IV Infusion** Dilute dose in 50 to 100mL infusion fluid and give over 30 minutes. **IM Injection** Give by deep IM into a large muscle. Max 400mg (3mL) at a single site.
Monitoring	• Plasma level monitoring recommended. • Monitor renal function, FBC and liver function.
Additional Information	Teicoplanin should be administered with caution to patients with known hypersensitivity to vancomycin since cross reactivity may occur.

Information provided relates to Targocid® manufactured by Sanofi.

Tenecteplase

Restricted for use under **Stroke Department in Radiology and ED** in accordance with **CUH Acute Stroke Pathway** available on www.emed.ie

Indication Acute Ischaemic Stroke

Form

Tenecteplase (Metalyse®) 25mg
(Each 25mg vial contains 5,000 units tenecteplase

Reconstitution

- Add 5ml volume of sterile water for injection to the vial containing the powder for injection.
- Keep syringe attached and agitate the mixture by gently swirling, inverting or rolling the vial.
- Do NOT shake the vial. Ensure powder is dissolved, only use clear solution with no particles.
- The reconstituted solution contains 5mg tenecteplase per mL.
- Using weight based table, only withdraw dose to be administered into syringe.

Compatibility & Stability

Sodium Chloride 0.9%

Dose

0.25 mg / kg IV bolus over 5 seconds
(Maximum dose 25 mg)

Calculate the total weight based dose of tenecteplase using table below.

Weight (kg)	Dose (mg)	Dose (mL)
40	10	**2.0**
42	10.5	**2.1**
44	11	**2.2**
46	11.5	**2.3**
48	12	**2.4**
50	12.5	**2.5**
52	13	**2.6**
54	13.5	**2.7**
56	14	**2.8**
58	14.5	**2.9**
60	15	**3.0**
62	15.5	**3.1**
64	16	**3.2**
66	16.5	**3.3**
68	17	**3.4**
70	17.5	**3.5**

Weight (Kg)	Dose (mg)	Dose (mL)
72	18	**3.6**
74	18.5	**3.7**
76	19	**3.8**
78	19.5	**3.9**
80	20	**4.0**
82	20.5	**4.1**
84	21	**4.2**
86	21.5	**4.3**
88	22	**4.4**
90	22.5	**4.5**
92	23	**4.6**
94	23.5	**4.7**
96	24	**4.8**
98	24.5	**4.9**
100	25	**5.0**

Administration

Give the total dose as an IV bolus injection over 5 seconds.
Flush prior to, and following administration with 10ml sterile sodium chloride 0.9%.
NOT compatible with IV lines containing glucose.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Monitoring	Document vital signs and neurological assessments every 15 minutes for 1 hours, then every 30 minutes for the next 6 hours, then hourly for the next 16 hours. Document any changes in neurological condition (develops severe headache, acute hypertension and/or bradycardia, nausea or vomiting, or decrease in level of consciousness) and inform Stroke immediately
Documentation	The total tenecteplase dose given must be documented in the patient's prescription kardex and the time of administration must be recorded.
Additional Information	To be stored at room temperature. Will be available in Radiology Department (Tenecteplase box, kept at back of main CT), Emergency Department and on Ward 3B (Acute Stroke Unit).

Information provided relates to Metalyse® manufactured by Boehringer Ingelheim.

Terlipressin

Form & Storage	1mg in 8.5mL ampoule	Store ampoules in a refrigerator (2- 8°C) and keep in outer carton to protect from light.
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**	
Compatibility & Stability	N/A	
Administration	**IV Injection** Give by slow IV injection into a large vein over 3-5 minutes.	
Monitoring	Monitor blood pressure, ECG, heart rate, serum sodium and potassium and fluid balance.	
Extravasation	Extravasation may cause tissue damage.	
Additional Information	Caution should be exercised in treating patients with hypertension, recognised heart disease, renal dysfunction, cerebral or peripheral vascular disease, asthma or respiratory failure.	

Information provided relates to Glypressin® solution for injection manufactured by Ferring.

