CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

Adult Injectable Medicines Guide

Pharmacy Department

Cork University Hospital

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	Miriam Flynn	1.19	32	Update Artesunate info
26/11/24		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
21/1/25	Miriam Flynn	1.21	102	Add Teva brand Iron as ferric carboxymaltose
21/1/25	Miriam Flynn	1.21	104	Add Iron as ferric derisomaltose
25/3/25	Miriam Flynn	1.22	19	Edit Adrenaline to include all routes
			134	Add Phentolamine
			163	New brand Terlipressin
			28	New brand Amoxicillin
			118	Added Vaborem
			116	Update Magnesium sulphate, new brand
6/5/25	Miriam Flynn	1.23	132	Edit Noradrenaline to include all routes
			15	Add Abatacept

			36	Add Anifrolumab
			42	Add Belimumab
			44	Add Benralizumab
			86	Add Eculizumab
			91	Add Eptinezumab
			119	Add SC Immunoglobulin Cuvitru®
			121	Add SC Immunoglobulin Hizentra®
			123	Add SC Immunoglobulin Hyqvia®
			146	Add Mepolizumab
			159	Add Natalizumab SC
			163	Add Obinutuzumab
			169	Add Ocrelizumab
			174	Add Omalizumab
			180	Add Patisiran
			199	Add Reslizumab
			201	Add Risankizumab
			225	Add Ustekinumab
			228	Add Vedolizumab
			126	Edit brands kept of Infliximab
			96	Add Famotidine
			51	Add Ceftaroline fosamil
			135	Add Isavuconazole
			209	Update reconstitution of sodium valproate
13/5/2025	Miriam Flynn	1.24	181	Update piperacillin/tazobactam with info to prevent stopper fragmentation
	Anna Keating		78	Add Difelikefalin
16/5/2025	Miriam Flynn	1.25	232	Update Zoledronic acid with new formulation
			49	Add Calcitonin
28/05/2025	Miriam Flynn	1.26	217	Add Thiamine
30/7/25	Miriam Flynn	1.27	101	Add Etelcalcitide
			190	Add Paricalcitol
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			229	Add Taurolock Urokinase
			200	Add Propofol
			157	Add Metaraminol
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			142	Add Isoprenaline
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			164	Update morphine with infusion details
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			97	Update fentanyl with infusion details
			186	Add new brand Vitamin B & C
			57	Update Cefazolin
18/9/25	Miriam Flynn	1.28	24	Add Acetylcysteine infusion
	Janice Mansfield		27	Add Acetylcysteine neb

	Miriam Flynn		128	Add Ibuprofen
			172	Update Metronidazole
	Emma Skelton		63	Add Cefiderocol
	Miriam Flynn		84	Add Dantrolene Agilus
			173	Update Midazolam
			203	Update Phenobarbital
			155	Update Levetiracetam
			251	Add Ublituximab
4/11/2025	Miriam Flynn	1.29	244	Update tacrolimus
	Anna Keating/ Meghan Kearney		245	Add Tacrolimus (Sublingual) for Renal Transplant Patients
	Miriam Flynn		92	Update desmopressin
	Anna Keating		93	Add Management of bleeding following insertion of tunnelled vascular catheters and to prevent bleeding during renal biopsy
	Miriam Flynn		258	Update tranexamic acid
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			117	Add fluconazole

Contents

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.
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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)**

I. 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

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III. 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.

IV. 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.

V. 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.

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	Orencia® 250mg 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.**
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.

Dose	Volume to remove from 100mL bag	Volume Orencia® to add to bag
500mg	20mL	20mL
750mg	30mL	30mL
1000mg	40mL	40mL

	• 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). • This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores.
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-

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

	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. • See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information relates to Orencia® (BMS)

Acetazolamide

Form	500mg vial powder for solution for injection
Reconstitution	Ideally, reconstitute each vial with 10mL water for injections to reduce injection pain, but a minimum of 5mL water for injections can be used to reconstitute each vial. If a part-vial is to be given, reconstitute the vial with 4.64 mL WFI to give a solution containing 100 mg/mL.
Compatibility & Stability	Reconstituted vials are stable for 24 hours if refrigerated.
Administration	**IV Injection** • Withdraw the required dose. • The solution should be clear and colourless. Inspect visually for particulate matter or discolouration prior to administration and discard if present. • Give by IV injection over 3–5 minutes. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely. Resite cannula at first signs of inflammation.
Extravasation	Avoid extravasation. Acetazolamide has a high pH (9.1) and may cause venous irritation and tissue damage in cases of extravasation.
Additional Information	• Contraindicated in: ↓Na and ↓K, in patients hypersensitive to sulphonamides, hyperchloraemic acidosis, in conditions such as Addison's disease and adrenocortical insufficiency, and in marked hepatic or renal impairment. Encephalopathy may be precipitated in patients with hepatic dysfunction. • Use with caution in elderly patients or those with potential obstruction in the urinary tract or with disorders of electrolyte balance or with the potential for liver dysfunction. • Caution in patients with a history of renal calculi; in COPD, emphysema and impaired alveolar ventilation (risk of acidosis). • IM injection is not recommended due to pH • If used long-term, electrolyte monitoring and periodic blood cell counts recommended. • This product is not licensed for use in Ireland.

Information provided relates to Diamox (Concordia International)

Acetylcysteine IV

(also known as N-Acetylcysteine, NAC)

CAUTION: High Administration Risk Rating

CAUTION: Acetylcystine is administered as a loading dose over 2 hours followed by a maintenance dose.

This information applies to ORAL paracetamol overdoses in adults, for INTRAVENOUS paracetamol overdoses contact the National Poisons Information Centre (NPIC) (01 8092566)

- See TOXBASE to determine the management of the patient depending on the number of hours since ingestion.
- If Acetylcysteine is indicated, follow the tables below

This monograph is for preparation of **intravenous acetylcysteine**
For nebulised administration see **Acetylcysteine nebulised**

Form	2g per 10mL ampoule (Parvolex®) (200mg per mL)	Store below 25°C.
Reconstitution	Already in solution • Draw up using a 5 micron filter needle • Use gloves when opening ampoules **Dilute further before administration**	
Compatibility & Stability	Glucose 5% (preferred) Sodium Chloride 0.9%	
Administration	**IV Infusion – SNAP**	

SNAP (Scottish and Newcastle Acetylcysteine Protocol)
(Also known as Modified 12-hour regimen)
For Adults ≥40kg – see table below

First infusion (100mg/kg, max 11g)

- Remove 50mL from a 250mL infusion bag
- **Add required dose to 200mL** infusion fluid
- Infuse over 2 hours

Second Infusion (200mg/kg, max 22g)

- **Add required dose to 1000mL** infusion fluid
- Infuse over next 10 hours

Acetylcysteine for Adults ≥40kg

12-hour Regimen	First infusion		Second Infusion	
Infusion fluid	200mL		1000mL	
Duration of infusion	2 hours		10 hours	
Drug dose	**100mg/kg**		**200mg/kg**	
Patient weight[1]	**Ampoule volume**[2]	**Infusion Rate**	**Ampoule volume**[2]	**Infusion Rate**
kg	mL	mL/hour	mL	mL/hour
40-49	23	112	45	105
50-59	28	114	55	106
60-69	33	117	65	107
70-79	38	119	75	108
80-89	43	122	85	109
90-99	48	124	95	110
100-109	53	127	105	111
≥110	55	128	110	111

[1]Dose calculations are based on weight in middle of each band.
[2]Figures have been rounded up to the nearest whole number.

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

For Adults <40kg see table below

The volume of infusion fluid has been modified to take patient weight into account, as fluid overload is a potential danger

First infusion (100mg/kg)

- **Pts 20-39.9kg** Prepare 50mg/mL solution;
  Add TWO 10mL ampoules NAC to 60mL of diluent (total volume = 80mL) & **infuse appropriate volume for patient weight** – see table below

Second Infusion (200mg/kg)

- **Pts 20-29kg** Prepare 10mg/mL solution;
  Remove 430mL from 1000mL bag to leave 570mL diluent.
  Add THREE 10mL ampoules NAC to 570mL (total volume = 600mL) &
  infuse appropriate volume for patient weight
- **Pts 30-39.9kg** Prepare 10mg/mL solution;
  Remove 240mL from 1000mL bag to leave 760 mL diluent.
  Add FOUR 10mL ampoules to 760mL of diluent (total volume = 800mL) &
  infuse appropriate volume for patient weight

Acetylcysteine for Adults <40kg

12-hour Regimen	First infusion		Second Infusion	
Concentration	50mg/mL		10mg/mL	
Duration of infusion	2 hours		10 hours	
Drug dose	100mg/kg		200mg/kg	
Patient weight[1]	**Infusion volume**[2]	**Infusion Rate**	**Infusion volume**[2]	**Infusion Rate**
kg	mL	mL/hour	mL	mL/hour
20-24	44	22	440	44
25-29	54	27	540	54
30-34	64	32	640	64
35-39	74	37	740	74

[1]Dose calculations are based on weight in middle of each band. [2]Figures have been rounded up to the nearest whole number.

Specialist advice on those with liver disease.

Discuss (with liver unit) if any of below:

- ALT > 1000 u/L
- INR >3.0
- ↑ creatinine
- Acidosis or encephalopathy
- ↓BP (MAP < 60 mmHg)
- Pre-existing liver disease

Adverse reactions

Anaphylactoid reactions may occur, particularly with initial loading dose. Patient should be carefully observed.

- Temporarily stopping the acetylcysteine may be all that is required.
- Consider an H_1 antihistamine (e.g. chlorphenamine 10 mg IV) and nebulised salbutamol if bronchospasm is present.
- It is essential that the acetylcysteine infusion is restarted once the reaction has settled. Consider slowing the infusion rate (e.g. administer the first bag over twice as long as usual. The normal infusion rate can be used for subsequent bags).

Monitoring

- Check bloods (LFTs, INR, U&E, P&S, FBC) 2 hrs before second infusion due to end

Can discontinue after the 2nd infusion if:

- INR ≤ 1.3 **and**
- ALT is normal **and**
- Paracetamol conc. < 10 mg/L **and**
- Patient has no symptoms suggesting liver damage

	If *all* of these criteria are not met: • Initiate a 3rd infusion of NAC at the same dose and rate as the 2nd infusion. i.e. 200mg/kg over 10 hours • Repeat bloods again after a further 10 hours of treatment **Stop treatment after 3rd infusion (22 hours after commencing NAC) if:** • INR ≤ 1.3 **and** • ALT < x2 upper limit of normal **and** • ALT < x2 the admission measurement **If *all* of these criteria are not met:** • Initiate a 4th infusion at same dose and rate • Discuss with NPIS • Discuss with Liver unit if not already involved
Extravasation	The first infusion 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 using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation.
Additional Information	• SNAP (modified 12-hour regimen) is an off label use of acetylcysteine albeit at its licensed dose. This regimen is endorsed by National Poisons Information Service (NPIS) and the Royal College of Emergency Medicine: see Toxbase (username/password required, available Resusc room ED) • A **ceiling weight of 110kg** should be used when calculating the acetylcysteine dose for paracetamol poisoning in obese patients. • NPIS advises that for **pregnant patients** the toxic dose should be calculated using the patient's pre-pregnancy weight and the acetylcysteine dose (both regimens) should be calculated using the patient's actual pregnant weight. • NB: Due to the **dialysability** of acetylcysteine for patients on renal replacement therapy the dose of acetylcysteine should be doubled.(Toxbase, UpToDate, RDD) • Paracetamol overdose in **Children**: see Toxbase for standard 21 hour regimen

Information provided relates to Parvolex® (Phoenix Labs)

Acetylcysteine - nebulised (NAC)

(also known as N-Acetylcysteine, NAC)

This monograph is for preparation of **nebulised acetylcysteine** **For IV administration see Acetylcysteine IV**		
Form	2g per 10mL ampoule Parvolex® 200mg/ml (20% solution)	Store below 25°C
Reconstitution	Already in solution Draw up using a 5 micron filter needle. Use gloves when opening ampoules. Acetylcysteine can be diluted with an identical volume of Sodium Chloride 0.9% to form a 10% solution for better tolerability (Reduced risk of bronchospasm)	
Indication	Nebulisation: Reduction of mucous viscosity in bronchopulmonary disease (Unlicensed use of ampoule for intravenous use. Currently there is no acetylcysteine product licensed for this indication in Ireland)	
Contraindication	Immune-mediated hypersensitivity to acetylcysteine or any components of the formulation.	
Compatibility & Stability	Sodium chloride 0.9%	
Administration	**Nebulization — Face Mask, Mouth Piece, Tracheostomy**	
	Patients should receive an aerosolized bronchodilator (e.g. salbutamol) 10 to 15 minutes prior to acetylcysteine, to reduce risk of bronchospasm. Administer undiluted or diluted in appropriate volume of sodium chloride 0.9% and nebulised via CPAP, ETT or mask. • For nebulization via face mask, standard nebulization giving set available in CUH to be used i.e. ECO Venturi mask 24% with tubing. • For patients being treated with AIRVO, use Aerogen Ultra adaptor with mask. The recommended dose for most patients is 3 to 5 mL of the 20% solution 3 to 4 times a day.	
Considerations	• Asthma or bronchospasm – risk of acute bronchospasm. Consider administering bronchodilator 10-15 minutes prior to nebulised acetylcysteine, particularly in asthmatic patients • Use with caution in patients with respiratory insufficiency, cough mechanism or gag reflex • Since increased bronchial secretions may develop after inhalation, mechanical suction of the liquefied secretions may be necessary. • If bronchospasm occurs, administer a bronchodilator; discontinue acetylcysteine if bronchospasm progresses. • Contact with rubber and some metals, particularly, iron, copper and nickel may inactivate acetylcysteine. Parts of the nebuliser that come into contact with acetylcysteine should be made of inert materials such as plastic or glass. • There are reports that nebulized acetylcysteine may block ventilator filters and set off fire alarms. • Acetylcysteine has an unpleasant odour and might make the face sticky if inhaled using a facemask. Any stickiness resulting from inhalation in this way can be removed by washing the face with water.	

Additional Information	Role of mucoactive agents and secretion clearance techniques in COPD - UpToDate The effect of nebulized N-acetylcysteine on the phlegm of chronic obstructive pulmonary disease: the NEWEST study - PMC (nih.gov) Oral and inhalation usage of acetylcysteine in patients with COPD | European Respiratory Society (ersnet.org)

Information provided relates to Parvolex® (Phoenix Labs)

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.	
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 (Pfizer, Bowmed Ibisqus, Eugia, Hikma, GlaxoSmithKline, 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 **Note that Addiphos is considered a concentrated potassium formulation.**
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	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 15mmol potassium 15mmol sodium **or** Add 20mL Addiphos® to 750mL glucose 5%. Mix well This provides approximately: 40mmol phosphate 30mmol potassium 30mmol sodium
	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® (Fresenius Kabi)

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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 Do not use if solution is cloudy or has sediments **Dilute further before administration**
Compatibility & Stability	Glucose 5% Sodium Chloride 0.9%
Administration	**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® (Fresenius Kabi)

Adenosine

CAUTION: High Administration Risk Rating	
Form	6mg per 2mL vial ?Adenoscan 30mg per 10mL vial (CathLab only)
Reconstitution	Already in solution
Compatibilty and Stability	N/A
Administration	**IV Injection only (Resuscitation)** 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	• Adenosine should only be used where facilities for cardiac monitoring and cardiorespiratory resuscitation equipment exist.
Adverse Drug Reactions	• 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® (Sanofi-Aventis)

Adrenaline (Epinephrine)

SALAD
Adrenaline and Atropine

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	**1:10,000 Prefilled syringe**: Already in solution If the prefilled syringe is not available, the 1:1000 (1mg per 1mL) may be diluted to 1 in 10,000. Dilute 1mL with 9mL Sodium Chloride 0.9% and mix well. **1:1000 Ampoule**: Already in solution. • Draw up using a 5 micron filter needle • Use gloves when opening ampoules **Dilute further before IV administration.** Discoloured solutions or solutions containing precipitate should not be used.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%
Administration	**IV injection (Resuscitation)** Use 1:10,000 (1mg per 10mL) prefilled syringe where available. 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. **IM Injection (Anaphylaxis)** Use 1:1000 (1mg per mL) ampoule) Administer into the middle third of anterolateral thigh. **Central IV infusion (Critical care only)** Use 1:1000 (1mg per mL) ampoules and administer through a **central line**, using a syringe driver to control the rate of infusion. The usual range is 1-30 microgram/min, titrated to desired effect, but can go higher (up to 80 microgram/min). **Single Strength Adrenaline – 60 microgram/mL** Add 3mg Adrenaline (3mL) to 47mL Glucose 5% to give 50mL of a solution containing 60microgram/mL Adrenaline. Infusion rate of 1mL/hr = 1microgram/min= 60microgram/hr 1mL/hr = 1microgram/min 2mL/hr = 2microgram/min 3mL/hr = 3microgram/min **Double Strength Adrenaline – 120 microgram/mL** Add 6mg Adrenaline (6mL) to 44mL Glucose 5% to give 50mL of a solution containing 120microgram/mL Adrenaline. Infusion rate of 1mL/hr = 2microgram/min= 120microgram/hr 1mL/hr = 2microgram/min 2mL/hr = 4microgram/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

	3mL/hr = 6microgram/min

Quadruple Strength Adrenaline (ITU only) – 240 microgram/mL

Add 12mg Adrenaline (12mL) to 38mL Glucose 5% to give 50mL of a solution containing 240microgram/mL Adrenaline.

Infusion rate of 1mL/hr = 4microgram/min= 240microgram/hr
1mL/hr = 4microgram/min
2mL/hr = 8microgram/min
3mL/hr = 12microgram/min

Peripheral IV infusion (where no Central access)

Use 1:1,000 (1mg/mL ampoule)
Add 4mg (4mL) to 246mL compatible fluid (conc. 16microgram/mL)
Administer via infusion pump
Starting dose 0.05microgram/kg/min
UP Titrate to desired effect - Maximum rate 8microgram/kg/h

Rate (mL/hour) for microgram/kg/min doses using 4mg/250mL infusion*

Dosage (microgram/kg/min)	50kg	80kg	100kg
0.05microgram/kg/min	9	15	19
0.1microgram/kg/min	19	30	38
Max 8 microgram/kg/h	**25**	**40**	**50**

- Doses rounded for convenience

Extravasation

If a **central venous access device** is not available, use a large peripheral vein and a concentration of adrenaline suitable for peripheral venous access. Monitor the insertion site closely (as may cause venous irritation) using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation.
Risk with extravasation resulting in tissue damage/necrosis if given peripherally as adrenaline is a potent vasoconstrictor and has a low pH.
If extravasation occurs, use warm compress + **Phentolamine** or consider application of 2.5cm **Nitroglycerin 0.2%** paste to area of extravasation

Monitoring

Continuous blood pressure and ECG monitoring required. When administered via an infusion, use invasive blood pressure monitoring and monitor blood glucose.

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.
- Reduce the rate of infusion gradually prior to discontinuation whilst closely monitoring blood pressure
- For hyperglycaemic patients, drug may be added to Sodium Chloride 0.9%
- Adrenaline infusion is usually prescribed as a "mcg/minute" dose for adults.
- IAEM-Clinical-Guideline-Peripheral-Vasopressors-V1.0.pdf
- 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.
- Extravasation injury from cytotoxic and other noncytotoxic vesicants in adults - UpToDate

Information provided relates to Adrenaline (MercuryPharma,Aguettant).

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

Alfentanil

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% Water For Injection (WFI)	
Administration C	**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** and **Drug Compatibility Checker** accessible on www.medicinescomplete.com	

Information provided relates to Rapifen® (Piramal Critical Care)

Alteplase (Cathflo®)

<table>
<tr><td colspan="3">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.</td></tr>
<tr><td>Form & Storage</td><td>2mg powder for solution for injection</td><td>Store in a refrigerator at 2–8°C</td></tr>
<tr><td>Reconstitution</td><td colspan="2">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.
The reconstituted preparation is a clear and colourless to pale yellow solution. Prior to administration it should be inspected visually for particles and colour.</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Sodium Chloride 0.9%</td></tr>
<tr><td>Administration</td><td colspan="2">Into occluded venous access device
Instil the appropriate volume of reconstituted solution into the occluded central venous access device.
<table><tr><th>Device</th><th>Volume of Alteplase</th></tr><tr><td>PICC</td><td>1mL</td></tr><tr><td>Hickmann’s</td><td>1 - 2mL</td></tr><tr><td>Port</td><td>1 - 2mL</td></tr></table>
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%.</td></tr>
<tr><td>Documentation</td><td colspan="2">Document batch numbers and expiry dates of vials in medical notes</td></tr>
<tr><td>Additional Information</td><td colspan="2">Actilyse® should not be administered to patients with a known hypersensitivity to Gentamicin (trace residue from manufacturing process).</td></tr>
</table>

Information provided relates to Actilyse Cathflo® (Boehringer Ingelheim)

AmBisome® (Amphotericin-Liposomal B)

<table>
<tr><td colspan="2">Ambisome® dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="2">Registered nurses and midwives are not authorized to administer the <u>test</u> dose of any intravenous medication that requires a test dose</td></tr>
<tr><td colspan="2">Reserve Antimicrobial
Refer to 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>50mg vial of powder for concentrate for dispersion for infusion</td></tr>
<tr><td>Reconstitution</td><td>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</td></tr>
<tr><td>Compatibility & Stability</td><td>Glucose 5% ONLY</td></tr>
<tr><td rowspan="2">Administration</td><td>IV Infusion</td></tr>
<tr><td>Test dose: Prior to the administration of the first dose, a test dose of 1mg should be administered
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.</td></tr>
<tr><td></td><td>• 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.

<table><tr><th>Required Dose</th><th>Volume of Infusion Fluid</th></tr><tr><td>Less than 100mg</td><td>100mL</td></tr><tr><td>100-200mg</td><td>250mL</td></tr><tr><td>200-400mg</td><td>500mL</td></tr><tr><td>>400mg</td><td>Remove volume from 500mL bag so total volume does not exceed 600mL</td></tr></table>
Administer over 30 - 60 minutes, or over two hours for doses greater than 5mg/kg.</td></tr>
</table>

	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	• Observe for allergic reactions, anaphylaxis, anaphylactoid type reactions and infusion-related reactions: these can occur at any point during treatment and may be severe. • Severe reactions: stop the infusion immediately. The patient should not receive any further liposomal amphotericin B infusion. • Mild infusion-related reactions: pause the infusion. These resolve rapidly on stopping the infusion and may not occur with every subsequent dose. Give the infusion more slowly (over 2 hours) if mild infusion-related reactions occur. • 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® (Gilead)

Amikacin

Amikacin dosing is weight based; ensure accuracy of documented weight before administration		
Reserve Antimicrobial Refer to CUH Antimicrobial Guidelines on Eolas for further information		
CAUTION: High Administration Risk Rating		
Form	500mg per 2mL vial	Store below 25°C
Reconstitution	Already in solution	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Infusion**	
	Dilute in 100mL of compatible fluid. Infuse over 30mins. **IM Injection (avoid if possible)** Give by deep IM injection.	
Extravasation	Amikacin 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.	
Monitoring	Monitor renal function and plasma drug levels. Take first sample (trough level) immediately prior to scheduled second dose. Refer to CUH Antimicrobial guidelines on Eolas for further guidance. Vestibular and auditory function if treatment is likely to be longer than 7 to 10 days.	
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 (Caragen)and Normon (unlicensed).

Aminophylline

Aminophylline dosing is weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating	
CAUTION: Aminophylline may be administered as **a loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.	
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 20 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). Adjust the rate and duration of the maintenance infusion according to plasma-theophylline level and individual patient requirements. 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. Aminophylline has a **low therapeutic index** and serum levels should be monitored regularly, particularly during initiation of therapy. Serum theophylline values should be maintained in the range of 10 to 20 microgram/ml. • 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 due to high pH.
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 • CUH Laboratory Medicine User Handbook

Information provided relates to Aminophylline (MercuryPharma)

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

Amiodarone

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

CAUTION: High Administration Risk Rating

CAUTION: Amiodarone may be administered as a **loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.

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	**IV Injection (Resuscitation)** 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 (usually 300mg) in 250mL glucose 5% and infuse over one hour. (Can be diluted in 100mL in ITU) **Continuous IV infusion** Add required amiodarone dose (usually 900mg, max 1200mg) 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. **Continuous IV infusion (ITU)** Day 1: 900mg Amiodarone in 500mL Glucose 5% given over 23 hours. Day 2: 900mg Amiodarone in 500mL Glucose 5% given over 24 hours Day 3: 600mg Amiodarone in 500mL Glucose 5% given over 24 hours. The maximum concentration for continuous infusion via **peripheral** veins is 2mg/mL.

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	• 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. • If extravasation occurs, use warm compress + Hyaluronidase
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.

Amoxicillin

<table>
<tr><th colspan="3">This is a PENICILLIN</th></tr>
<tr><td>Form</td><td>500mg vial of powder for solution for injection or infusion</td><td>Store below 25°C</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Intravenous
Add 10mL WFI to 500mg vial and shake vigorously.
Add 20mL WFI to 1g 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.</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Sodium Chloride 0.9% (preferred fluid)
Glucose 5% (unstable after 20 minutes. Use only if sodium chloride 0.9% contraindicated)</td></tr>
<tr><td rowspan="4">Administration</td><td colspan="2">IV Injection</td></tr>
<tr><td colspan="2">For doses less than or equal to 1g
Give slowly over 3 - 4 minutes.</td></tr>
<tr><td colspan="2">Intermittent IV Infusion</td></tr>
<tr><td colspan="2">• Dilute further with compatible fluid
• Administer over 30 minutes

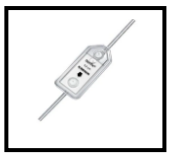
<table><tr><th>Dose</th><th>Bag volume</th></tr><tr><td>500mg</td><td>50 mL</td></tr><tr><td>1g</td><td>100 mL</td></tr><tr><td>2g</td><td>250 mL</td></tr></table>Preferably administer via a central venous access device to avoid potential venous irritation. If given peripherally, choose a large vein and monitor the injection site closely.
Fluid Restriction: For 2g dose: remove 40mL from 100mL bag and then dilute the dose in the remaining volume</td></tr>
<tr><td rowspan="2"></td><td colspan="2">IM Injection</td></tr>
<tr><td colspan="2">Do not inject more than 1g of amoxicillin IM at one time.</td></tr>
<tr><td>Extravasation</td><td colspan="2">Amoxicillin has a high pH and may cause venous irritation and tissue damage in cases of extravasation</td></tr>
<tr><td>Additional Information</td><td colspan="2">• Monitor for convulsions in patients with impaired renal function or receiving high doses.
• Avoid skin contact as may cause sensitisation.</td></tr>
</table>

Information provided relates to Amoxicillin (Laboratoires Delbert).

Andexanet

SALAD
Anexate® (Flumazenil) and Andexanet (Onexxya®)

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 Infusion** • **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

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<table>
<tr><td></td><td>
<table>
<tr><td>IV Infusion (Maintenance)</td><td>960mg</td><td>96mL</td><td>48 mL/hr</td><td>120 min</td></tr>
</table>
</td></tr>
<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® (Astra Zeneca)

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

Anidulafungin

<table>
<tr><td colspan="3">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td colspan="3">CAUTION: Anidulafungin is administered as a loading dose followed by a maintenance dose.
Double check the correct dose has been prescribed.</td></tr>
<tr><td>Form & Storage</td><td>Vial containing 100mg dry powder</td><td>Store at 2–8°C in original packaging.</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Reconstitute each vial with 30mL WFI and allow to stand for up to five minutes.
Dilute further before 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

<table>
<tr><th>Dose</th><th>Volume infusion fluid</th><th>Infusion time</th></tr>
<tr><td>100mg</td><td>100mL</td><td>90 mins</td></tr>
<tr><td>200mg</td><td>200mL</td><td>3 hours</td></tr>
</table>

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.</td></tr>
<tr><td>Extravasation</td><td colspan="2">Anidulafungin 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 colspan="2">• Infusion-related reactions have been reported with anidulafungin. Do not exceed the maximum infusion rate.
• Anidulafugin is usually prescribed as a Loading dose followed by a Maintenance dose.</td></tr>
</table>

Information provided relates to Ecalta® (Pfizer) and Anidulafungin (Teva and Rowex)

Anifrolumab (Saphnelo®)

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
CAUTION: High Administration Risk Rating		
Form	300mg concentrate for infusion. Each 2mL vial contains 300mg anifrolumab (150mg/mL)	Store in a refrigerator (2°C - 8°C) in the original package to protect from light.
Reconstitution	Already in solution **MUST be further diluted before administration** Visually inspect the vial for particulate matter and discolouration. Saphnelo is a clear to opalescent, colourless to slightly yellow solution. Discard the vial if the solution is cloudy, discoloured or visible particles are observed. Do not shake the vial.	
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**	
Administration	**IV Infusion only** • Withdraw and discard 2 mL of solution from a 50 mL or 100 mL 0.9% sodium chloride injection bag using aseptic technique. • Then, withdraw 2 mL (300 mg) of anifrolumab concentrate for injection from the single-use vial, and transfer to the 0.9% sodium chloride injection bag. • Gently invert the bag of anifrolumab to mix; do not shake. • Infuse over approximately 30 minutes. • Use an intravenous infusion set with a **0.2 µ in-line filter**. This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores.	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Adverse Drug Reactions	Serious hypersensitivity reactions including angioedema including anaphylaxis have been reported following administration of anifrolumab. In patients with a history of infusion-related reactions and/or hypersensitivity, premedication (e.g., an antihistamine) may be administered before the infusion of anifrolumab. Anifrolumab increases the risk of respiratory infections and herpes zoster. Anifrolumab should be used with caution in patients with a chronic infection, a history of recurrent infections, or known risk factors for infection. Treatment with anifrolumab should not be initiated in patients with any clinically significant active infection until the infection resolves or is adequately treated. Patients should be instructed to seek medical advice if signs or symptoms of clinically significant infection occur.	
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.	
Additional Information	Saphnelo is indicated as an add-on therapy for the treatment of adult patients with moderate to severe, active autoantibody-positive systemic lupus erythematosus (SLE), despite standard therapy Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via: Ireland HPRA Pharmacovigilance Website: www.hpra.ie	

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

	See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Saphnelo® (AstraZeneca)

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® (Nordic Group B.V.) and local expert opinion

Artesunate

<table>
<tr><td colspan="3">Artesunate dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td>Form</td><td>Artesunate Artesun® 60mg powder for injection
1 ampoule of 1mL sodium bicarbonate
1 ampoule of 5mL sodium chloride solution for injection</td><td>Store at room temperature in outer box for light protection.</td></tr>
<tr><td>Reconstitution</td><td colspan="2">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.
For intravenous use after reconstitution draw up 5 mL 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
</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">No further dilution required
Reconstituted solution should be used immediately</td></tr>
<tr><td>Administration</td><td colspan="2">IV Injection
Inject the desired volume (0.24 mL/kg) slowly over 1-2 minutes.</td></tr>
<tr><td>Monitoring</td><td colspan="2">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 colspan="2">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
No dose adjustment 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® 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 (Resuscitation)** 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 (Mercury Pharmaceuticals) and prefilled syringes (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	
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 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
	Add 1g to 50mL Add 2g to 100mL 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® (Bristol Myers Squibb)

Belimumab (Benlysta®)

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
Belimumab dosing is weight based; ensure accuracy of documented weight before administration		
CAUTION: High Administration Risk Rating		
Form	Vials containing belimumab powder for reconstitution – 120mg and 400mg	Store in a refrigerator (2°C - 8°C) in original carton to protect from light

Reconstitution	• Allow **10 to 15 minutes** for the vial to warm to room temperature (15°C to 25°C).
	• It is recommended that a 21–25-gauge needle be used when piercing the vial stopper for reconstitution and dilution.
	• Reconstitute with **water for injection**,
	  ○ **1.5mL per 120mg** vial or
	  ○ **4.8mL per 400mg** vial, to obtain a concentration of 80mg/mL
	• The stream of water for injections should be directed toward the side of the vial to minimize foaming. Gently swirl the vial for 60 seconds. Allow the vial to sit at room temperature (15°C to 25°C) during reconstitution, gently swirling the vial for 60 seconds every 5 minutes until the powder is dissolved.
	• Do not shake.
	• Reconstitution is typically complete within **10 to 15 minutes** after the water has been added, but it may take up to 30 minutes. Once reconstitution is complete, the solution should be opalescent and colourless to pale yellow, and without particles. Small air bubbles, however, are expected and acceptable.
	• A volume of 1.5mL (120mg belimumab) can be withdrawn from the 120mg vial
	A volume of 5mL (400mg belimumab) can be withdrawn from the 400mg vial
	• Protect the reconstituted solution from sunlight.
	• **MUST be further diluted before administration**	

Compatibility & Stability	Sodium chloride 0.9% **ONLY**	
Administration	**IV Infusion**	
	• Dilute **to 250mL** with sodium chloride 0.9% • Withdraw and discard a volume equal to the volume of the reconstituted Benlysta solution required for the patient's dose. • Then add the required volume of the reconstituted Benlysta solution into the infusion bag. • Gently invert the bag or bottle to mix the solution. • Infuse over 1 hour	
Premedication	• Paracetamol 1g IV if >50kg (15mg/kg if <50kg) • Chlorphenamine 10mg IV	
Monitoring	• The infusion rate may be slowed or interrupted if the patient develops an infusion reaction. • Monitor blood pressure, pulse, respiratory rate and temperature frequently (e.g., every 15 minutes initially then every 30-60 minutes if previous observations stable) during and for several hours post-	

	infusion (e.g., for 5 hours after first two infusions, but follow local guidance). • Warn patient that hypersensitivity reactions may occur/reoccur on the day of, or the day after, infusion and to seek immediate medical help if symptoms develop.
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	• Severe or life-threatening hypersensitivity reactions and infusion reactions. • Patients with a history of multiple drug allergies or significant hypersensitivity reactions may be at increased risk • Patients should remain under clinical supervision for a prolonged period of time (for several hours), following at least the first 2 infusions, taking into account the possibility of a late onset reaction. • Clinical trials show an increased risk of depression, suicidal ideation or behavior, or self-injury in patients with systemic lupus erythematosus on belimumab. Healthcare professionals should assess patients for these risks before starting treatment, monitor for new or worsening signs of these risks during treatment, and advise patients to seek immediate medical attention if new or worsening symptoms occur. • Monitor for symptoms suggestive of PML (e.g., cognitive, neurological or psychiatric symptoms or signs) during the course of treatment therapy • See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Benlysta® (GlaxoSmithKlineUK)

Benralizumab (Fasenra®)

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

Form & Storage	Each pre-filled syringe contains 30 mg benralizumab/1mL.	Store in a refrigerator (2°C to 8°C). Fasenra may be kept at room temperature up to 25°C for a maximum of 14 days. After removal from the refrigerator, Fasenra must be used within 14 days or discarded.
Reconstitution	**Already in solution** Visually inspect Fasenra for particulate matter and discolouration prior to administration. Fasenra is clear to opalescent, colourless to yellow, and may contain translucent or white to off-white particles. Do not use Fasenra if liquid is cloudy, discoloured, or if it contains large particles or foreign particulate matter.	
Compatibility & Stability	This medicinal product must not be mixed with other medicinal products	
Administration	**Subcutaneous Injection** • Prior to administration, warm Fasenra by leaving carton at room temperature. This generally takes 30 minutes • It should be injected into the thigh or abdomen	
Documentation Requirements	In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded in medical notes	
Adverse Drug Reactions	• The most commonly reported adverse reactions during treatment are headache and pharyngitis. • Acute systemic reactions including anaphylactic reactions and hypersensitivity reactions (e.g. urticaria, papular urticaria, rash) have occurred following administration of benralizumab. These reactions may occur within hours of administration, but in some instances have a delayed onset (i.e. days).	
Additional Information	Fasenra solution for injection is supplied in a sterile single-use pre-filled syringe or pre-filled pen for individual use. Do not shake. Do not freeze. First three injections are usually administered in the Infusion Unit. Follow up injections are at 8 weekly intervals. Patient can return to Asthma out patients for injection or opt to self-administer. See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information	

Information provided relates to Fasenra® (Astra Zeneca)

Benzylpenicillin

This is a PENICILLIN		
Form	600mg vial	Store at room temperature
Reconstitution	**Intravenous** Add 4mL WFI to each 600mg vial. **Dilute further before IV Injection/Infusion** **Intramuscular** Add 2mL WFI to each 600mg vial.	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Injection**	
	Draw up entire contents of 600mg vial (4mL) and dilute to 10mL with WFI* Administer each 600mg vial by IV injection over at least 2 minutes (not faster than 300mg/min). If a part vial is required, withdraw dose and dilute to a concentration of approximately 60mg in 1mL with water for injections.	
	IV Infusion	
	After reconstitution, dilute total dose with 100mL infusion fluid and infuse over 30 - 60 minutes. Patients with **renal impairment/heart failure**: dilute with glucose 5% for IV infusion* **Fluid restriction** A 50mL infusion may be used or doses of 2.4g or less if required. The residual volume in the infusion line must be flushed through at the same rate to avoid significant underdosing.	
	IM Injection	
	Maximum 1.2g as single dose.	
Extravasation	Undiluted benzylpenicillin (150mg in 1mL) has a high osmolarity, it may cause tissue damage if extravasation occurs. Preferably dilute as recommended above for peripheral administration to reduce this risk.	
Additional Information	• Benzylpenicillin is also referred as **Penicllin G** is some clinical guidelines. • One mega unit = 600mg. • *Patients with **renal impairment/heart failure**: dilute with glucose 5% for IV infusion due to the risk of sodium overload if sodium chloride 0.9% is used. Benzylpenicillin sodium has a high sodium content 1.68mmol sodium per 600mg vial • Water for injections is recommended for reconstituting and diluting for IV injection as it reduces the osmolarity further compared to sodium chloride 0.9% giving an acceptable osmolarity for peripheral administration. Sodium chloride 0.9% does not lower the osmolarity enough for peripheral administration by IV injection. However, for IV infusion benzylpenicillin can be diluted with sodium chloride 0.9% as the resultant osmolarity is acceptable for peripheral administration	

	• 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® (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	**IV injection (Resuscitation)**
	In an emergency can be given undiluted by a slow IV injection. Administer each 10mL ampoule over a minimum of 3 - 5 minutes.
	Intermittent & Continuous IV Infusion
	Dilute 100mL of Calcium Gluconate 10% in 1L of compatible fluid. Give at an initial rate of 50mL/hour adjusted according to response. 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. 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.