Tetracosactide (Synacthen®)

<table>
<tr><td colspan="3">Tetracosactide dosing may be weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td>Form</td><td>250 microgram per mL</td><td>Store in a refrigerator (2-8°C). Keep ampoules in the outer carton.</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Already in solution
• Draw up using a 5 micron filter needle
• Use gloves when opening ampoules</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Sodium chloride 0.9%</td></tr>
<tr><td>Administration</td><td colspan="2"><u>IV Injection</u>
Give by slow injection over 2 minutes.

<u>IM Injection</u>
Give by IM injection.</td></tr>
<tr><td>Adverse Drug Reactions</td><td colspan="2">Patients should be kept under observation for 30 minutes after the injection due to the possibility of hypersensitivity reactions. Ensure resuscitation facilities are available should a serious hypersensitivity reaction occur.</td></tr>
<tr><td>Additional Information</td><td colspan="2">Tetracosactride (Synacthen®) is used as a diagnostic test for the investigation of adrenocortical insufficiency. This test (the short Synacthen® test) is based on measurement of the plasma cortisol concentration immediately before and exactly 30 minutes after an intramuscular or intravenous injection of 250microgam (1mL) Synacthen®
<table>
<tr><td>Indications</td></tr>
<tr><td>Diagnosis of adrenal insufficiency and can be used as screening procedure in the non-critically ill patient
Liase with endocrinology service to ensure testing appropriate and for support around result interpretation</td></tr>
<tr><td>Cautions/Contraindications</td></tr>
<tr><td>Acute psychosis; adrenogenital syndrome; allergic disorders; asthma; avoid injections containing benzyl alcohol in neonates; Cushing's syndrome; infectious diseases; peptic ulcer; primary adrenocortical insufficiency; refractory heart failure.</td></tr>
<tr><td>Procedure</td></tr>
<tr><td>Non fasting
If on hydrocortisone, last dose should be at midday the day before
Test begins at 09:00
Plain tetracosactrin Synacthen 250 micrograms IV or IM at time 0</td></tr>
<tr><td>Samples</td></tr>
<tr><td>Serum cortisol (red bottle) at time 0, 30, 60 min
Serum ACTH if required (pink bottle from laboratory) at time 0 min
Ensure samples clearly state time of sample and that these are part of a Synacthen Test
e.g SST T0 09:00</td></tr>
</table>
</td></tr>
</table>

Information provided relates to Synacthen® manufactured by Alfasigma.

Tigecycline

Restricted Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information	
Form	Vial containing 50mg dry powder
Reconstitution	Reconstitute each vial with 5.3mL of compatible fluid and swirl gently to dissolve. This gives a 10mg/mL solution. **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% Use immediately
Administration	Reconstituted solution should be inspected visually for particulate matter and green or black discolouration. The reconstituted solution should be yellow to orange in colour; if not, the solution should be discarded. **<u>IV Infusion</u>** **Loading dose – 100mg (FIRST DOSE ONLY)** Withdraw 10mL of the reconstituted solution (5mL from each vial). Add to 100mL of compatible fluid. Give over 30-60 minutes. **Maintenance dose** Withdraw appropriate volume of reconstituted solution and add to 100mL of compatible fluid. Give over 30-60 minutes.
Additional Information	• Contra-indicated in patients hypersensitive to tetracyclines. • Manufacturer advises patients and carers should be cautioned on the effects on driving and performance of skilled tasks—increased risk of dizziness. • Tigecycline is usually prescribed as a **loading dose** followed by a **maintenance dose**.

Information provided relates to Tygacil® manufactured by Pfizer.