Calcitonin

Form	Calcitonin 100 IU/ml solution for injection and infusion	Store in fridge at 2–8°C
Reconstitution	Already in solution • Use gloves when opening ampoules • Draw up using a 5 micron filter needle	
Compatibility & Stability	Sodium chloride 0.9%	
Administration	**SC (preferred) or IM**	
	Allow to reach room temperature before intramuscular or subcutaneous use Administer undiluted	
	IV infusion Severe/emergency cases of hypercalcaemia of malignancy only	
	Dilute dose in 500mL compatible fluid. Give over at least 6 hours using an infusion pump after previous rehydration. Glass or hard plastic containers should not be used.	
Monitoring	Frequent monitoring of the clinical and laboratory response to treatment, including measurement of serum calcium, is recommended especially in the early phases of treatment. **Acute reactions:** • Nausea and vomiting • Hypersensitivity • Hypertension • Dizziness • Headache • Altered taste • Musculoskeletal pain including arthralgia • Fatigue • Facial or upper body flushing. Because calcitonin is a peptide, the possibility of systemic allergic reactions exists and allergic-type reactions including isolated cases of anaphylactic shock have been reported in patients receiving calcitonin. Such reactions should be differentiated from generalised or local flushing, which are common non-allergic effects of calcitonin. Skin testing should be conducted in patients with suspected sensitivity to calcitonin prior to their treatment with calcitonin.	
Extravasation	Calcitonin 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.	
Additional Information	• Salmon calcitonin may be administered at bedtime to reduce the incidence of nausea or vomiting which may occur, especially at the initiation of therapy • Calcitonin is contraindicated in patients with hypocalcaemia	

Information provided relates to Calcitonin (Essential Pharma)

Caspofungin

<table>
<tr><td colspan="3">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td colspan="3">Caspofungin dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="3">CAUTION: Caspofungin may be administered as a loading dose followed by a maintenance dose. Double check the correct dose has been prescribed.</td></tr>
<tr><td>Form & Storage</td><td>50mg dry powder vial
70mg dry powder vial</td><td>Vials should be stored in fridge.</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Allow the vial to reach room temperature.

Add 10.5 mL of WFI and mix gently.
Do not use if the solution is cloudy or has precipitated.

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</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Sodium Chloride 0.9% ONLY</td></tr>
<tr><td>Administration</td><td colspan="2">IV infusion
Add the required amount of the reconstituted solution to 250mL of compatible fluid, and infuse over a period of one hour.

<table><tr><td>35mg dose</td><td>Add 7mL of reconstituted solution from 50mg vial</td></tr><tr><td>50mg dose</td><td>Add 10mL of reconstituted solution from 50mg vial</td></tr><tr><td>70mg dose</td><td>Add 10mL of reconstituted solution from 70mg vial</td></tr></table>
Fluid restriction: 35mg and 50mg may be added to 100mL
70mg may be administered in 140mL (max conc 0.5mg/mL).</td></tr>
<tr><td>Monitoring</td><td colspan="2">Monitor LFTs, U&Es, urinalysis and FBCs</td></tr>
<tr><td>Additional Information</td><td colspan="2">Caspofungin is usually prescribed as a loading dose followed by a maintenance dose .Refer to CUH Antimicrobial Guidelines on Eolas for further guidance.</td></tr>
</table>

Information provided relates to Caspofungin manufactured by Wockhardt.

CeFAZolin

SALAD – all Cephalosporins cefazolin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, ceFUROxime **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 & 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.	
Additional Information	Unlicensed medication in Ireland.	

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

CeFIDerocol

SALAD – all Cephalosporins
cefazolin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, ceFUROxime
Contains a PENICILLIN-like structure
May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration

Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information

Form	Fetcroja® 1g powder for concentrate for solution for infusion	Store at 2–8°C vials in fridge
Reconstitution	Reconstitute each vial with 10mL of sodium chloride 0.9% or Glucose 5% giving a total volume of 11.2mL Gently shake vial(s) to dissolve Allow the vial(s) to stand until surface foaming disappears (usually within 2 minutes) **Dilute further before administration**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5% **From a microbiological point of view, should be used immediately.**	
Administration	**IV Infusion** Add required dose (see below) to 100ml of compatible infusion fluid Administer over 3 hours	

Dose	Number of vials to be reconstituted	Volume to add to 100mL
750 mg	1	**8.4mL**
1g	1	**11.2 mL** (contents of 1 vial)
1.5g	2	**16.8mL** (contents of 1 vial plus 5.6mL from second vial)
2g	2	**22.4mL** (contents of 2 vials)

Monitoring	**Acute reactions** • Anaphylaxis • Hypersensitivity (including skin reactions and pruritus) • Infusion site reactions (erythema, phlebitis, pain) • Raised liver function tests and creatinine • Seizures • diarrhoea, nausea, vomiting **Monitor:** infusion site, skin for urticaria, lip and face swelling, blood pressure, pulse, renal function, liver function, severe diarrhoea (colitis) including *C.difficile*
Additional Information	This monograph describes a method of preparation that differs from the manufacturers information (SmPC/package insert), which recommends taking the solution to reconstitute the vial/s from the infusion bag. The volume of a 2g dose does not exceed the maximum volume (25mL) that may be added to a 100mL infusion bag. (Ref: Medusa)

Information relates to Fetcroja® (Shionogi B.V.)

CefTAROLine fosamil

SALAD – all Cephalosporins cefAZOlin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, ceFURoxime **Contains a PENICILLIN-like structure** May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form	Zinforo 600 mg powder for concentrate for solution for infusion	Store vials below 30°C in the original packaging to protect from light.
Reconstitution	Reconstitute each vial with 20mL WFI Shake well until solution is clear **Dilute further before administration**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV Infusion**	
	Add required dose to 100-250mL compatible infusion fluid Administer over 5 to 60 minutes for standard dose (every 12 hours) or 120 minutes for high dose (every 8 hours) The total time interval between starting reconstitution and completing preparation of the intravenous infusion should not exceed 30 minutes	
Monitoring	**Acute reactions** • anaphylaxis, hypersensitivity, • infusion site reactions (erythema, phlebitis, pain) • headache, dizziness • pyrexia • diarrhoea, nausea, vomiting, abdominal pain • rash, pruritis Note: Contains arginine which may cause hypersensitivity reactions **Monitor:** infusion site, skin for urticaria, lip and face swelling, blood pressure, pulse, severe diarrhoea (colitis).	
Additional Information	A 50ml infusion may be used if required (eg fluid restriction) but the residual volume in the infusion line must be flushed through at the same rate to avoid significant underdosing. Infusion related reactions can be managed by prolonging infusion duration.	

Information relates to Zinforo (Pfizer)

CefTAZidime

SALAD – all Cephalosporins
cefAZOlin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, ceFUROxime
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	500mg, 1g and 2g dry powder vial	Store at room temperature and in the outer carton to protect from light

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%

Administration

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 (Wockhardt and GlaxoSmithKline)

Ceftazidime-Avibactam
(Zavicefta®)

<table>
<tr><td colspan="3">SALAD – all Cephalosporins
cefAZOlin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, cefuroxime, Ceftolozane-Tazobactam (Zerbaxa)

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">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td>Form</td><td>Ceftazidime-avibactam 2g/0.5g powder for concentrate</td><td>Store below 25ºC
Store in original pack to protect from light</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Reconstitute each 2g/0.5g vial with 10mL sterile WFI
Dilute further before administration</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">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.</td></tr>
<tr><td>Administration</td><td colspan="2">IV Infusion

<table>
<tr><th>Dose</th><th>Reconstituted volume required</th><th>Fluid volume</th></tr>
<tr><td>2g/0.5g</td><td>Total reconstituted volume</td><td>100mL</td></tr>
<tr><td>1g/0.25g</td><td>6mL</td><td>100mL</td></tr>
<tr><td>0.75g/0.1875g</td><td>4.5mL</td><td>50mL</td></tr>
</table>

Administer over 2 hours.
Flush the administration set or line before it is disconnected, use sufficient volume of sodium chloride 0.9% to ensure that the total dose is given and infuse at the same rate the medicine was administered.
Fluid restriction: Can administer all doses in 50mL
</td></tr>
<tr><td>Additional Information</td><td colspan="2">
Manufacturer advises patients and carers should be counselled on the effects on driving and performance of skilled tasks—risk of dizziness.
The final concentration of the infusion must be between 8 and 40mg/ml of ceftazidime component
</td></tr>
</table>

Information provided relates to Zavicefta® manufactured by Pfizer.

Ceftolozane-Tazobactam (Zerbaxa®)

SALAD – all Cephalosporins cefAZOlin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, cefuroxime, Ceftazidime – Avibactam (Zavicefta) **Contains a PENICILLIN-like structure** May be appropriate in penicillin-allergic patient. Refer to CUH Antimicrobial Guidelines on Eolas for further information before administration		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form	Vial contains ceftolozane 1g and tazobactam 500 mg. Prescribed as combination i.e. 1g/0.5g, 2g/1g etc	Store vials at 2–8°C in fridge
Reconstitution	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**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV Infusion** • Any required dose to 100ml infusion fluid • Administer over 60 minutes	
Monitoring	Monitor: Blood pressure, heart rate. Hypersensitivity reactions including anaphylaxis, nausea, abdominal pain headache, dizziness, anxiety, fever, hypotension, tachycardia, rash, infusion site reactions, dyspnoea.	
Additional Information	Manufacturer advises ceftolozane with tazobactam may influence driving and performance of skilled tasks—increased risk of dizziness.	

Dose of Ceftolazone/tazobactam	Volume of reconstituted solution
2g/1g	22.8ml (two vials)
1.5g/0.75g	17.1ml
1g/0.5g	11.4ml (one vial)

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

CefTRIAXone

SALAD – all Cephalosporins
cefAZOlin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, ceFUROxime
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	1g dry powder vial
Reconstitution	IV Administration: Add 10mL WFI to 1g vial. IM Administration add 3.5mL Lidocaine 1% to 1g vial.
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% **Incompatible with** calcium-containing solutions. See Additional Information. **From a microbiological point of view, should be used immediately**; 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.
Administration	The reconstituted solution should be clear. Do not use if particles are present. **IV Injection:** Slow IV injection 5 minutes preferably via a large vein. **IV Infusion: 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.

Volume discarded from 50mL bag	Volume left in 50mL bag	Dose to be added	Final Volume for infusion
40mls	10mL	**1g** (in 10mL WFI)	20mL
30mls	20mL	**2g** (in 20mL WFI)	40mL

	IM Injection: Withdraw the required dose. For intramuscular injection, doses over 1g must be divided between more than one site.
Additional Information	• 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

	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 – all Cephalosporins cefAZOlin, cefOTAXime, cefTARoline, cefTAZidime, cefTRIAXone, ceFURoxime **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		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form	1g dry powder vial as Chloramphenicol Sodium Succinate	Store below 25°C in original container for light protection.
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.	
Extravasation	Undiluted chloramphenicol (reconstituted with sodium chloride 0.9% or glucose 5% only): extravasation may cause tissue damage due to high osmolarity.	
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® (Pfizer) and Chloranic® (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

SALAD Ciclosporin and Cyklokapron® (tranexamic acid)	
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

SALAD Clarithromycin and Clindamycin		
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

SALAD Clarithromycin and Clindamycin	
Form	600mg per 4mL ampoule
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% **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** 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. **IM injection** 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.
Additional Information	Administration of more than 1.2g in a single 1 hour infusion is not recommended.

Dose	Administration time
300mg	10 minutes
600mg	20 minutes
900mg	30 minutes
1.2g	60 minutes

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	**IV Injection**
	Give by slow IV injection over 10 - 15 minutes. May be diluted to 10mL to facilitate slow administration. 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
	IV Infusion
	Dilute required dose in 50 - 100mL of compatible infusion fluid and administer over 15 minutes. 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
Extravasation	Clonidine 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
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.

Cotrimoxazole

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

Form

400mg Sulphamethoxazole and 80mg Trimethoprim per 5 mL ampoule

Store below 25°C

Reconstitution

Already in solution
Draw up using a 5 micron filter needle
Dilute further before administration.

Compatibility & Stability

Sodium Chloride 0.9%
Glucose 5%

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.

Dose	volume	Diluent volume	Fluid Restriction Glucose volume
480mg	5mL	125mL	75mL
960mg	10mL	250mL	150mL
1440mg	15mL	500mL	225mL
1920mg	20mL	500mL	300mL
2400mg	25mL	1000mL	375mL
2880mg	30mL	1000mL	450mL
3360mg	35mL	1000mL	525mL

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 due to reduced stability.

Cotrimoxazole may be administered undiluted as an infusion via a central line, over 90 to 120 minutes

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.

Monitor

- Full blood counts frequently during treatment, especially if signs and symptoms of blood disorders occur
- fluid balance
- injection site
- the patient closely for skin reactions
- serum sodium and potassium closely in those at risk of hyperkalaemia and hyponatraemia

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

Reserve 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	**IV Infusion (preferred)**
	Dilute reconstituted vial further to 50mL and administer over 30 - 60 minutes.
	Slow IV injection (Patient must have Totally Implantable Venous Access Device)
	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.
	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® (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="3">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td>Form</td><td>500mg per vial dry powder for concentrate for solution for infusion.</td><td>Store below 25°C</td></tr>
<tr><td>Reconstitution</td><td colspan="2">• 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 colspan="2">Glucose 5% ONLY</td></tr>
<tr><td>Administration</td><td colspan="2">IV Infusion
Administer as an intravenous infusion over 30 minutes.

<table>
<tr><th>Required Dose</th><th>Volume of reconstituted solution</th><th>Volume of Glucose 5%</th></tr>
<tr><td>1500mg</td><td>75mL</td><td>500mL</td></tr>
<tr><td>1000mg</td><td>50mL</td><td>250mL</td></tr>
<tr><td>500mg</td><td>25mL</td><td>100-250mL</td></tr>
</table>

Infusion concentration should be between 1-5 mg/mL.</td></tr>
<tr><td>Monitoring</td><td colspan="2">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 colspan="2">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 colspan="2">• 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 (Agilus®)

Administration guidance is for the management of malignant hyperthermia crisis, or neuroleptic malignant syndrome (unlicensed)

Dantrium® (20mg dantrolene powder for solution for injection) has been discontinued however stock may be available.
Check form of dantrolene before administration – Dantrium® or Agilus®

Form

120mg dantrolene sodium hemiheptahydrate powder for solution for injection (Agilus®)

Store at room temperature in outer box for light protection.

Reconstitution

- Add 20mL **sterile water for injection** and shake until solution dissolved
- Shake vial for approximately 1 minute until the solution is free from particles (this may take longer than 1 minute).
- The reconstituted solution should be a yellow-orange colour and free from particulates. The volume of solution in a reconstituted vial is 22.6 mL (**5.3mg/mL** dantrolene sodium hemiheptahydrate)
- Reconstituted solution must be protected from light. Do not store above 25 °C and do not refrigerate

Bodyweight (kg)	Number of vials to prepare for loading dose
Up to 48 kg	1 vial
49-96 kg	2 vials
From 97 kg	3 vials

Compatibility & Stability

No further dilution permitted

Administration

Bolus intravenous injection

Management of malignant hyperthermia crisis, or neuroleptic malignant syndrome (unlicensed)

- Give by rapid injection over at least 1 minute
- Administer an initial dose: 2.5 mg/kg body weight intravenously
- If there is no response after 5 minutes repeat a dose of 1 mg/kg. Further doses can be given every 5 minutes, until ETCO2 <6 kPa and temp <38.5°C
- Repeat 1mg/kg to maintain ETCO2 <6 kPa and temp <38.5°C even if exceeds maximum dose of 10 mg/kg.
- If a cumulative dose of 10 mg/kg or above is considered, the diagnosis of malignant hyperthermia should be re-examined.
- For a 70kg patient, if a cumulative dose of 10mg/kg is needed this will amount to approximately 6 vials.
- See table below for examples of volume of reconstituted Agilus (5.3mg/mL) to be given

Dosing examples by body weight

Number of vials to be prepared for Loading Dose	Body weight range	Body weight (kg)	Recommended Dose	Dose to be administered (mg)	Volume to be administered[a] (mL)
1	Up to 48 kg	5	2.5mg/kg	12.5 mg	**2.4 mL**
			1mg/kg	5 mg	**0.94 mL**
		10	2.5 mg/kg	25 mg	**4.7 mL**
			1mg/kg	10 mg	**1.9 mL**
		15	2.5 mg/kg	37.5 mg	**7.1 mL**
			1mg/kg	15 mg	**2.8 mL**
		20	2.5 mg/kg	50 mg	**9.4 mL**
			1mg/kg	20 mg	**3.8 mL**
		25	2.5mg/kg	62.5 mg	**11.8 mL**
			1mg/kg	25 mg	**4.7 mL**
		30	2.5 mg/kg	75 mg	**14.2 mL**
			1mg/kg	30 mg	**5.7 mL**
		40	2.5 mg/kg	100 mg	**18.9 mL**
			1mg/kg	40 mg	**7.5 mL**
2	49 kg to 96 kg	50	2.5 mg/kg	125 mg	**23.6 ml**
			1mg/kg	50 mg	**9.4 mL**
		60	2.5 mg/kg	150 mg	**28.3 mL**
			1mg/kg	60 mg	**11.3 mL**
		70	2.5mg/kg	175 mg	**33 mL**
			1mg/kg	70 mg	**13.2 mL**
		80	2.5mg/kg	200 mg	**37.7 mL**
			1mg/kg	80 mg	**15.1 mL**
3	From 97 kg	100	2.5mg/kg	250 mg	**47.2 mL**
			1mg/kg	100 mg	**18.9 mL**
		120	2.5mg/kg	300 mg	**56.6 mL**
			1mg/kg	120 mg	**22.6 mL**
		140	2.5mg/kg	300 mg[b]	**56.6 mL**
			1mg/kg	140 mg	**26.4 mL**

[a]Total volume of one reconstituted vial is 22.6 mL
[b]For all bodyweights, the initial dose and any repeat doses should not exceed 300 mg, equivalent to 2.5 vials.