Tobramycin

<table>
<tr><td colspan="2">Tobramycin dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="2">Restricted Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td colspan="2">CAUTION: High Administration Risk Rating</td></tr>
<tr><td>Form</td><td>80mg per 2mL vial</td></tr>
<tr><td>Reconstitution</td><td>Already in solution</td></tr>
<tr><td>Compatibility & Stability</td><td>Sodium Chloride 0.9%
Glucose 5%</td></tr>
<tr><td>Administration</td><td>
<table>
<tr><th>Multiple Daily Dosing</th><th>Once Daily Dosing</th></tr>
<tr><td><u>IV Infusion</u>
Dilute in 50 - 100mL compatible fluid and give over 20 - 60 minutes.</td><td><u>IV Infusion</u>
Dilute to 100mL compatible fluid and give over 60 minutes.</td></tr>
<tr><td><u>IV Injection</u>
Slow Injection over 3 - 5 minutes
May be diluted to 10 mL with sodium chloride 0.9% or glucose 5% to facilitate slow administration</td><td><u>IV Injection</u>
Not recommended</td></tr>
<tr><td><u>IM Injection</u>
Give by deep IM injection</td><td><u>IM Injection</u>
Not recommended</td></tr>
</table>
</td></tr>
<tr><td>Monitoring</td><td>Plasma level monitoring recommended; refer to CUH antimicrobial guidelines on Eolas for further information.
Monitor renal function before starting and during treatment.
Monitor auditory and vestibular function during treatment.</td></tr>
<tr><td>Extravasation</td><td>Extravasation may cause damage due to low pH.</td></tr>
<tr><td>Additional Information</td><td>To avoid excessive dosage in obese patients (where Actual Body Weight is more than 120% of Ideal Body Weight), use Adjusted Body Weight to calculate dose – see the CUH Antimicrobial Guidelines on Eolas for guidance. Dose should be rounded to nearest vial.
Duration should be kept as short as possible (usual maximum duration 5-7 days) to minimise risk of otoxoticity and nephrotoxicity.</td></tr>
</table>

Information provided relates to Tobramycin manufactured by Pfizer, Flynn Pharma and Mylan.

Tocilizumab

Reduce direct handling to a minimum and wear appropriate personal protective equipment.		
Tocilizumab dosing is weight based; ensure accuracy of documented weight before administration		
CAUTION: High Administration Risk Rating		
Form & Storage	80mg in 4mL concentrate for solution for infusion 200mg in 10mL concentrate for solution for infusion 400mg in 20mL concentrate for solution for infusion	Store vials in a refrigerator 2°C-8°C. Do not freeze.
Reconstitution	Already in solution Inspect for particulate matter prior to infusion Should be a clear to opalescent, colourless to pale yellow solution	
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**	
Administration	**IV Infusion** • Withdraw a volume of sterile, sodium chloride 0.9% from a 100 mLinfusion bag, equal to the volume of Tocilizumab concentrate required for the patient's dose, under aseptic conditions. • The required amount of Tocilizumab concentrate should be withdrawn from the vial and added to the 100 mL infusion bag. This should make an approximate final volume of 100 mL. • To mix the solution, gently invert the infusion bag to avoid foaming • Administer by intravenous infusion over 60 minutes. See **PPG-CUH-CUH-243 Policy Procedure and Guidelines for management of patients attending CUH infusion unit** for more information.	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Adverse Drug Reactions	• Serious hypersensitivity reactions have been reported in association with infusion of Tocilizumab. • Medicinal products for the treatment of hypersensitivity reactions, e.g. adrenaline, oxygen, antihistamines and corticosteroids should be available for immediate use in the event of an allergic reaction during administration.	
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.	
Additional Information	Prescribers should round dose to nearest whole vial.	

Information provided relates to Roactemra® manufactured by Roche

Tramadol

Form	100mg in 2mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Give slowly over 2 - 3 minutes. **IV infusion** Dilute the required dose in 50 - 100mL of compatible infusion fluid and administer over 15 - 30 minutes. **IM injection** Withdraw required dose, give by deep IM injection. **SC injection** Withdraw required dose, give by SC injection.
Monitoring	Close monitoring of respiratory rate and consciousness is recommended for 30 minutes in patients receiving an initial dose, especially elderly patients or those of low bodyweight.
Additional Information	• May cause respiratory depression in high doses or when used in combination with other respiratory depressants. • Should not be used in patients who are taking MAO inhibitors or who have taken them within the last 14 days.