Monitoring	Monitor blood pressure, respiratory rate, pulse, temperature, pH, pCO_2, K Recommendations for standards of monitoring during anaesthesia and recovery 2021 | Association of Anaesthetists
Extravasation	Dantrolene sodium has a high pH (pH 9.5) 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	• Reference: Association of Anaesthetists Guidelines Guideline Malignant hyperthermia 2020.pdf • 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 a result of the co-administration of dantrolene with verapamil. Concomitant use of Agilus® and calcium channel blockers is not recommended. • **Liver damage** may occur during dantrolene therapy. This is dependent on the dosage and duration of therapy and may run a lethal course. • Agilus® contains 3530 mg hydroxypropylbetadex (a cyclodextrin) in each vial, which is equivalent to 156.2 mg/mL in the reconstituted solution. Hydroxypropylbetadex increases solubility of dantrolene and thereby reduces preparation time and fluid volume. Hydroxypropylbetadex has been associated with **ototoxicity** in animal studies; and cases of hearing impairment have been observed in studies in other clinical settings. Cases of hearing impairment have been observed at hydroxypropylbetadex exposure levels comparable to the higher range of recommended Agilus® doses. In most cases the hearing impairment has been transient and of slight to mild severity. • **Stock** kept in ED Antidote press, Theatres, CUMH Theatre

Information provided relates to Agilus® (Norgine)

Dantrolene (Dantrium®)

Dantrium® (20mg dantrolene powder for solution for injection) has been discontinued however stock may be available. Check form of dantrolene before administration **– Dantrium® or Agilus®**	
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		
Reserve 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® (MSD) and Daptomycin (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. • See below CUH-PPG-C-PHA-20 **Management of bleeding following insertion of tunnelled vascular catheters and to prevent bleeding during renal biopsy Protocol**	

Information provided relates to DDAVP® manufactured by Ferring Pharmaceuticals Ltd

Management of bleeding following insertion of tunnelled vascular catheters and to prevent bleeding during renal biopsy

Dose of Desmopressin as Desmopressin Acetate (DDAVP®)	0.3 to 0.4microgram/kg IV (usual maximum of 20 microgram, doses >40mcg have not been reported for bleeding indications)[2,3]
Form	4 microgram Desmopressin in 1 ml ampoule (4 microgram/ml)
Reconstitution	Already in solution Further dilute before administration
Administration	**IV Infusion**
	Dilution for intravenous infusion • Add required dose to 50 ml of Sodium Chloride 0.9% • Infuse over 30 minutes • See CUH Adult Intravenous Guidelines for monograph for further information
Pharmacokinetics	• Onset of action less than one hour[2] • Duration of effect 4-8hours[2]
Compatibility & Stability	Sodium Chloride 0.9% only
Special Notes	• Vial should be stored in the fridge (2-8˚C) • Patients with renal impairment: dose as in normal renal function • Patients undergoing renal replacement therapies: unlikely to be dialysed • These are unlicensed indications • See SPC for full prescribing information

Information relates to DDAVP® manufactured by Ferring Pharmaceuticals

References

1. DDAVP®/Desmopressin, Summary of Product Characteristics, Ferring Pharmaceuticals – https://www.hpra.ie
2. The Renal Drug Database -https://renaldrugdatabase.com. Accessed on: 19/06/23
3. Up to date- www.uptodate.com. Accessed on: 19/06/23

Dexamethasone Sodium Phosphate

SALAD Dexamethasone and Dexmetedomidine	
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.

Difelikefalin

Indication	Difelikefalin is indicated for the treatment of moderate-to severe pruritus associated with chronic kidney disease in adult patients on haemodialysis.
Form	Difelikefalin (Kapruvia®) 50micrograms per 1ml vial
Method of Administration	**IV bolus injection** • Do not mix or dilute the injection solution prior to administration • The drug is removed by the dialyser membrane and must be administered after blood is no longer circulating through the dialyser • Administer three times per week by intravenous bolus injection into the venous line of the dialysis circuit at the end of each HD session ✓ The dose may be given either during or after rinse back of the dialysis circuit. ✓ If the dose is given after rinse back, administer it into the venous line followed by at least 10 mL of Sodium chloride 0.9% flush. ✓ If the dose is given during rinse back, no additional Sodium chloride 0.9% is needed to flush the line.
Dose	• 0.5 micrograms/kg dry body weight (i.e. the target post-dialysis weight). • The total dose volume (mL) required from the vial should be calculated as follows: 0.01 x dry body weight (kg), rounded to the nearest tenth (0.1 mL). (see table 1 below) • For patients with a dry body weight equal to or above 195 kg the recommended dose is 100 micrograms (2 mL). • **If a regularly scheduled HD treatment is missed**, resume administration of the drug at the end of the next HD treatment. • **Patients with incomplete haemodialysis treatment:** for haemodialysis treatments less than 1 hour, administration of difelikefalin should be withheld until the next haemodialysis session. See dosing information in Table 1
Additional Information	• An effect of difelikefalin in reducing pruritus is expected after 2 to 3 weeks of treatment. • Store below 25^0C. • Somnolence and/or dizziness have been reported in patients taking difelikefalin-caution patients about driving and operating machinery. • Difelikefalin should be for in-centre haemodialysis use only. • See SPC for full prescribing information.

Table 1: Injection volume based on Target Dry Weight

Target Dry Weight Range (kg)	Injection volume(ml)
40-44	0.4
45-54	0.5
55-64	0.6
65-74	0.7
75-84	0.8
85-94	0.9
95-104	1
105-114	1.1
115-124	1.2
125-134	1.3
135-144	1.4
145-154	1.5
155-164	1.6
165-174	1.7
175-184	1.8
185-194	1.9
≥195	2
***Total Injection Volume(ml)=Patient Target Dry Body Weight(kg)x0.01, rounded to the nearest tenth(0.1ml)**	

Information relates to Kapruvia® (Vifor)

Digoxin

CAUTION: High Administration Risk Rating	
CAUTION: Digoxin may be administered as a **loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.	
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
• 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

<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>

Osteolytic lesions and bone pain in bone metastases associated with breast cancer and multiple myeloma
• Give 90mg as a single dose, every four weeks
• The dose may be administered at three-weekly intervals to coincide with chemotherapy if desired</td></tr>
</table>

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

	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 **Unlicensed medicine in Ireland**

Information provided relates to Disodium Pamidronate (Mylan & 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.

Eculizumab (Soliris®)

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

CAUTION: High Administration Risk Rating

<table>
<tr><td>Form</td><td>300mg in 30ml vial (concentrate for infusion)</td><td>Store in a refrigerator (2°C - 8°C) in the original package to protect from light.</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Already in solution
MUST be further diluted before administration
Do not use if there is evidence of particulate matter or discolouration.</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 only

Withdraw the total amount of Soliris from the vial(s) using a sterile syringe.
Transfer the recommended dose to an infusion bag.
Dilute Soliris to a final concentration of 5 mg/ml by addition to the infusion bag of suitable diluent.

<table>
<tr><th>Dose and drug volume</th><th>Diluent volume</th><th>Total infusion volume after dilution</th><th>Method of preparation of infusion</th></tr>
<tr><td>300mg (30ml)</td><td>30ml</td><td>60ml</td><td>Remove 70ml from 100ml infusion bag and add 30ml drug solution</td></tr>
<tr><td>600mg (60ml)</td><td>60ml</td><td>120ml</td><td>Remove 190ml from 250ml infusion bag and add 60ml drug solution</td></tr>
<tr><td>900mg (90ml)</td><td>90ml</td><td>180ml</td><td>Remove 160ml from 250ml infusion bag and add 90ml drug solution</td></tr>
<tr><td>1200mg (120ml)</td><td>120ml</td><td>240ml</td><td>Remove 130ml from 250ml infusion bag and add 120ml drug solution</td></tr>
</table>

Gently agitate the infusion bag containing the diluted solution to ensure thorough mixing of the product and diluent.
The diluted solution should be allowed to warm to room temperature prior to administration by exposure to ambient air.
Administered by intravenous infusion over 25 – 45 minutes
Discard any unused portion left in a vial.
Any unused medicinal product or waste material should be disposed of in accordance with local requirements.
</td></tr>
<tr><td>Documentation Requirements</td><td colspan="2">Document batch numbers and expiry dates of vials in medical notes.</td></tr>
<tr><td>Adverse Drug Reactions</td><td colspan="2">Monitor for headache (occurs in more than 10% of patients)</td></tr>
</table>

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

	• The use of Soliris increases the patient's susceptibility to meningococcal infection (*Neisseria meningitidis*). Meningococcal disease due to any serogroup may occur. (see additional information below) • Patient to **report fever, headache with fever or neck stiffness** (to out-rule meningitis)
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.
Additional Information	**Eculizumab must NOT be initiated in patients:** • with unresolved Neisseria meningitidis infection • who are not currently vaccinated against Neisseria meningitidis (unless they receive prophylactic treatment with appropriate antibiotics until 2 weeks after vaccination) Dose depends on indication. Soliris is licensed for treatment of Atypical Haemolytic Uremic Syndrome (aHUS),Paroxysmal Nocturnal Haemoglobinuria (PNH), refractory generalised Myasthenia Gravis and Neuromyelitis Optica Spectrum Disorder (NMOSD) Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via: Ireland HPRA Pharmacovigilance Website: www.hpra.ie Give **PATIENT INFORMATION BROCHURE and PATIENT SAFETY CARD** See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Soliris® (Alexion Pharma)

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.

Eptinezumab (Vyepti®)

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
CAUTION: High Administration Risk Rating		
Form	100mg concentrate for infusion (100mg/mL) 300mg concentrate for infusion (300mg/3mL)	Store in a refrigerator (2°C - 8°C) in the original package to protect from light.
Reconstitution	Already in solution **MUST be further diluted before administration** Prior to dilution, the medicinal product (concentrate in the vials) should be inspected visually; do not use if the concentrate contains visible particulate matter or is cloudy or discoloured (other than clear to slightly opalescent, colourless to brownish-yellow).	
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**	
Administration	**IV Infusion only**	
	100mg dose • Withdraw 1.0 mL from one single-use 100 mg vial using a sterile needle and syringe. • Inject the 1.0 mL (100 mg) content into a 100 mL bag of 0.9% sodium chloride for injection **300mg dose** • Withdraw 1.0 mL from 3 x single-use 100 mg vials or 3.0 mL of Vyepti® from one single-use 300 mg vial using a sterile needle and syringe. • Inject the resulting 3.0 mL (300 mg) content into a 100 mL bag of 0.9% sodium chloride. Infuse over approximately 30 minutes. • Use an intravenous infusion set with a **0.2 µ in-line filter**. This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores. • After the infusion is complete, flush the line with 20 mL of 0.9% sodium chloride for injection.	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Adverse Drug Reactions	The most common adverse reactions were nasopharyngitis and hypersensitivity. Most hypersensitivity reactions occurred during infusion and were not serious. Fatigue was most frequent on the day of the first infusion. Following the first week and with subsequent infusions, fatigue was reported in lower incidences and the incidences were comparable to placebo. Serious hypersensitivity reactions, including anaphylactic reactions, have been reported and may develop within minutes of the infusion. Most hypersensitivity reactions occurred during infusion and were not serious. If a serious hypersensitivity reaction occurs, administration of VYEPTI should be discontinued immediately and appropriate therapy initiated. If the hypersensitivity reaction is not serious, continuation of further treatment with VYEPTI is up to the discretion of the treating physician, taking into account the benefit-risk for the individual patient.	

	Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via: **Ireland** HPRA Pharmacovigilance Website: www.hpra.ie
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.
Additional Information	This medicinal product contains 40.5 mg of sorbitol in each mL. Patients with hereditary fructose intolerance (HFI) must not be given this medicinal product unless strictly necessary

Information provided relates to Vyepti® (Lundbeck)

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		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form	1g dry powder vial	Store below 25ºC
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%	
Administration	**IV Infusion**	
	For a 1g dose, add contents of reconstituted solution to 50 mL of sodium chloride 0.9%. Infuse over a period of 30 minutes.	
Extravasation	Extravasation may cause tissue damage	

Information provided relates to Invanz® (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.

Etelcalcetide

For use in Hemodialysis patients only		
Form	Each vial contains 5 mg of etelcalcetide (as hydrochloride) in 1 mL of solution.	Store in fridge at 2–8°C
Reconstitution	Already in solution	
Compatibility & Stability	N/A	
Administration	**IV bolus**	
	Parsabiv is administered into the venous line of the dialysis circuit at the end of the haemodialysis treatment during rinse-back or intravenously after rinse-back. When given during rinse-back at least 150 mL of rinse-back volume should be administered after injection. If rinse-back is completed and Parsabiv was not administered, then it may be administered intravenously followed by at least 10 mL sodium chloride 9 mg/mL (0.9%) solution for injection flush volume.	
Monitoring	Manufacturer advises monitor parathyroid hormone level 4 weeks after treatment initiation or dose adjustment and approximately every 1–3 months during maintenance treatment; monitor serum-calcium concentration before treatment initiation, within 1 week of initiation or dose adjustment, and then approximately every 4 weeks during maintenance treatment.	
Adverse Drug Reactions	• Diarrhoea; electrolyte imbalance; headache; heart failure aggravated; hypotension; muscle complaints; nausea; QT interval prolongation; sensation abnormal; vomiting	
Additional Information	First dispensing on yellow Rx, subsequently sent from weekly stock order list sent by Dialysis Unit to Pharmacy	

Information provided relates to Parsabiv (Amgen)

Famotodine

Form	Famotidine 20mg per 2mL (10mg/mL) Concentrate for injection	Store in fridge at 2–8°C
Reconstitution	Already in solution **Dilute further before administration**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV bolus**	
	Dilute 2mL (20mg) to 5mL or 10mL with compatible fluid Inject over at least 2 mins	
	IV Infusion	
	Dilute 2mL (20mg) with 100mL of compatible fluid. Infuse over 15-30 mins	
Adverse Drug Reactions	• In adults with CrCL<50mL/min clearance may be reduced. • CNS adverse effects have been reported in moderate and severe renal insufficiency, consider reducing dose or increasing interval between doses to 36-48 hours	
Additional Information	Unlicensed preparation in Ireland	

Information provided relates to Famotidine (Hikma)

Fentanyl

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	100 micrograms per 2mL (50 microgram/mL) 500 micrograms per 10mL (50 microgram/mL) (ITU, Theatres)	**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- ITUs Theatres & ED only	
	Use 500 micrograms per 10ml (**50microgram/mL**) ampoules and administer using a syringe pump to control the rate of infusion.	
	IM Injection	
	No dilution required.	
	SC Injection	
	Give required dose by SC injection.	
	Continuous SC Infusion	
	Dilute required dose with WFI or 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 (MercuryPharma).

Flucloxacillin

<table>
<tr><th colspan="3">This is a PENICILLIN</th></tr>
<tr><td>Form</td><td>1g dry powder vials</td><td>Store vials at room temperature</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Intravenous: Reconstitute 1g with 20mL WFI

Intramuscular: Reconstitute 1g with 3mL WFI</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Sodium Chloride 0.9%
Glucose 5%</td></tr>
<tr><td rowspan="5">Administration</td><td colspan="2">IV Infusion (preferred for doses over 1g)</td></tr>
<tr><td colspan="2">Following reconstitution, dilute the required dose in 100mL of compatible infusion fluid and infuse over 30 - 60 minutes.

Fluid restriction: A 50ml infusion may be used if required
The residual volume in the infusion line must be flushed through at the same rate to avoid significant underdosing.
<table>
<tr><th>Dose</th><th>Volume fluid to remove from 50mL bag</th><th>Volume reconstituted solution to add</th></tr>
<tr><td>1g</td><td>20mL</td><td>20mL</td></tr>
<tr><td>2g</td><td>40mL</td><td>40mL</td></tr>
</table></td></tr>
<tr><td colspan="2">IV Injection (doses up to 1g only)</td></tr>
<tr><td colspan="2">Give by slow IV injection over 3 - 4 minutes.</td></tr>
<tr><td colspan="2">IM Injection</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td>Monitor</td><td colspan="2">Check serum sodium and potassium regularly with high doses of flucloxacillin</td></tr>
</table>

Information provided related to Flucloxacillin injection (Ibigen)

Fluconazole

SALAD Caution with other BBraun products; **Metronidazole** 500mg/100mL bottle, **Ibuprofen** 400mg/100mL bottle		
Form & Storage	200mg/100mL solution for infusion	Store below 25°C
Reconstitution	Already in solution	
Compatibility & Stability	Once opened, the opened bottle should be used immediately and any unused contents discarded.	
Administration	**IV Infusion**	
	Max rate of 10mL per minute Give 200mg over at least 10 minutes. Give 400mg over at least 20 minutes.	
Extravasation	May cause tissue damage due to low pH. If a central venous access device is unavailable, give via a large peripheral vein monitoring insertion site closely using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation.	
Monitoring	• Liver function tests in patients receiving a high dose or extended course of treatment. ○ Discontinue if signs or symptoms of hepatic disease develop. • Consider ECG in patients at risk of QT prolongation e.g. patients with cardiac comorbidities or those with risk factors (electrolyte abnormalities, concomitant medicines which prolong the QT interval).	
Additional Information	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 (B Braun)

Flumazenil

CAUTION: High Administration Risk Rating		
Form	500 microgram (0.5mg) per 5mL ampoule	Store below 25ºC
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 to a concentration of 10 microgram/mL e.g. 500 microgram in 50mL 2.5mg in 250mL Give using an infusion pump, adjusting rate according to 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. • See Toxbase (username/password required, available Resusc room ED)	

Information provided relates to Anexate® (Cheplapharm Arzneimittel GmbH) and Flumazenil (Baxter)

Foscarnet

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
Reserve Antimicrobial See CUH Guidelines on Eolas for further information		
CAUTION: High Administration Risk Rating		
Form	250mL bottle containing 6g foscarnet, 24mg/mL	Store at room temperature
Reconstitution	Already in solution	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV Infusion**	
	Central (preferred) 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. **Peripheral** **Doses ≤ 6000mg** Remove a volume of infusion fluid from a 500ml bag **to leave** an equal volume to the drug solution in the bag (because this method means that the drug will be diluted 50:50 (i.e. to produce 12mg/mL)) Add in the foscarnet solution **Doses 6,000-12,000mg** Remove a volume of infusion fluid from a 1000ml bag **to leave** an equal volume to the drug solution in the bag (because this method means that the drug will be diluted 50:50 (i.e. to produce 12mg/mL)) Add in the foscarnet solution **Doses > 12,000mg consider central line** Calculate required dose, and withdraw excess drug from infusion bottle and discard it. Administer the volume left in the infusion bottle (the required dose) over 120 minutes (60 minutes for doses of 60mg/kg or less) while at the same time piggybacking 1000ml sodium chloride 0.9% through the same catheter/cannula as the foscarnet infusion (at the same rate as foscarnet) This dilutes the injection solution to the required concentration as it is being administered.	
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**. The patient should receive IV hydration with 500-1000mL of sodium chloride 0.9% with each infusion. Clinically dehydrated patients should have their condition corrected before	

	initiating foscarnet therapy. The volume of IV hydration fluid may be decreased if clinically appropriate therefore exercise clinical judgement. • As the drug is supplied in glass bottles, precautions need to be taken during administration to **prevent possible air embolism** - particularly in central line administration. 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. • Foscavir® is considered high in sodium – 60mmol sodium per 250mL bottle • Unlicensed medication in Ireland

Information provided relates to Foscavir® (Clinigen Healthcare)

Fosfomycin

<table>
<tr><td colspan="3">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td>Form</td><td>Fosfomycin 40mg/mL powder for solution for infusion</td><td>Store below 25ºC</td></tr>
<tr><td>Reconstitution</td><td colspan="2">
<table>
<tr><th>Vial</th><th>Volume</th><th>Method</th></tr>
<tr><td>2g</td><td>20mL</td><td>Reconstitute 2g vial with 20ml diluent removed from a 50ml infusion bag. Keep 30mL infusion bag for infusion.</td></tr>
<tr><td>4g</td><td>20mL</td><td>Reconstitute 4g vial with 20ml diluent removed from a 100ml infusion bag. Keep 80mL infusion bag for infusion.</td></tr>
<tr><td>8g</td><td>40mL</td><td>Remove and discard 50mL from 250mL bag glucose. Reconstitute 8g vial with 40ml diluent removed from the 200ml infusion bag, Keep 160mL infusion bag for infusion.</td></tr>
</table>
A slight degree of warming occurs when the powder is dissolved
Dilute further before administration.
</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">Glucose 5%</td></tr>
<tr><td>Administration</td><td colspan="2">IV infusion
Add the reconstituted contents of 2 g vial (20mL) into the infusion bag containing 30mL glucose (total volume 50mL) and administer over at least 15 minutes.
Add the reconstituted contents of 4 g vial (20mL) into the infusion bag containing 80 mL of solvent (total volume 100mL) and administer over at least 30 minutes.
Add the reconstituted contents of 8 g vial (40mL) into an infusion container with further 160 mL of solvent (total volume 200mL) and administer over at least 60 minutes.</td></tr>
<tr><td>Monitoring</td><td colspan="2">Monitor electrolytes, fluid balance, full blood count (including leucocytes).</td></tr>
<tr><td>Extravasation</td><td colspan="2">Extravasation is likely to cause tissue damage due to high osmolarity.</td></tr>
<tr><td>Additional information</td><td colspan="2">Assess the risk of hypernatraemia and fluid overload, especially in patients with a history of congestive heart failure or underlying comorbidities which may make them more susceptible. Fosfomycin has a high sodium content</td></tr>
</table>

Information provided relates to Fomicyt® (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

Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information

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 = $\frac{\text{Dose prescribed(mg)}}{500\text{mg}} \times 110\text{mL}$ 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 (Baxter) and Cymeven® (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.

Glyceryl Trinitrate

<table>
<tr><td>Form</td><td>50mg/10mL ampoule Glyceryl Trinitrate</td></tr>
<tr><td>Reconstitution</td><td>Already in solution
Draw up using a 5 micron filter needle
Must be diluted further before administration.</td></tr>
<tr><td>Compatibility & Stability</td><td>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. (Braun Combidyn PE Ref 5215035)</td></tr>
<tr><td>Administration</td><td>Continuous IV infusion
To prepare a 1mg/mL solution:
Add each 50mg/10mL ampoule to 40mL of compatible infusion fluid.

Usual max rate 20mg/hr

<table>
<tr><th colspan="11">Syringe 1mg/mL glyceryl trinitrate</th></tr>
<tr><th>Dose (micrograms/min)</th><th>5</th><th>10</th><th>15</th><th>20</th><th>50</th><th>100</th><th>125</th><th>150</th><th>175</th><th>200</th></tr>
<tr><th>Rate (ml/h)</th><td>0.3</td><td>0.6</td><td>0.9</td><td>1.2</td><td>3.0</td><td>6.0</td><td>7.5</td><td>9</td><td>10.5</td><td>12</td></tr>
</table>
</td></tr>
<tr><td>Monitoring</td><td>• Monitor Heart rate and BP during administration. Also consider pulmonary capillary wedge pressure, cardiac output.</td></tr>
<tr><td>Extravasation</td><td>• Extravasation is likely to cause tissue damage due to low pH and presence of excipients propylene glycol and ethanol.</td></tr>
<tr><td>Additional Information</td><td>• Do not use if solution is discoloured.
• The diluted solution should be used immediately.
• Oral nitrates should be withheld when administering IV nitrates
• Each 5 ml ampoule of Glyceryl Trinitrate Sterile Concentrate contains 2639.2 mg of anhydrous ethanol, which is equivalent to less than 66 ml of beer or 27 ml of wine.
• There have been reports of ethanol intoxication during high-dose glyceryl trinitrate infusion.
• The ethanol content in this medicinal product should be carefully considered in the following patient groups who may be at higher risk of ethanol-related adverse effects: • Pregnant or breast-feeding women • Patients with liver disease • Patients with epilepsy • Patients suffering from alcoholism
• Glyceryl trinitrate is contraindicated with PDE5 inhibitors such as sildenafil, tadalafil and vardenafil.</td></tr>
</table>

Information provided relates to Glyceryl Trinitrate (Hospira)

Granisetron

Granisetron dosing may be weight based; ensure accuracy of documented weight before administration	
Form	1mg/mL solution for injection
Reconstitution	Already in solution The solution should be clear and colourless. Inspect visually for particulate matter or discoloration prior to administration and discard if present. • 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	**IV Injection**
	Withdraw the required dose and dilute each 1 mg (1 mL) to 5 mL with sodium chloride 0.9% in the syringe. 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 (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	**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 containing 500 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, Ratiopharm.

Heparin (Unfractionated)

Potential SALAD Ensure correct unfractionated heparin concentration is selected when preparing & administering unfractionated heparin	
CAUTION: High Administration Risk Rating	
CAUTION: Heparin may be administered as a **loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.	
Form	5000 units UFH 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	Sodium chloride 0.9%
Administration	**Loading Dose: IV Injection**
	Give slowly over 5 minutes
	Continuous IV Infusion 25000/50mL (500 units/mL) maintenance infusion
	Draw up 25mL of UFH 1000 units/mL in a syringe (5 vials of 5000 units in 5mL) Add 25 mL of sodium chloride 0.9% to give a concentration of 500 units/mL Administer by syringe pump. • Refer to Unfractionated Heparin Guideline on QPulse. • Rate is adjusted according to Activated Partial Thromboplastin Time ratio (APTT ratio)
Neutralisation of Heparin	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 (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® (Pfizer)

Hydroxocobalamin (Vitamin B_{12})

Form	1000 microgram/mL solution for injection	Do not store above 25°C. Keep the ampoule in the outer carton to protect from light.
Reconstitution	Already in solution	
Compatibility & Stability	N/A	
Administration	**IM Injection only**	
	Give the required dose by IM injection.	
Monitoring	Monitor **potassium plasma** levels as hypokalaemia and arrhythmias may occur during initial therapy Monitor **platelet count** during the first weeks of use in megaloblastic anaemia due to the possible occurrence of reactive thrombocytosis.	
Additional Information	• The medicines used to treat vitamin B12 deficiency (hydroxocobalamin, cyanocobalamin) contain cobalt. There are case reports in the literature describing cobalt sensitivity-type reactions in patients being treated for vitamin B12 deficiency. • Cyancobalamin 50microgram, Vitamin B_{12} (cyanocobalamin) 1000microgram tablets available in CUH	

Information provided relates to Neo-Cytamen® (RPH Pharmaceuticals)

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.
	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 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® (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 • 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

Ibuprofen

SALAD Caution with other BBraun products; **Fluconazole** 200mg/100mL bottle, **Metronidazole** 500mg/100mL bottle		
Approved for use in Theatres ONLY in CUH		
Form	400mg solution for infusion in 100mL bottle	Store at room temperature in outer box for light protection.
Reconstitution	Already in solution – ready to administer	
Compatibility & Stability	N/A	
Administration	**IV Infusion**	
	Administer over 30 minutes	
Monitoring	• Monitor for signs of gastrointestinal bleeding, ulceration or perforation • Monitor for signs of bronchospasm, urticaria or angioedema • Monitor for oedema, hypertension and cardiac failure • infusion site reactions: pain and burning sensation, swelling, haematoma	
Additional Information	The licensed maximum IV treatment duration is 3 days. Switch to oral treatment as soon as possible. Maintain adequate hydration to minimise risk of renal adverse effects	

Information provided relates to Ibuprofen (BBraun)

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.	

	• 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

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 IV, 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 The solution should be clear or slightly opalescent. Do not use solutions that are cloudy or have deposits.
Compatibility & Stability	N/A
Administration	**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: **STOP the infusion and contact a member of the medical team**
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. • *Note the infusion rate may be adjusted according to local policy (e.g. Infusion Unit) • Prescriber should round dose down to nearest whole vial size to minimise waste. • Refer to **Adult Intravenous Immunoglobulin (IVIG) Prescription and Administration Record (Form 15B).** Copies available in Pharmacy (on Disp Press 6)

Information relates to Flebogamma® DIF (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 IV, 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 The solution should be clear or slightly opalescent and colourless or pale yellow. Do not use solutions that are cloudy or have deposits.
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	**IV Infusion** 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: **STOP the infusion and contact a member of the medical team**
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. • *Note the infusion rate may be adjusted according to local policy (e.g. Infusion Unit) • Refer to **Adult Intravenous Immunoglobulin (IVIG) Prescription and Administration Record (Form 15B).** Copies available in Pharmacy (on Disp Press 6)

Information relates to Kiovig® (Shire)

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 SC, Cuvitru®

Cuvitru® dosing may be weight based; ensure accuracy of documented weight before administration	
Caution High Risk rating	
Form & Storage	Vials containing Normal Human Immunoglobulin (SCIg) **200 mg/mL** solution for subcutaneous injection 1g in 5mL, 2g in 10mL, 4g in 20mL, 8g in 40mL or 10g in 50mL of solution in a vial Store at **room temperature**. In case the product is stored in a refrigerator, the unopened vials must be placed at room temperature for a minimum of 90 minutes prior to use and kept at room temperature during administration.
Reconstitution	Already in solution. **Do not dilute**
Compatibility & Stability	Cuvitru® should be inspected visually for particulate matter and discoloration prior to administration. Do not use if particulate matter and/or discoloration is observed. The infusion must be started immediately upon transfer of Cuvitru® into the syringe
Administration	**Subcutaneous Infusion**
	The dose and dose regimen is dependent on the indication and Consultant instruction • The dose regimen should achieve a trough level of IgG (measured before the next infusion) of at least 5 to 6 g/L and aim to be within the reference interval of serum IgG for age. • A loading dose of at least 0.2 to 0.5g/kg (1 to 2.5mL/kg) body weight may be required. This may need to be divided over several days, with a maximum daily dose of 0.1 to 0.15 g/kg. After steady state IgG levels have been attained, maintenance doses are administered at repeated intervals to reach a cumulative monthly dose of the order of 0.3 to 1.0 g/kg. • Sub cutaneous via specific infusion pump, multiple sites can be used • Infusions are carried out in the infusion unit to assess patient suitability for home therapy. It is recommended to use an initial administration speed of 10 mL/h/infusion site. If well tolerated, the rate of administration may be increased at intervals of at least 10 minutes to a maximum of 20 mL/h/infusion site for the initial two infusions.

Documentation Requirements	This is a blood product, therefore batch and expiry should be recorded in patient's notes.
Monitoring	Vital signs pre and post infusion. SC injection site/s. Plasma IgG levels Patients naive to human normal immunoglobulin, patients switched from an alternative immunoglobulin product or when there has been a long interval since the previous infusion should be monitored during the first infusion and for the first hour after the first infusion All other patients should be observed for at least 20 minutes after administration
Adverse Drug Reactions	Infusion related reactions, localised or systemic Avoid potential complications by injecting the product slowly
Additional Information	The administration is foreseen to take up to two hours. Should an administration shorter than two hours not be possible due to required dose or administration rate of Cuvitru®, the required dose is to be portioned and administered at different infusion sites. If Cuvitru® remains in siliconized syringes for more than two hours, visible particles may form. Assess level of understanding and compliance with treatment Ensure that the patient and family member are educated and proficient in carrying on this treatment at home Usually, three SC infusions in the Infusion Unit.

Information provided relates to Cuvitru® (Takeda)

Immunoglobulin SC, Hizentra®

Hizentra® dosing is weight based; ensure accuracy of documented weight before administration		
Caution High Risk rating		
Form	Hizentra 200 mg/ml solution for subcutaneous injection	Store in a refrigerator (2°C – 8°C). Do not freeze. Keep the vials in the outer carton in order to protect from light.
	Each vial of 5 ml solution contains: 1 g of human normal immunoglobulin Each vial of 10 ml solution contains: 2 g of human normal immunoglobulin Each vial of 20 ml solution contains: 4 g of human normal immunoglobulin Each vial of 50 ml solution contains: 10 g of human normal immunoglobulin	
Reconstitution	Because the solution contains no preservative, Hizentra should be used/infused as soon as possible after opening the vial or blistered pre-filled syringe. The medicinal product should be brought to room or body temperature before use.	
Compatibility & Stability	The solution should be clear and pale-yellow or light-brown. Solutions that are cloudy or have deposits should not be used	
Administration	**Subcutaneous Infusion**	
	Sub cutaneous via specific infusion pump, multiple sites can be used • Refer to SPC for recommended infusion rates	
Monitoring	Ensure that patients are carefully monitored for any symptoms throughout the infusion period. In particular, patients naive to human normal immunoglobulin, patients switched from an alternative immunoglobulin product or when there has been a long interval since the previous infusion should be monitored during the first infusion and for the first hour after the first infusion, in order to detect potential adverse signs. All other patients should be observed for at least 20 minutes after the administration	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Adverse Drug Reactions	If Hizentra® is accidentally administered into a blood vessel, patients could develop shock. In case of adverse reaction, either the rate of administration must be reduced or the infusion stopped.	
Additional Information	A number of infusions are carried out in the infusion unit to assess patient suitability for home therapy **Hypersensitivity True allergic reactions** are rare. They can particularly occur in patients with anti-IgA antibodies who should	

	be treated with particular caution. Patients with anti-IgA antibodies, in whom treatment with subcutaneous IgG products remains the only option, should be switched to Hizentra only under close medical supervision. 6 Rarely, human normal immunoglobulin can induce a fall in blood pressure with anaphylactic reaction, even in patients who had tolerated previous treatment with human normal immunoglobulin. **Thromboembolism** Arterial and venous thromboembolic events including myocardial infarction, stroke, deep venous thrombosis and pulmonary embolism have been associated with the use of immunoglobulins. Caution should be exercised in patients with pre-existing risk factors for thrombotic events (such as advanced age, hypertension, diabetes mellitus and a history of vascular disease or thrombotic episodes, patients with acquired or inherited thrombophilic disorders, patients with prolonged periods of immobilization, severely hypovolemic patients, patients with diseases which increase blood viscosity). Patients should be informed about first symptoms of thromboembolic events including shortness of breath, pain and swelling of a limb, focal neurological deficits and chest pain and should be advised to contact their physician immediately upon onset of symptoms. Patients should be sufficiently hydrated before use of immunoglobulins. **Aseptic Meningitis Syndrome (AMS)** AMS has been reported with use of IVIg or SCIg. The syndrome usually begins within several hours to 2 days following immune globulin treatment. AMS is characterised by the following signs and symptoms: severe headache, neck stiffness, drowsiness, fever, photophobia, nausea, and vomiting. Patients exhibiting signs and symptoms of AMS should receive a thorough neurological examination, including CSF studies, to rule out other causes of meningitis. Discontinuation of immunoglobulin treatment may result in remission of AMS within several days without sequelae.

Information provided relates to Hizentra® (CSL Behring GmbH)

Immunoglobulin SC, HyQvia®

HyQvia® dosing is weight based; ensure accuracy of documented weight before administration		
Caution High Risk rating		
Form	HyQvia is a dual vial unit consisting of one vial of human normal immunoglobulin (Immune Globulin 10% or IG 10%) and one vial of recombinant human hyaluronidase (rHuPH20).	Store in a refrigerator (2°C – 8°C). Do not freeze. Keep the vials in the outer carton in order to protect from light.
	Each vial of 25 mL contains: 2.5 g of human normal immunoglobulin Each vial of 50 mL contains: 5 g of human normal immunoglobulin Each vial of 100 mL contains: 10 g of human normal immunoglobulin Each vial of 200 mL contains: 20 g of human normal immunoglobulin Each vial of 300 mL contains: 30 g of human normal immunoglobulin	
Reconstitution	In case the product is stored in a refrigerator, the unopened vials must be placed at room temperature for a minimum of 90 minutes prior to use and kept at room temperature during administration.	
Compatibility & Stability	• IG 10% is a clear or slightly opalescent and colourless or pale yellow solution. • Recombinant human hyaluronidase is a clear, colourless solution.	
Administration	**Subcutaneous Infusion**	
	Sub cutaneous via specific infusion pump, multiple sites can be used • This medicinal product is comprised of two vials. Do not mix the components of this medicinal product. • First, the full dose of recombinant human hyaluronidase solution is infused at a rate of 1 to 2 mL/minute per infusion site or as tolerated. Infuse the full dose per site of IG 10% through the same subcutaneous needle set within 10 minutes of the recombinant human hyaluronidase. • The suggested site(s) for the infusion of the medicinal product are the middle to upper abdomen and thighs. If two sites are used, the two infusion sites should be on opposite sides of the body. • Refer to SPC for recommended infusion rates	
Monitoring	Ensure that patients are carefully monitored for any symptoms throughout the infusion period. In particular, patients naive to human normal immunoglobulin, patients switched from an alternative immunoglobulin product or when there has been a long interval since the previous infusion should be monitored during the	

	first infusion and for the first hour after the first infusion, in order to detect potential adverse signs. All other patients should be observed for at least 20 minutes after the administration
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	If HyQvia® is accidentally administered into a blood vessel, patients could develop shock. In case of adverse reaction, either the rate of administration must be reduced or the infusion stopped.
Additional Information	A number of infusions are carried out in the infusion unit to assess patient suitability for home therapy

Information provided relates to HyQvia® (Takeda)

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 two biosimilars of infliximab available in CUH. Biosimilars must be prescribed by brand (Remicade®, Remsima®) and they are not interchangeable**. Remsima® is preferred brand.**	
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
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**
Premedication	Premedication for first 3 doses only OR if history of infusion related reactions • *Hydrocortisone 100mgs slow IV over 3-5 mins and/or* • *Chlorphenamine 4mgs PO or Cetirizine 10mg PO or Loratidine 10mg PO and/or* • *Paracetamol 1g PO*
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 2 infusions (induction) administered over 2 hours • In patients who have tolerated at least two initial 2-hour infusions of Infliximab (induction phase) and are receiving maintenance therapy, 3rd infusion can be given over 1 hour. Subsequent infusions can be given over 30min/1 hour. This is local policy and agreed with the relevant consultants in the infusion unit. • 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.
Monitoring	• Vital signs assessment pre and post infusion and every 30 minutes during infusion ➢ Infusions 1 and 2 observe for 1-hour post infusion ➢ For third infusion observe for 30mins post infusion ➢ Subsequent infusions no observation required unless clinically indicated. • This is local infusion unit policy and agreed with the relevant consultants. • Before the first three infusions, Full Blood Count, Renal/Liver/Bone profile, C Reactive Protein are taken by phlebotomy/GP. Bloods for subsequent infusions are taken on cannulation and are used as a baseline for the next infusion if the patient is well. • Trough infliximab levels on consultant selected patients, POC test with immediate (10min) results. Communication and follow up with these results will be with Gastro CNS and consultant. Dose mg/kg and frequency of treatment may be altered • If patient is towards the end or just finished antibiotics, they may proceed with infusion if they are well and asymptomatic. Repeat bloods are not required • If the patient presents to the unit and meets the criteria in **7.7***, medical review may be required prior to reconstituting medication for infusion
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. Patient Reminder Cards are available. The Reminder Card contains important safety information that you need to be aware of before and during treatment with Infliximab. Remicade Remsima

Information provided relates to Remicade®, Remsima®

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.** An **insulin syringe** must always be used to draw up and prepare insulin (soluble).	
Compatibility & Stability	**IV insulin infusion to achieve glycaemic control in diabetes**	
	Sodium chloride 0.9%	
	Treatment of hyperkalaemia	
	Glucose 50% Prepared syringes should be used immediately.	
Administration	**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® (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

Dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating
See safety alert Risk of permanent skin staining due to extravasation of intravenous iron infusions

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 Ferric carboxymaltose 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 Ferric carboxymaltsoe 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.