Information provided relates to Zydol® manufactured by Grünenthal.

Tranexamic Acid

Tranexamic acid dosing may be weight based; ensure accuracy of documented weight before administration	
Form	500mg per 5mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**IV injection** (preferred) Slow IV injection at a rate of 100mg/minute (1mL/minute). **Continuous IV Infusion** Following initial treatment by intravenous injection, dilute required dose with a volume of compatible fluid e.g. 1 - 2 grams in 100mL. Give by continuous infusion at a dose of 25 - 50mg/kg/day. Prepare a new infusion bag every 24 hours.
Additional Information	Rapid IV injection may cause dizziness and/or hypotension.

Information provided relates to Cyklokapron® manufactured by Pfizer.

Uromitexan (Mesna)

Form	100mg/mL solution Each 4 mL ampoule contains 400 mg Uromitexan Each 10 mL ampoule contains 1000 mg Uromitexan
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	The method of administration depends on the patient's chemotherapy regimen. Consult individual chemotherapy protocols for infusion times. **Intermittent IV Infusion** Give over 15-30 minutes It is usually convenient to dilute in 50mL or 100mL, but smaller or larger infusion volumes may be used if necessary. **Continuous IV Infusion** Give over 12-24 hours
Additional Information	• Mesna is also available for oral administration as Uromitexan Tablets. • See **PPG –CUH-CUH-243 Policy, Procedure and Guidelines for management of patients attending CUH infusion unit for intravenous therapy** for information on administration of mesna with cyclophosphamide.

Information provided relates to Mesna® manufactured by Baxter.

Vancomycin

Vancomycin dosing is weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating	
Form	500mg and 1g vials
Reconstitution	Add 10mL WFI to 500mg vial Add 20mL WFI to 1g vial **Further dilution essential before administration**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately**; however: • Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.
Administration	**IV Infusion** After reconstitution as above, dilute each 500mg with at least 100mL compatible infusion fluid, and infuse at a rate **not exceeding** 10mg/min. Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Monitoring	Vancomycin blood level monitoring is required to ensure efficacy and minimise toxicity. Refer to CUH Antimicrobial guidelines on Eolas for further guidance. • Monitor renal function before starting and during treatment. • Monitor auditory and vestibular function during treatment.
Extravasation	Vancomycin is very irritant to tissue and may cause necrosis if extravasation occurs.
Additional Information	• To avoid 'red man' syndrome vancomycin should be administered at a maximum rate of 10mg/min. • Other side effects include otoxoticity and nephrotoxicity • The contents of vials for parenteral administration may be used for oral administration in the treatment of C Diff. Refer to CUH Antimicrobial guidelines on Eolas or contact pharmacy for further information. • Use with caution in teicoplanin sensitivity. • Vancomycin is usually prescribed as a **loading dose** followed by a **maintenance dose**.

Information provided relates to Vancocin® manufactured by Flynn Pharma and Vancomycin Mylan manufactured by Gerard and Vancomycin manufactured by Demo.

Vedolizumab

Reduce direct handling to a minimum and wear appropriate protective clothing		
CAUTION: High Administration Risk Rating		
Form & Storage	Powder for concentrate for solution for infusion	Store in a refrigerator (2°C - 8°C) in the original package to protect from light.
Reconstitution	• Allow vial to reach room temperature. • Add 4.8mL water for injections, using a syringe with a 21-25 gauge needle, directing the liquid down the wall of the vial to avoid excessive foaming. • Gently swirl the vial for at least 15 seconds. Do not shake vigorously or invert. • Leave for 20 minutes to allow foam to settle; the vial can be gently swirled occasionally during this time. • If not fully dissolved, leave for another 10 minutes. The solution should be clear or opalescent and colourless to light yellow.	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	**IV Infusion** Invert the vial gently three times before withdrawing 5mL of the reconstituted solution with a 21-25 gauge needle. Add to a 250mL infusion bag of sodium chloride 0.9%. Gently mix the contents of the bag. Administer by IV infusion over 30 minutes. See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Adverse Drug Reactions	Medicinal products for the treatment of hypersensitivity reactions, e.g. adrenaline, oxygen, antihistamines and corticosteroids should be available for immediate use in the event of an allergic reaction during administration of all infusions.	
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.	