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

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. Patient Information Leaflet Ferinject Patient Information Leaflet Ferric Carboxymaltose

Information provided relates to Ferinject® (Vifor) and ferric carboxymaltose (Teva) .

Iron as Ferric derisomaltose (Monover®)

Potential SALAD Check which Iron preparation is prescribed	
Monover® dosing is weight based; ensure accuracy of documented weight before administration	
CAUTION: High Administration Risk Rating **See safety alert** Risk of permanent skin staining due to extravasation of intravenous iron infusions	
Form	100mg in 1mL solution for injection/infusion • 100mg in 1mL vial • 500mg in 5ml vial • 1000mg in 10mL vial
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.** • Add required dose to 100mL to 500mL sodium chloride 0.9%. Do not dilute to a concentration less than 1mg iron in 1mL and do not dilute in more than 500mL • Give doses up to 1g over at least 15 minutes. • Give doses exceeding 1g over at least 30 minutes. • Max single dose 20mg/kg by IV infusion
	IV Injection – choose a large vein
	• Give undiluted or dilute in a maximum of 20mL sodium chloride 0.9% • For doses up to 500mg: Give slowly at a maximum rate of 250mg/minute (risk of hypotensive episodes if given too rapidly). Give diluted or undiluted. • Max dose 500mg by IV bolus
Monitoring	Patient should be observed for adverse effects for at least 30 minutes following **each** administration. Monitor BP; Hypotensive episodes may occur if intravenous injection is administered too rapidly.
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. 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). Parenteral iron should be used with caution in case of acute or chronic infection. Monover should not be used in patients with ongoing bacteraemia.
Extravasation	The undiluted solution 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. Re-site cannula at first signs of inflammation.

	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 iron must be stopped immediately.
Additional Information	The total dose per week should not exceed 20 mg iron/kg bodyweight. A single Monover infusion should not exceed 20 mg iron/kg body weight. A single Monover bolus injection should not exceed 500 mg iron. Use IBW if patient is overweight. Patient Guide to Monover

Information provided relates to Monover® (Pharmacosmos)

Iron Sucrose (Venofer®)

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

CAUTION: High Administration Risk Rating
See safety alert Risk of permanent skin staining due to extravasation of intravenous iron infusions

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 (1mL per minute)

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®). Patient information leaflet Venofer

Information provided relates to Venofer® manufactured by Vifor.

Isavuconazole

CAUTION: High Risk Administration		
CAUTION: Isavuconazole is usually administered as six loading doses followed by a less frequent maintenance dose. Check the correct regimen is prescribed.		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form	Cresemba® 200 mg powder for concentrate for solution for infusion	Store in fridge at 2–8°C
Reconstitution	Reconstitute each vial with 5mL WFI Shake vial until the solution is clear. **Dilute further before administration**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV Infusion**	
	Withdraw the entire contents of the vial and add to 250mL sodium chloride 0.9% or glucose 5% infusion bag. Gently mix or roll the bag to minimise particulate formation. Some fine white-to-translucent particulates may occur which do not sediment. They will be removed by the in-line filter during administration Give over at least 60 minutes via an in-line 0.2 - 1.2micron polyethersulfone (PES) filter using an infusion pump This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores	
Extravasation	Isavuconazole 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.	
Additional Information	Each vial contains 200 mg isavuconazole (as 372.6 mg isavuconazonium sulfate).	

Information provided relates to Cresemba® (Pfizer)

Isoprenaline Hydrochloride

There are different isoprenaline preparations available**.**
Carefully check the concentration and storage temperature.
This monograph is for **isoprenaline HYDROCHLORIDE** only.
Isoprenaline sulfate 1.125mg = isoprenaline hydrochloride 1mg.

Form	Isoprenaline hydrochloride 0.2mg/mL ampoules	Store in a refrigerator at 2–8°C and protect from light.
Reconstitution	Already in solution. Draw up using a 5 micron filter needle **Further dilute prior to administration**	
Compatibility & Stability	Glucose 5% (preferred) Sodium Chloride 0.9%	
Administration	**Continuous IV Infusion**	
	Local practice: Add 1mg (5 mL) to 245ml compatible fluid to make a 4 microgram/mL solution Adjust rate according to response and indication.	

Isoprenaline 4 microgram/mL

Dose (micrograms/min)	**0.5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Rate (ml/h)	7.5	15	30	45	60	75	90	105	120	135	150

Monitoring	• Monitor ECG, arterial blood pressure, heart rate, urine flow, central venous pressure, blood pH, blood pCO_2 or bicarbonate, and cardiac output
Extravasation	This medicine 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.
Notes	• Infusion should preferably be given via central line • This product contains metabisulphite and may cause allergic reactions • Do not use if the injection is pinkish, darker than slightly yellow or contains a precipitate.

Information provided relates to Isoprenaline Hydrochloride (Macure)

Labetalol

<table>
<tr><th colspan="2">CAUTION: High Administration Risk Rating</th></tr>
<tr><td>Form</td><td>100mg per 20mL ampoule (5mg/mL)</td></tr>
<tr><td>Reconstitution</td><td>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.</td></tr>
<tr><td>Compatibility & Stability</td><td>Glucose 5% (preferred)
Sodium Chloride 0.9%</td></tr>
<tr><td>Administration</td><td>IV Injection
Emergency use only. Use undiluted at a maximum rate of 50mg/min.
Usual maximum total dose 200mg.

IV infusion
Using 1mg/mL solution.
See possible preparations in Table below

<table><tr><th>Volume Labetalol 5mg/mL</th><th>Volume infusion fluid</th><th>Final volume 1mg/mL</th></tr><tr><td>50mL</td><td>200mL</td><td>250mL</td></tr><tr><td>60mL</td><td>240mL</td><td>300mL</td></tr><tr><td>100mL</td><td>400mL</td><td>500mL</td></tr></table>
Infuse the prescribed dosage using a rate-controlled infusion pump.
Refer to UpToDate for recommended dose based on indication.

IV Infusion (Fluid restriction, unlicensed. Central line only)
Draw up 300mg (60mL) of labetalol into a syringe neat to give a 5mg/mL infusion. Adjust rate according to response.
Usual infusion rate of up to 2mg/min.</td></tr>
<tr><td>Monitoring</td><td>Monitor blood pressure, heart rate, ECG, respiratory function.</td></tr>
<tr><td>Extravasation</td><td>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.</td></tr>
<tr><td>Additional Information</td><td>For obstetric patients refer to CUMH guidelines or the Pharmacy Department
Patient should avoid upright position during and for 3 hours after intravenous administration.</td></tr>
</table>

Information provided relates to Trandate® (RPH Pharmaceuticals)

Lacosamide

Form	200mg per 20mL ampoule
Reconstitution	Already in solution Product with particulate matter or discolouration should not be used.
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**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® (UCB Pharmaceuticals)

Levetiracetam

Form	500mg per 5mL vial	Store at room temperature
Reconstitution	Already in solution Product with particulate matter or discolouration should not be used. • 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	**IV Infusion**	
	Add required dose to 100mL compatible infusion fluid and administer over 15 minutes. **Status epilepticus**: Administer required dose over 10 minutes.(unlicensed)	
	Continuous SC Infusion (unlicensed)	
	• Given over 24 hours via a syringe pump (CSCI) using WFI or sodium chloride 0.9% as diluent. • Maximal dilution with sodium chloride 0.9% or WFI is recommended in order to preserve the infusion site. • Levetiracetam should be infused via CSCI over 24 hours. However, depending on the volume, two 12 hour drivers may be required.	
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® (UCB Pharma)

Levofloxacin

Form	500mg in 100mL bottle
Reconstitution	Already in solution Only clear solutions, free from particles, should be used. Solution may be greenish-yellow in colour.
Compatibility & Stability	N/A
Administration	**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 Lidoaine Mini-Plasco® manufactured by B Braun.

Linezolid

Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form & Storage	600mg in 300mL infusion bag	Store at room temperature in the original package (overwrap and carton) until ready to use to protect from light.
Reconstitution	Already in solution	
Compatibility & Stability	N/A	
Administration	IV Infusion	
	Administer by IV infusion over 30 - 120 minutes.	
Extravasation	Linezolid infusion 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.	
Monitoring	Monitor blood pressure, for signs of metabolic acidosis. Monitor blood counts weekly (including haemoglobin levels, platelets and differentiated leucocyte counts). Visual function should be monitored if treatment is required for longer than 28 days as severe optic neuropathy may occur rarely particularly with prolonged use.	
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® (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

Magnesium Sulphate	50%	1g	**2mL**	4mmol Mg in 2mL (2mmol/mL)
Magnesium Sulphate	50%	5g	**10mL**	20mmol Mg in 10mL (2mmol/mL)

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 - Resuscitation

Dilute 2-4mL to 10mL with sodium chloride 0.9%.
Dose typically given over 10 -15 minutes, rate not exceeding 0.6mmol/min.

IV Infusion (Peripheral) – preferred method

Infuse via a volumetric infusion device at a rate appropriate to the indication (usual max 1g/hour). Use lowest possible rate to avoid ADRs
Peripheral line: Usual maximum concentration 5% i.e. 5g (20mmol) in at least 100ml

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

Current infusion rates for patients in the **infusion unit** (local practice) are:

Dose	Volume	Dilute in	Infusion Time
2g (8mmol)	4mL	250mL	2 hours 30 min
4g (16mmol)	8mL	250mL	2 hours 30 min

IV Infusion (Central) ITU only

Dilute 20mmol (10ml) in 100ml compatible fluid, and administer over one hour.(local practice)

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 of concentrations exceeding 5% is likely to cause tissue damage due to high osmolarity.

Additional Information

For obstetric patients refer to CUMH guidelines or the Pharmacy Department

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	• 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

Information provided relates to Magnesium Sulphate (Aurum Pharmaceuticals) (Ethypharm) (Labesfal)

Mepolizumab (Nucala®)

Reduce direct handling to a minimum and wear appropriate personal protective equipment	
Form	100mg powder for solution for injection
Reconstitution	• Reconstitute the contents of the vial with 1.2 mL of sterile water for injection preferably using a 2 to 3 mL syringe and a 21gauge needle. The stream of sterile water should be directed vertically, onto the centre of the lyophilised cake. Allow the vial to sit at room temperature during reconstitution, gently swirling the vial for 10 seconds with circular motion at 15-second intervals until the powder is dissolved. • Note: The reconstituted solution **must not be shaken** • Following reconstitution, Nucala® should be visually inspected for particulate matter and clarity prior to use. The solution should be clear to opalescent, and colourless to pale yellow or pale brown, free of visible particles. Small air bubbles, however, are expected and acceptable. • If particulate matter remains in the solution or if the solution appears cloudy or milky, the solution must not be used.
Compatibility & Stability	This medicinal product must not be mixed with other medicinal products
Administration	**Subcutaneous Injection** • A 1 mL polypropylene syringe fitted with a disposable needle 21 gauge to 27-gauge x 0.5 inch (13 mm) should preferably be used • Administer the 1 mL injection (equivalent to 100mg mepolizumab) subcutaneously into the upper arm, thigh, or abdomen • For EGPA or Eosinophilic driven Arthritis, administration of 300mgs may be necessary (100mgs x 3 injections) every 4 weeks, under the governance of the rheumatology consultants. It is recommended that individual injection sites are separated by at least 5 cm.
Documentation Requirements	Batch and expiry should be recorded in patient's notes.
Monitoring	• Pre and post injection vital signs • Observe for 1-hour post first injection and 30 mins for second and third injections • For rheumatology patients receiving 300mgs the patient must be observed for 1 hour after the first 3 doses, then 15 minutes monthly thereafter until the rheumatology consultant deems them fit to self-administer the medication without observation. • Blood eosinophil count ≥ 300/microliter in previous 12 months prior to commencing treatment • Routine bloods- FBC, Renal, Liver, Bone profile, CRP, CK by GP/phlebotomy at commencement of therapy and thereafter every 3 months • If CK is elevated but patient is asymptomatic it is OK for infusion to proceed. If in any doubt contact Consultant or Registrar • If the patient presents to the unit and meets the criteria in **7.7**, medical review may be required prior to administrating medication
Adverse Drug Reactions	• Acute and delayed systemic reactions, including hypersensitivity reactions (e.g., anaphylaxis, urticaria, angioedema, rash, bronchospasm, hypotension), have occurred following administration of Nucala® These reactions generally occur within hours of administration, but in some instances have a delayed onset (i.e., typically within several days). These reactions may occur for the first time after a long duration of treatment

Additional Information	• Nucala ®should not be used to treat acute asthma exacerbations • Asthma-related adverse events or exacerbations may occur during treatment. Patients should be instructed to seek medical advice if their asthma remains uncontrolled or worsens after initiation of treatment • Abrupt discontinuation of corticosteroids after initiation of Nucala® therapy is not recommended • Reduction in corticosteroid doses, if required, should be gradual and performed under the supervision of a physician • Nucala has not been studied in patients with organ threatening or life-threatening manifestations of EGPA • Mepolizumab crosses the placental barrier in monkeys. Animal studies do not indicate reproductive toxicity. The potential for harm to a human fetus is unknown. As a precautionary measure, it is preferable to avoid the use of Nucala during pregnancy. Administration of Nucala to pregnant women should only be considered if the expected benefit to the mother is greater than any possible risk to the fetus. • See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Nucala® (GlaxoSmithKline)

Meropenem

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		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
Form	500mg and 1g vials	Store vials below 25°C
Reconstitution	Add 10mL WFI to 500mg vial Add 20mL WFI to 1g vial (**Fluid restricted** 10mL per 1g) The solution should be shaken before use. Use immediately after reconstitution.	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**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 100mL of compatible infusion fluid. If adding a 2g dose to a 100mL bag, first remove 40mL from the bag and discard. Then add dose to the remaining fluid in the bag. Infusion concentration should not exceed 20mg/mL fluid. Administer over 15 - 30 minutes. **Fluid Restriction:** 1g can be added to 50mL (first remove 20mL from 50mL bag and discard, then add 20mL reconstituted meropenem)	
Monitoring	Manufacturer advises monitor liver function – risk of hepatotoxicity	
Additional Information	Decreases in blood levels of **valproic acid** have been reported when it is co-administered with carbapenem agents resulting in a 60-100 % decrease in valproic acid levels in about two days. In exceptional circumstances, where treatment options are extremely limited for a patient, following discussion with Microbiology/Infectious Diseases consultant, a carbapenem may be considered the only/best available treatment option In this case, the consultant with primary responsibility for the patient may decide to proceed with carbapenem treatment for a patient on sodium valproate treatment based on a risk/benefit analysis and following consultation with a consultant neurologist Consultant neurologist advice should be sought regarding the potential requirement for adjunct anticonvulsant therapy if the indication for valproate use is seizure control, and advice on clinical monitoring and therapeutic drug monitoring of anticonvulsant drug serum concentrations	

Information provided relates to Meropenem (Fresenius Kabi)

Meropenem & Vaboractam (Vaborem®)

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

Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information

Form	Vial contains meropenem 1g and vaboractam 1g Powder for concentrate for solution for infusion Prescribed as combination i.e. 1g/1g, 2g/2g etc	Do not store vials above 25°C. Store in the original packaging
Reconstitution	Reconstitute each 1g/1g vial with 20mL sodium chloride 0.9% Mix gently Final volume 21.3mL **Dilute further prior to administration** **Use immediately once reconstituted**	
Compatibility & Stability	Sodium chloride 0.9% only	
Administration	**IV infusion only** • Add required dose to 250ml sodium chloride 0.9% infusion bag. • Administer over 3 hours	
Monitoring	Monitor: for hypersensitivity and infusion site reactions. Monitor LFTs during treatment due to the risk of hepatotoxicity.	
Adverse reactions	Hypersensitivity reaction (in particular if patient is penicillin allergic), Infusion site phlebitis, pyrexia, hypokalaemia, hypoglycaemia, hypotension, headache, diarrhoea, nausea and vomiting.	
Additional Information	Decreases in blood levels of **valproic acid** have been reported when it is co-administered with carbapenem agents resulting in a 60-100 % decrease in valproic acid levels in about two days. In exceptional circumstances, where treatment options are extremely limited for a patient, following discussion with Microbiology/Infectious Diseases consultant, a carbapenem may be considered the only/best available treatment option In this case, the consultant with primary responsibility for the patient may decide to proceed with carbapenem treatment for a patient on sodium valproate treatment based on a risk/benefit analysis and following consultation with a consultant neurologist Consultant neurologist advice should be sought regarding the potential requirement for adjunct anticonvulsant therapy if the indication for valproate use is seizure control, and advice on clinical monitoring and therapeutic drug monitoring of anticonvulsant drug serum concentrations	

Dose of Meropenem/Vaboractam	Volume of reconstituted injection
2g/2g	42.6 mL (two vials)
1g/1g	21.3 mL(one vial)
0.5g/0.5g	10.5 ml (half vial)

Information provided relates to Vaborem® (Menarini)

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

Metaraminol

SALAD
Metaraminol and Metoclopramide

CAUTION: High Administration Risk Rating

Form	• 10mg/mL ampoule • 2.5mg in 5mL Pre Filled Syringe (0.5mg/ml)
Reconstitution	Already in solution Using ampoule • Draw up using a 5micron filter needle • Use gloves when opening ampoules
Compatibility & Stability	Glucose 5% Sodium Chloride 0.9%
Administration	**IV Injection** Use PreFilled Syringe PFS (2.5mg in 5mL = 0.5mg/mL) where available In an emergency, give 500microgram - 1000microgram (1-2ml) bolus slowly over 2-5 minutes as required according to response, followed by an infusion. If PFS not available prepare a 0.5mg/mL solution

Volume of metaraminol	Volume of compatible Fluid	Final Conc
1mL	19mL	0.5mg/mL (500 microgram/mL)

IV Infusion

Prepare 0.5mg/mL solution as per table below

Volume of metaraminol	Volume of compatible Fluid	Final Conc
2mL	38mL	0.5mg/mL (500 microgram/mL)

Preferably give via a **central venous access device** using an infusion pump at a rate up to 10mg/hour (20mL/hour of 0.5mg/mL).
If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site. Resite cannula at first signs of inflammation.