Information provided relates to Entyvio® manufactured by Takeda.

Verapamil

Form	5mg per 2mL ampoule
Reconstitution	Already in solution • **Draw up using a 5 micron filter needle** • **Use gloves when opening ampoules**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV Injection** Give slowly over at least 2 minutes (3 minutes in the elderly). **IV infusion** Can be diluted with compatible infusion fluid and given at a rate of 5 to 10 mg per hour up to a total dose of 100mg/day.
Monitoring	Monitor blood pressure, heart rate and ECG continuously during treatment.

Information provided relates to Isoptin® manufactured by Mylan.

Vitlipid N Adult®

Form	10mL ampoule. Concentrate for emulsion for infusion Each vial contains Vitamin A, Vitamin D_2, Vitamin E and Vitamin K_1
Reconstitution	Already in solution. **Dilute further before administration.**
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV infusion** Peripheral or central: Add 10mL of Vitlipid N Adult® to at least 100mL of compatible fluid and administer over a minimum of 2 - 3 hours.
Additional Information	• Vitlipid N Adult® is normally administered with Parenteral Nutrition. • For patients prescribed Additrace®, Solivito N®, and Vitlipid N Adult®, or a combination of these, they can be infused together in 100mL glucose 5% or sodium chloride 0.9% over 2-3 hours. • **Contraindications:** Hypersensitivity to the active substances or to any of the excipients of Vitlipid N Adult or to egg, soya or peanut protein.

Information provided relates to Vitlipid N® manufactured by Fresenius Kabi

Voriconazole

<table>
<tr><td colspan="2">Voriconazole dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="2">Restricted Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td colspan="2">CAUTION: High Administration Risk Rating</td></tr>
<tr><td>Form</td><td>200mg dry powder vial</td></tr>
<tr><td>Reconstitution</td><td>Add 19mL WFI or sodium chloride 0.9% to a 200mg vial.
Discard the vial if vacuum does not pull the diluent into the vial.
This produces 20mL of a 10mg/mL solution.
Dilute further before administration.</td></tr>
<tr><td>Compatibility and Stability</td><td>Glucose 5%
Sodium Chloride 0.9%

From a microbiological point of view, should be used immediately; however:
Reconstituted vials may be stored at 2–8°C for 24 hours.
Prepared infusions may be stored at 2–8°C and infused (at room temperature) within 24 hours.</td></tr>
<tr><td>Administration</td><td><u>IV Infusion</u>
Withdraw volume from vial(s) which equates to the dose required. This should be diluted using a compatible infusion fluid to produce a solution with a final concentration of 0.5 - 5mg/mL.

Suggested dilution:<table><tr><th>Required Dose</th><th>Volume of Infusion Fluid</th></tr><tr><td>50 - 500mg</td><td>100mL</td></tr><tr><td>Over 500mg</td><td>250mL</td></tr></table>Infuse over 60 - 180 minutes at a rate not exceeding 3mg/kg/hour.</td></tr>
<tr><td>Additional Information</td><td>A loading dose regimen is required consisting of two doses administered 12 hours apart. Commence maintenance dosing (twice daily) 12 hours after second loading dose.
Never administer Voriconazole as an IV bolus.
Voriconazole has excellent oral bioavailability, consider oral route from the onset, or a rapid IV to oral switch as appropriate - see CUH Adult Antimicrobial Guidelines on Eolas for further information.</td></tr>
</table>

Information provided relates to Vfend® manufactured by Pfizer.