After discontinuation, flush the peripheral cannula with sodium chloride 0.9% at the same rate the medicine was infused to avoid an unintentional 'bolus' dose. Discard the IV administration set before flushing the cannula.
Peripheral cannula: Flush if it is to remain in situ.
Central venous access device: Aspirate the cannula contents before flushing.

Monitoring	• Monitor blood pressure, heart rate, ECG, central venous pressure, drowsiness, urine output, potassium levels, lactate levels.
Extravasation	• Extravasation is likely to cause tissue damage because metaraminol is a potent vasoconstrictor and has a low pH.
Additional Information	• Maximum effects are not immediately apparent: at least 10 minutes should elapse between dose increases

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

	• Metaraminol has a longer duration of action than noradrenaline, and an excessive vasopressor response may cause a prolonged rise in blood pressure.

Information relates to Metaraminol (Flexipharm Austrading)

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

SALAD Metaraminol and 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

SALAD Caution with other BBraun products; **Ibuprofen** 400mg/100mL bottle, **Fluconazole** 200mg/100mL bottle		
Form & Storage	500mg/100mL infusion bottle	Store at room temperature in outer box for light protection.
Reconstitution	Already in solution	
Compatibility & Stability	N/A	
Administration	**IV Infusion**	
	Administer over at least 20 minutes. 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 (B Braun)

Midazolam

Potential SALAD
Ensure selection of the correct **strength** of midazolam ampoule

CAUTION: High Administration Risk Rating

Form	10mg per 5mL ampoule (2 mg/mL) 10mg per 2mL ampoule (5 mg/mL)	Store at room temperature in outer box for light protection.
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 - ITU & ED only Administer using a syringe driver to control the rate of infusion. Titrate dose to desired effect. To prepare a **2mg/mL** solution containing 120mg/60mL	
	SC Injection Give required dose by SC injection	
	Continuous SC Infusion (Unlicensed) Use 10mg per 2mL (5mg/mL) ampoule and dilute with WFI or 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.	

Form	Strength	Preparation
10mg/5mL	2mg/mL	Use TWELVE neat ampoules

Information provided relates to Hypnovel® (Cheplapharm)

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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	• 1mg per 1mL ampoule (Preservative Free) • 10mg per 1mL ampoule • 30mg per 1mL ampoule • 60mg per 1mL ampoule • CADD Cassette 200mg in 100mL Sodium Chloride 0.9%	**Controlled Drug (CD): Must be stored in CD Press**
Reconstitution	Already in Solution • Draw up from ampoules 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 – ITU & ED only	
	Administer using a syringe driver to control the rate of infusion. Titrate dose to desired effect. **Single strength – 1mg/mL** Dilute 60mg (one ampoule 60mg/mL) to 60mL with compatible fluid to form a 1mg/mL solution. **Double strength – 2mg/mL** Dilute 120mg (two ampoules 60mg/mL) to 60mL with compatible fluid to form a 2mg/mL solution.	
	IM Injection	
	No dilution required	
	SC Injection	
	No dilution required.	
	Continuous SC Infusion	
	Dilute required dose with WFI or 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	• CADD Cassettes containing 200mg in 100 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.	

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

	• 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 (Mercury Pharmaceuticals) Morphine CADD (Georgelle)

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 IV

Reduce direct handling to a minimum and wear appropriate protective clothing **Check which form before administering – SC or IV**		
CAUTION: High Administration Risk Rating		
Form & Storage	Concentrate for solution for infusion 300mg per 15mL vial	Refrigerate unopened vials at 2°C - 8°C and protect from light.
Reconstitution	Already in Solution **Dilute further before 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.	
Compatibility & Stability	Sodium Chloride 0.9%	
Administration	**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 (Biogen)

Natalizumab (Tysabri®) SC

Reduce direct handling to a minimum and wear appropriate personal protective equipment Check which form before administering – SC or IV		
CAUTION: High Administration Risk Rating		
Form & Storage	150 mg solution for injection in pre-filled syringe for sub-cut administration	Refrigerate at 2°C - 8°C and protect from light.
Reconstitution	Already in Solution	
Compatibility & Stability	N/A	
Administration	**SC injection** • The recommended dose for subcutaneous administration is 300 mg every 4 weeks. As each pre-filled syringe contains 150 mg natalizumab two pre-filled syringes need to be administered to the patient. • The sites for subcutaneous injection are the thigh, abdomen, or the posterior aspect of the upper arm. The injection should not be made into an area of the body where the skin is irritated, reddened, bruised, infected, or scarred in any way. • When removing the syringe from the injection site, the plunger should be let go of while pulling the needle straight out. Letting go of the plunger will allow the needle guard to cover the needle. • The second injection should be more than 3 cm away from the first injection location	
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.	
Monitoring	• If the patient meets the criteria in section **7.7*,** medical review may be is required prior to administration • Natalizumab naïve patients should be observed during the injection and for 1 hour after for signs and symptoms of injection reactions including hypersensitivity for the first 6 natalizumab doses. • For patients currently receiving natalizumab and who have already received at least 6 doses, regardless of the route of natalizumab administration used for the first 6 doses, the 1-hour post-injection observation time for subsequent subcutaneous injections may be reduced or removed according to clinical judgement if the patients have not experienced any injection/infusion reactions. • Pre and post infusion vital signs • JCV testing is required every 6 months • Urinalysis is required only if patient is symptomatic • Neurological assessment by Neurology CNS if patient is symptomatic • Annual MRI	
Disposal	Any unused medicinal product or waste material should be disposed of in a purple 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. • Patient Alert Card contains important safety information that you need to be aware of before, during and after stopping treatment with Tysabri (natalizumab). • Any switch in route of administration of the medicinal product should be made 4 weeks after the previous dose.

Information provided relates to Tysabri® (Biogen)

Nimodipine

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

CAUTION: High Administration Risk Rating

Form	10mg/50mL Infusion bottle
Reconstitution	Already in solution
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% • **Incompatible with PVC** Use polyethylene or polypropylene syringes Do not store above 25°C. Keep the vial in the outer carton to protect from light.
Administration	**IV Continuous Infusion** • Administer as a continuous IV infusion via a central catheter using an infusion pump. • Only use the infusion line provided by the manufacturer. • Nimodipine solution must be drawn up into a 50mL syringe - use neat - **do not dilute further** • Connect to a three-way stopcock using the infusion line provided. • The three-way stopcock should be used to connect the Nimodipine polyethylene tube with the co-infusion line and the central catheter. • Co-infusion is connected to the second port of the three-way stopcock prior to its connection with the central line catheter. • The stopcock must allow for concomitant flow of the Nimodipine solution and a co-infusion of sodium chloride 0.9% or glucose 5%.
Extravasation	Extravasation is likely to cause tissue damage due to the presence of alcohol as an excipient and high osmolarity. Give via a central venous catheter.
Monitoring	Monitor BP and heart rate. Monitor renal function (including fluid balance) in patients with renal disease and/or receiving nephrotoxic drugs. A transient rise in liver enzymes may occur during intravenous administration; this usually reverts to normal on completion of treatment.
Additional Information	• IV infusions should not be used concurrently with Nimodipine oral tablets. • Use only the infusion container and the infusion line provided by the manufacturer. • Each 50 ml vial also contains 10 g of ethanol (0.2 g/ml) • Prepare a fresh infusion if required once 10 hours has elapsed.

Rates to run co-infusion fluid at

Nimodipine Rate	Rate of administration of co-infusion fluid
1mg/hour (5mL/hour)	20mL/hour
2mg/hour (10mL/hour)	40mL/hour

i.e. **For every 5mL per hour of nimodipine infused, 20mL per hour of a compatible fluid must be infused simultaneously** to prevent formation of crystals.

Protect nimodipine solution from direct sunlight during infusion; it is stable in diffuse sunlight or artificial light for up to 10 hours.

Information provided relates to Nimotop (Bayer)

Noradrenaline

CAUTION: High Administration Risk Rating

Form	Ampoules containing 1mg/mL (1:1000) Noradrenaline as Noradrenaline tartrate.
Reconstitution	Already in solution. Further dilution is required before administration. • Draw up using a 5 micron filter needle • Use gloves when opening ampoules **Dilute further before IV administration.** Discoloured solutions or solutions containing precipitate should not be used.
Compatibility & Stability	Glucose 5%
Administration	**Central IV Infusion (critical care only)** Use a syringe driver to control the rate of infusion. Noradrenaline is usually prescribed as a "microgram/minute" dose for adults. The usual range is 0-30 microgram/minute titrated to desired effect. Doses outside this range (up to 80 microgram/min) may be required in some patients.

Single Strength Noradrenaline – 60 microgram/mL

Add 3mg Noradrenaline (3mL) to 47ml Glucose 5% to give 50mL of a solution containing 60microgram/ml Noradrenaline.

Infusion rate of 1mL/hr = 60microgram/hr = 1microgram/min
1mL/hr = 1microgram/min
2mL/hr = 2microgram/min
3mL/hr = 3microgram/min

Double Strength Noradrenaline – 120 microgram/mL

Add 6mg Noradrenaline (6mL) to 44mL Glucose 5% to give 50mL of a solution containing 120microgram/mL Noradrenaline.

Infusion rate of 1mL/hr = 120microgram/hr = 2microgram/min
1mL/hr = 2microgram/min
2mL/hr = 4microgram/min
3mL/hr = 6microgram/min

Quadruple Strength Noradrenaline (ITU only) – 240 microgram/mL

Add 12mg Noradrenaline (12mL) to 38ml Glucose 5% to give 50mL of a solution containing 240microgram/mL Noradrenaline.

Infusion rate of 1mL/hr = 240microgram/hr = 4microgram/min
1mL/hr = 4microgram/min
2mL/hr = 8microgram/min
3mL/hr = 12microgram/min

<table>
<tr><td></td><td>Peripheral IV infusion (where no Central access)
Use 1:1,000 (1mg/mL ampoule)
Add 4mg (4mL) to 246mL Glucose 5% (conc. 16 microgram/mL)
Administer via infusion pump
Starting dose 0.05microgram/kg/min
UP Titrate to desired effect - Maximum rate 0.13 microgram/kg/min (8 microgram/kg/h)

<table>
<tr><td colspan="4">Rate (mL/hour) for microgram/kg/min doses using 4mg/250mL infusion*</td></tr>
<tr><td>Dosage (microgram/kg/min)</td><td>50kg</td><td>80kg</td><td>100kg</td></tr>
<tr><td>0.05 microgram/kg/min</td><td>9</td><td>15</td><td>19</td></tr>
<tr><td>0.1 microgram/kg/min</td><td>19</td><td>30</td><td>38</td></tr>
<tr><td>Max 0.13 microgram/kg/min</td><td>25</td><td>40</td><td>50</td></tr>
</table>
*Doses rounded for convenience</td></tr>
<tr><td>Monitoring</td><td>Continuous blood pressure and ECG monitoring required. When administered via an infusion, use invasive blood pressure monitoring and monitor blood glucose.</td></tr>
<tr><td>Extravasation</td><td>If a central venous access device is not available, use a large peripheral vein and a concentration of noradrenaline suitable for peripheral venous access.
Monitor the insertion site closely (as may cause venous irritation) using a recognised phlebitis scoring tool.
Re-site cannula at first signs of inflammation.
Risk with extravasation resulting in tissue damage/necrosis if given peripherally as noradrenaline is a vasoconstrictor and has a low pH.
If extravasation occurs, use warm compress + Phentolamine or consider application of 2.5cm Nitroglycerin 0.2% paste to area of extravasation</td></tr>
<tr><td>Notes</td><td>• Infuse through a central venous catheter using a syringe driver to control the rate of infusion.
• Do not use if brown colour or precipitate is visible in solution.
• IAEM-Clinical-Guideline-Peripheral-Vasopressors-V1.0.pdf
• Extravasation injury from cytotoxic and other noncytotoxic vesicants in adults - UpToDate</td></tr>
</table>

Information provided relates to Noradrenaline (Hospira)

Obinutuzimab (Gazyvaro®)

Reduce direct handling to a minimum and wear appropriate protective clothing.

CAUTION: High Administration Risk Rating

Form & Storage	Prepared in Pharmacy Aseptic Unit for inpatients	Store in a fridge at 2 - 8°C
Reconstitution	Already in solution	
Compatibility & Stability	Follow storage instructions provided by pharmacy	
Premedication	Administer premedication as charted Allow 60 minutes after discontinuing steroids before starting infusion **Methylprednisolone 100mg/100mL Sodium chloride 0.9% IV over 30 minutes** completed at least 1 hour prior to infusion **Chlorphenamine 10mg IV** at least 30 minutes prior to infusion **Paracetamol 1G PO** at least 30 minutes prior to infusion	
Administration	**IV Infusion** The dose and schedule of Obinutuzimab is individualized for each patient and defined by the consultant's clinical judgment and patient's underlying condition **IV infusion** (all indications): • Start the infusion at a rate of 50mg/hour for 30 minutes. • Rate may be increased by increments of 50mg/hour every 30 minutes, if tolerated, to a maximum of 400mg/hour See rate sheets below	
Monitoring	• Apply BP cuff to opposite arm and oxygen saturation probe and set for half hourly intervals to coincide with rate increase (see flow sheet) • Most frequently reported (≥ 5%) symptoms associated with an infusion-related reactions (IRR) were nausea, vomiting, diarrhoea, headache, dizziness, fatigue, chills, pyrexia, hypotension, flushing, hypertension, tachycardia, dyspnoea, and chest discomfort. Respiratory symptoms such as bronchospasm, larynx and throat irritation, wheezing, laryngeal oedema and cardiac symptoms such as atrial fibrillation have also been reported • Mild or moderate IRR usually respond to a reduction in the rate of infusion. The infusion rate may be increased upon improvement of symptoms. • Patients who develop evidence of severe reactions, especially severe dyspnoea, bronchospasm or hypoxia should have the infusion interrupted immediately. • Monitor IV site for infiltration • Patients should be closely monitored for thrombocytopenia, especially during the first cycle	
Adverse Effects	**Worsening of pre-existing cardiac conditions**	

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

	Cases of arrhythmias (such as atrial fibrillation and tachyarrhythmia), angina pectoris, acute coronary syndrome, myocardial infarction and heart failure have occurred when treated with obinutuzimab. These events may occur as part of an IRR and can be fatal. These patients should be hydrated with caution in order to prevent a potential fluid overload. **Laboratory abnormalities** Transient elevation in liver enzymes (aspartate aminotransferase [AST], alanine aminotransferase [ALT], alkaline phosphatase) has been observed shortly after the first infusion of obinutuzimab. **Severe and life-threatening thrombocytopenia** including acute thrombocytopenia (occurring within 24 hours after the infusion) has been observed during treatment with. Patients with renal impairment (CrCl < 50 mL/min) are more at risk of thrombocytopenia. Fatal haemorrhagic events have also been reported in Cycle 1 in patients treated with obinutuzumab.
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.
Additional Information	• Hypotension may occur during obinutuzimab intravenous infusions. Therefore, withholding of antihypertensive treatments should be considered for 12 hours prior to and throughout each obinutuzimab infusion and for the first hour after administration. Patients at acute risk of hypertensive crisis should be evaluated for the benefits and risks of withholding their anti-hypertensive medicine. • Use of any concomitant therapies which could possibly worsen thrombocytopenia-related events, such as platelet inhibitors and anticoagulants, should also be taken into consideration, especially during the first cycle. • Obinutuzimab should not be administered in the presence of an active infection and caution should be exercised when considering the use of obinutuzimab in patients with a history of recurring or chronic infections

Information provided relates to Gazyvaro® (Roche)

Obinutuzimab (Gazyvaro®) – Infusion Unit ONLY

Reduce direct handling to a minimum and wear appropriate protective clothing.