Zanamivir

Restricted antimicrobial
Please contact Microbiology/ID/Antimicrobial pharmacist for further information

Form	Dectova® (Zanamivir) 10 mg/mL solution for infusion Each vial contains 200 mg of zanamivir (as hydrate) in 20 mL.
Reconstitution	Already in solution **Dilute further before administration**
Compatibility & Stability	Sodium chloride 0.9% **ONLY**
Administration	**IV Infusion** • Remove an equivalent volume to the dose from a 100mL or 250mL sodium chloride 0.9% infusion bag and discard. • Add the required dose to the remaining infusion bag. • The final concentration must be 200 micrograms in 1mL or greater. • The infusion bag should be gently manipulated by hand to ensure it is mixed thoroughly • Give by intravenous infusion over 30 minutes. • The recommended dose is 600 mg twice daily for 5 to 10 days given by intravenous infusion.
Monitoring	Renal function should be monitored regularly during treatment. The patient should also be closely monitored for behavioural changes and any concerns discussed with a specialist. **Acute reactions:** • abnormal behaviour, hallucinations, delirium • convulsions, depressed level of consciousness • diarrhoea • oropharyngeal oedema and facial oedema, anaphylaxis • rash, urticaria • severe cutaneous adverse reactions (SCARs)
Additional Information	• Manufacturer advises reduce dose if creatinine clearance (GFR) less than 80 mL/minute (see table above) • Can give undiluted over 30 minutes

Doses in Renal Impairment

GFR (mL/min)	Initial dose	Maintenance dose	Maintenance dose schedule
50 to <80	600 mg	400 mg twice daily	Begin Maintenance dose 12 hours after initial dose
30 to <50	600 mg	250 mg twice daily	
15 to < 30	600 mg	150 mg twice daily	Begin Maintenance dose 24 hours after initial dose
< 15	600 mg	60 mg (SIXTY) twice daily	Begin Maintenance dose 48 hours after initial dose

CAPD/APD	CVVHD	HD
Dose as in GFR < 15mL/min	Dose as in GFR 15-30 mL./min	Dose as in FGR < 15mL/min

Information provided relates to Zanamivir (Dectova®) manufactured by GlaxoSmithKline.

This information has been summarised to act as a guide for those administering IV medication. The monograph should be used in conjunction with the drug data sheet and BNF for information on dose, adverse effects, cautions and contra-indications. Further information is available from Pharmacy on 22146 or 22542

Zoledronic Acid

Form	4mg/5mL concentrate for solution for infusion
Reconstitution	Already in solution **Dilute further prior to administration**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**IV Infusion** Dilute required dose with 100mL compatible fluid. Give over at least 15 minutes. **Dose** / **Volume of concentrate** 5mg / 6.3mL 4mg / 5mL 3.5mg / 4.4mL 3.3mg / 4.1mL 3.0mg / 3.8mL
Monitoring	• Monitor serum electrolytes, calcium, phosphate and magnesium. • Monitor renal function.
Additional Information	Patients must be maintained well hydrated prior to and following administration.

Information provided relates to Zoledronic Acid manufactured by Mylan

VIII. Appendix 1 High Dependency Unit Drug Monograph List (to include GITU, CITU, CCU and A+E)

For information on drugs used in critical care areas contact Pharmacy or ITU

Abciximab (ED)
Acetazolamide (ED)
Adrenaline
Alteplase (ED)
Amiodarone
Atenolol (ED)
Atracurium
Cangrelor (CCU)
Digifab (ED)
Dobutamine
Dopamine
Droperidol(ED)
Eptifibitide (CCU)
Esmolol
Fentanyl
Glyceryl Trinitrate
Ibutilide (CCU)
Isoprenaline (CCU)
Ketamine
Labetalol
Metaraminol (ED)
Midazolam
Milrinone
Morphine
Nimodipine (ED)
Noradrenaline
Phenylephrine
Propofol
Recuronium
Sodium Nitroprusside
Sugammadex
Thiopentone
Vecuronium
Vasopressin
Vernakalant (CCU)

ITU Specific:
Dexmedetomidine
Epoprostenol
Remifentanil
Electrolytes given centrally