CAUTION: High Administration Risk Rating

Form & Storage	Obinutuzumab (Gazyvaro®) 1000 mg concentrate for solution for infusion — Store in a fridge at 2 - 8°C
Reconstitution	Already in solution **Must be diluted further** Parenteral medicinal products should be inspected visually for particulates and discolouration prior to administration**.** Solution should be clear, colourless to slightly brownish liquid. **Do not shake vial.**
Compatibility & Stability	Sodium chloride 0.9%
Dose	See table below
Premedication	Administer premedication as charted Allow 60 minutes after discontinuing steroids before starting infusion **Methylprednisolone 100mg/100mL Sodium chloride 0.9% IV over 30 minutes** completed at least 1 hour prior to infusion **Chlorphenamine 10mg IV** at least 30 minutes prior to infusion **Paracetamol 1G PO** at least 30 minutes prior to infusion
Administration	**1000mg dose: Do not shake vial.** • Add 40 mL Gazyvaro® (Obinutuzumab)to 250mls Sodium chloride 0.9% **using the chemo-clave system.** • The bag should be gently inverted to mix the solution in order to avoid excessive foaming. The diluted solution should not be shaken. The dose and schedule of Obinutuzimab is individualized for each patient and defined by the consultant's clinical judgment and patient's underlying condition **IV infusion** (all indications): ➢ Start the infusion at a rate of 50mg/hour for 30 minutes. ➢ Rate may be increased by increments of 50mg/hour every 30 minutes, if tolerated, to a maximum of 400mg/hour See rate sheets below
Monitoring	• Apply BP cuff to opposite arm and oxygen saturation probe and set for half hourly intervals to coincide with rate increase (see flow sheet)

Dose	**No of vials**	**Volume obinutuzumab**	**Sodium chloride 0.9% Volume**
1000 mg	1	40 mL	250 mL

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

	• Most frequently reported (≥ 5%) symptoms associated with an infusion-related reactions (IRR) were nausea, vomiting, diarrhoea, headache, dizziness, fatigue, chills, pyrexia, hypotension, flushing, hypertension, tachycardia, dyspnoea, and chest discomfort. Respiratory symptoms such as bronchospasm, larynx and throat irritation, wheezing, laryngeal oedema and cardiac symptoms such as atrial fibrillation have also been reported • Mild or moderate IRR usually respond to a reduction in the rate of infusion. The infusion rate may be increased upon improvement of symptoms. • Patients who develop evidence of severe reactions, especially severe dyspnoea, bronchospasm or hypoxia should have the infusion interrupted immediately. • Monitor IV site for infiltration • Patients should be closely monitored for thrombocytopenia, especially during the first cycle
Adverse Effects	*Worsening of pre-existing cardiac conditions* Cases of arrhythmias (such as atrial fibrillation and tachyarrhythmia), angina pectoris, acute coronary syndrome, myocardial infarction and heart failure have occurred when treated with obinutuzimab. These events may occur as part of an IRR and can be fatal. These patients should be hydrated with caution in order to prevent a potential fluid overload. *Laboratory abnormalities* Transient elevation in liver enzymes (aspartate aminotransferase [AST], alanine aminotransferase [ALT], alkaline phosphatase) has been observed shortly after the first infusion of obinutuzimab. *Severe and life-threatening thrombocytopenia* including acute thrombocytopenia (occurring within 24 hours after the infusion) has been observed during treatment with. Patients with renal impairment (CrCl < 50 mL/min) are more at risk of thrombocytopenia. Fatal haemorrhagic events have also been reported in Cycle 1 in patients treated with obinutuzumab.
Documentation Requirements	Document trade name and batch numbers of obinutuzimab in medical notes.
Disposal	Dispose of infusion bag and administration set in purple-lidded bin.
Additional Information	• Hypotension may occur during obinutuzimab intravenous infusions. Therefore, withholding of antihypertensive treatments should be considered for 12 hours prior to and throughout each obinutuzimab infusion and for the first hour after administration. Patients at acute risk of hypertensive crisis should be evaluated for the benefits and risks of withholding their **anti-hypertensive medicine**. • Use of any concomitant therapies which could possibly worsen thrombocytopenia-related events, such as **platelet**

	inhibitors and anticoagulants, should also be taken into consideration, especially during the first cycle. • Obinutuzimab should not be administered in the presence of an active infection and caution should be exercised when considering the use of obinutuzimab in patients with a history of recurring or chronic infections

Information provided relates to Gazyvaro® manufactured by Roche.

Cycle 1, day1, day 15 **Date** _____

Obinutuzumab 1000mg (40ml) /250ml NaCl 0.9%

Infusion time- 4 hours, 15 minutes - 290ml infusion solution

Addressograph

Time	mgs/hr	Rate	Volume infused over 30mins	Temp	B/P	R/R	Pulse	O_2 sats	PVAD check	Initial
1st 30 min	50mg/hr	14.5mls/hr	7.25mls							
2nd 30 min	100mg/hr	29mls/hr	14.5mls							
3rd 30 min	150mg/hr	43.5mls/hr	21.75mls							
4th 30 min	200mg/hr	58mls/hr	29mls							
5th 30 min	250mg/hr	72.5mls/hr	36.25mls							
6th 30 min	300mg/hr	87mls/hr	43.5mls							
7th 30 min	350mg/hr	101.5mls/hr	50.75ml							
8th 30 min	400mg/hr	116mls/hr	58ml							
	400mg/hr	116mls/hr	29ml balance given over 15 min							

Ocrelizumab (Ocrevus®) IV

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
Caution: High Administration Risk Rating		
Form & Storage	Concentrate for solution for infusion	Store in refrigerator 2°C-8°C. Keep in outer carton to protect from light
Reconstitution	Already in solution- 300mg/10mL **MUST be further diluted before administration** Inspect visually prior to dilution Clear to slightly opalescent, and colourless to pale brown solution	
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**	
Premedication	**30 mins before each infusion** Methylprednisolone 100mg/100mL sodium chloride 0.9% Chlorphenamine 10mg IV/other antihistamine Paracetamol 1g po	
Administration	**IV Infusion**	
	To prepare a 300mg infusion • Add the contents of one vial (10mL) to 250mL sodium chloride 0.9%. **To prepare a 600mg infusion** • Add the contents of two vials (20mL) to 500mL sodium chloride 0.9%. The infusion concentration is approximately 1.2mg in 1mL. Ensure the infusion is at room temperature before administering. Give via a 0.2 or 0.22micron **in-line filter.** This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores See below for rates of administration. **Initial Dose: 600mg** dose is administered as two separate intravenous infusions; first as a 300mg infusion, followed 2 weeks later by a second 300 mg infusion • Initiate the infusion at a rate of 30 mL/hour for 30 minutes • The rate can be increased in 30 mL/hour increments every 30 minutes to a maximum of 180 mL/hour. • Each infusion should be given over approximately 2.5 hours **Subsequent doses** of Ocrevus® thereafter are administered as a single 600 mg intravenous infusion every 6 months. The first subsequent dose of 600 mg should be administered six months after the first infusion of the initial dose. • Initiate the infusion at a rate of 40 mL/hour for 30 minutes • The rate can be increased in 40 mL/hour increments every 30 minutes to a maximum of 200 mL/hour • Each infusion should be given over approximately 3.5 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

	Faster rate If patients did not experience a serious infusion-related reaction (IRR) with any previous Ocrevus®infusion, a shorter (2-hour) infusion can be administered for subsequent doses A minimum interval of 5 months should be maintained between each dose of Ocrevus® • Initiate the infusion at a rate of 100 mL/hour for the first 15 minutes • Increase the infusion rate to 200 mL/hour for the next 15 minutes • Increase the infusion rate to 250 mL/hour for the next 30 minutes • Increase the infusion rate to 300 mL/hour for the remaining 60 minute • Each infusion should be given over approximately 2 hour
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes
Monitoring	• Baseline vital signs and every 30 minutes during infusion and during post infusion observation (1 hour) • Observe cannula site regularly • Be vigilant for infusion Related Reactions (IRR) • Blood forms given on discharge for next infusion (6 Months) FBC, Renal/Liver/Bone profile, Immunoglobulins (IgG)
Adverse Drug Reactions	Infusion Related Reactions **Mild to Moderate** - the infusion rate should be reduced to half the rate at the onset of the event. This reduced rate should be maintained for at least 30 minutes. If tolerated, the infusion rate may then be increased according to the patient's initial infusion rate. **Severe** - stop infusion, get medical assistance, treat symptomatically. Have anaphylaxis kit available. May restart again only when symptoms have resolved and under medical advisement.
Disposal	Purple lidded bin for waste from this infusion
Additional Information	Rates sheets attached Patient not to self-drive home after administration of Chlorphenamine (sedating antihistamine) See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Ocrevus® Manufactured by Roche

Date:_____ Ocrevus® No 1 (300mg): Infusion time 3 hours
Total Volume 260 mls Conc. 1.15mg/ml

TIME	RATE	VOLUME ml(30mins)	Temp	B/P	R/R	Pulse	O2 sats	PVAD checked	Initials
	30mls/hr	15mls							
	60mls/hr	30mls							
	90mls/hr	45mls							
	120mls/hr	60mls							
	150mls/hr	75mls							
	180mls/hr	90mls							

Date:_____Ocrevus® No 2 (300mg): Infusion time 3 hours
Total Volume 260 mls

TIME	RATE	VOLUME (30mins)	Temp	B/P	R/R	Pulse	O2 sats	PVAD checked	Initials
	30mls/hr	15mls							
	60mls/hr	30mls							
	90mls/hr	45mls							
	120mls/hr	60mls							
	150mls/hr	75mls							
	180mls/hr	90mls							

Date:_____ Ocrevus® (600mg): Infusion time 4 hours
Total volume 520mls Conc. 1.15mg/ml

TIME	RATE	VOLUME (30mins)	Temp	B/P	R/R	Pulse	O2 sats	PVAD checked	Initials
	40mls/hr	20mls							
	80mls/hr	40mls							
	120mls/hr	60mls							
	160mls/hr	80mls							
	200mls/hr	100mls							

Balance 220ml at max rate

OR

Faster rate

Date:_____ Ocrevus® (600mg): Infusion time 2.15 hrs
Total volume 520mls Conc. 1.15mg/ml

TIME	RATE	VOLUME	Temp	B/P	R/R	Pulse	O2 sats	PVAD checked	Initials
	100mls/hr	25mls (15mins)							
	200mls/hr	50mls (15mins)							
	250mls/hr	125mls (30mins)							
	300mls/hr	300mls							

Ocrelizumab (Ocrevus®) SC

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
Caution: High Administration Risk Rating		
Form & Storage	Solution for SC injection	Store in refrigerator 2°C-8°C. Keep in outer carton to protect from light
Reconstitution	Already in solution- 920mg/23mL (40mg/mL) Inspect visually prior to dilution Clear to slightly opalescent, and colourless to pale brown solution Remove vial from the refrigerator and allow it to come to room temperature. Do not shake.	
Compatibility & Stability	N/A	
Premedication	**30 mins before each infusion** Dexamethasone 20mg PO Loratadine 10mg PO Paracetamol 1g PO	
Administration	**SC Injection** • The 920mg dose should be administered as a subcutaneous infusion in the abdomen over 15 minutes (local practice). • Use of a subcutaneous infusion set (e.g., winged/butterfly) is recommended. • Any residual hold-up volume remaining in the subcutaneous infusion set should not be administered to the patient. • The injection site should be the abdomen, avoid 5 cm around the navel. Injections should never be given into areas where the skin is red, bruised, broken, tender or hard, or areas where there are moles or scars. • For the initial dose, post-injection monitoring with access to appropriate medical support to manage severe reactions such as IRRs, for at least one hour after injection is recommended. For subsequent doses, the need for post-injection monitoring is at the treating physician's discretion	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes	
Monitoring	• Baseline vital signs pre and post infusion and during post infusion observation (1 hour) • Be vigilant for infusion Related Reactions (IRR) • Blood forms given on discharge for next infusion (6 Months) FBC, Renal/Liver/Bone profile, Immunoglobulins (IgG)	
Adverse Drug Reactions	Infusion Related Reactions **Life-threatening** – If there are signs of a life-threatening IR, the injection should be stopped immediately, and the patient should receive appropriate treatment. Treatment must be permanently discontinued in these patients **Severe** - If a patient experiences a severe IR, the injection should be stopped immediately, and the patient should receive	

	symptomatic treatment. The injection should be restarted only after all symptoms have resolved
Disposal	Purple lidded bin for waste from this infusion
Additional Information	• A minimum interval of 5 months should be maintained between each dose of ocrelizumab. • Patients may start treatment using intravenous or subcutaneous ocrelizumab and patients currently receiving intravenous ocrelizumab may continue treatment with intravenous ocrelizumab or transition to Ocrevus 920 mg solution for injection. • Administration of ocrelizumab must be delayed in patients with an active infection until the infection is resolved. • It is recommended to verify the patient's immune status before dosing since severely immunocompromised patients (e.g., with lymphopenia, neutropenia, hypogammaglobulinemia) should not be treated. • Patients bloods should be taken 1-2 weeks prior to infusion See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Ocrevus® (Roche)

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.

Omalizumab (Xolair®)

Reduce direct handling to a minimum and wear appropriate personal protective equipment		
Xolair® dosing may be weight based; ensure accuracy of documented weight before administration		
Form & Storage	Pre-filled syringe containing 75mg/mL and 150mg/mL solution for Injection	Store in a fridge at 2°C - 8°C
Reconstitution	Already in solution	
Administration	**For subcutaneous administration only** • The syringe should be taken out of the refrigerator 20 minutes before injecting to allow it to reach room temperature. • Doses of more than 150 mg should be divided across two or more injection sites. • The injections are administered subcutaneously in the deltoid region of the arm. Alternatively, the injections can be administered in the thigh if there is any reason precluding administration in the deltoid region.	
Monitoring	• Pre and post injection vital signs • Local or systemic allergic reactions, including anaphylaxis and anaphylactic shock, may occur when taking omalizumab, also with onset after a long duration of treatment. Most of these reactions occurred within 2 hours after the first and subsequent injections of Xolair but some started beyond 2 hours and even beyond 24 hours after the injection. • For the first three injections, the patient is monitored in the infusion unit for two hours • For subsequent injections, the monitoring period should be 20 minutes Blood tests including FBC, U/E and LFTs monthly before first 3 doses by GP/phlebotomy, thereafter every three months by GP/Phlebotomy • Once the patient is established on this treatment (more than three doses), subsequent injections may be given in the asthma out patient's clinic • If the patient presents to the unit and meets the criteria in **7.7***, medical review may be required prior to administration of this medication	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Additional Information	*See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information	

Information provided relates to Xolair® (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 concentrate for infusion (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	**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 given over at least 30 minutes. Facilities for treating anaphylaxis should be available.

Information provided relates to Pabrinex® (Archimedes Pharmaceuticals) and Vitamins B & C (Noridem).

Pantoprazole

Form	40mg dry powder vial	Store vials in original package at room temperature
Reconstitution	Add 10mL sodium chloride 0.9% to vial.	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5% The appearance of the product after reconstitution is a clear yellowish solution. Discard any product which appears cloudy or where precipitate has formed	
Administration	**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.	
Extravasation	Pantoprazole 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.	

Information provided relates to Protium® (Takeda UK), Pantoprazole (Noridem)

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	**IV Infusion** 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.

Paricalcitol

For use in Hemodialysis patients only	
Form	Zemplar 5 micrograms/ml solution for injection
Reconstitution	Already in solution Draw up using a 5 micron filter needle
Compatibility & Stability	N/A
Administration	**IV bolus** Zemplar solution for injection is administered via haemodialysis access
Monitoring	**Important**: all patients receiving pharmacological doses of vitamin D should have their plasma-calcium concentration checked at intervals as clinically indicated and whenever nausea or vomiting occur.
Adverse Drug Reactions	Dizziness may occur following administration of paricalcitol, which may have a minor influence on the ability to drive and use machines. The most common adverse reaction associated with paricalcitol therapy was hypercalcaemia, occurring in 4.7% of patients. Hypercalcaemia is dependent on the level of PTH oversuppression and can be minimised by proper dose titration.
Additional Information	Zemplar solution for injection contains 30% v/v of **propylene glycol** as an excipient. Isolated cases of Central Nervous System depression, haemolysis and lactic acidosis have been reported as toxic effect associated with propylene glycol administration at high doses. Although they are not expected to be found with Zemplar administration as propylene glycol is eliminated during the dialysis process, the risk of toxic effect in overdosing situations has to be taken into account. Propylene glycol interacts with **heparin** and neutralises its effect. Zemplar solution for injection contains propylene glycol as an excipient and should be administered through a different injection port than heparin. First dispensing on yellow Rx, subsequently sent from weekly stock order list sent by Dialysis Unit to Pharmacy

Information provided relates to Zemplar (AbbVie)

Patisiran (Onpattro®)

Reduce direct handling to a minimum and wear appropriate personal protective equipment.		
Patisiran dosing is weight based; ensure accuracy of documented weight before administration		
Caution High Administration Risk rating		
Form & Storage	2mg/mL concentrate for solution for infusion Each 5mL vial contains patisiran sodium equivalent to 10 mg patisiran formulated as lipid nanoparticles.	Store in a refrigerator (2°C – 8°C). Do not freeze. Keep the vial in the outer carton in order to protect from light
Reconstitution	Already in solution **MUST be further diluted before administration** **Do NOT shake**	
Compatibility & Stability	Sodium chloride 0.9% Inspect visually for particulate matter and discolouration. Do not use if discolouration or foreign particles are present. Onpattro is a white to off-white, opalescent, homogeneous solution.	
Premedication	Each of the following medicinal products should be given on the day of Onpattro infusion at least 60 minutes prior to the start of infusion: • Dexamethasone 10 mg IV stat (Consider switch to 10mg PO from 3rd infusion if previous infusions tolerated) • Chlorphenamine 10mg IV stat (Consider switch to 4mg PO from 3rd infusion if previous infusions tolerated) • Paracetamol 500mg -1g PO stat • Famotidine 20mg PO stat	
Administration	**IV Infusion** • Calculate the required volume of Onpattro based on the recommended weight-based dosage • Withdraw the entire contents of one or more vials into a single sterile syringe. • Filter Onpattro through a sterile **0.45 micron** polyethersulfone (PES) syringe filter into a sterile syringe. • Withdraw the required volume of filtered Onpattro from the sterile container using a sterile syringe. • Remove **50mL + calculated volume** of Onpattro from a 250mL bag sodium chloride 0.9%. Dilute the required volume of filtered Onpattro into this infusion bag containing sodium chloride 0.9% for a **total volume of 200 mL**. • Use infusion bags that are free of di(2-ethylhexyl)phthalate (DEHP). • Gently invert the bag to mix the solution. • Do not shake. Do not mix or dilute with other medicinal products. • A dedicated line with an infusion set containing a 1.2 micron polyethersulfone (PES) in-line infusion filter must	

	be used. The infusion sets and lines must be free of di(2-ethylhexyl)phthalate (DEHP) • The diluted solution of Onpattro should be infused intravenously over approximately 80 minutes ○ ***Initial infusion rate*** of approximately **1 mL/min** for the first 15 minutes ○ ***Followed by*** an increase to approximately **3 mL/min** for the remainder of the infusion. The duration of the infusion may be extended in the event of an IRR
Monitoring	• Pre and post vital signs
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	Commonly reported adverse effects with patisiran include upper respiratory-tract infections, dyspepsia, muscle spasm, bronchitis, vertigo, and peripheral oedema
Additional Information	• **Vitamin A supplementation** at approximately 2 500 IU vitamin A per day is advised for patients treated with Onpattro to reduce the potential risk of ocular toxicity due to vitamin A deficiency. Referral for ophthalmological assessment is recommended if patients develop ocular symptoms suggestive of vitamin A deficiency, including reduced night vision or night blindness, persistent dry eyes, eye inflammation, corneal inflammation or ulceration, corneal thickening or corneal perforation • Particular care should be taken by women of child-bearing potential and during early stages of **pregnancy** as levels of serum vitamin A too low or too high may increase the risk of fetal malformations. • Onpattro is indicated for the treatment of hereditary transthyretin-mediated amyloidosis (hATTR amyloidosis) in adult patients with stage 1 or stage 2 polyneuropathy. • See **PPG-CUH-CUH-243** Policy Procedure and Guidelines for Management of Patients Attending CUH Infusion Unit for Intravenous Therapy CUH for more information

Information provided relates to Onpattro® (Alnylam)

Phenobarbital (Phenobarbitone)

Form	30mg/mL 1mL amp 60mg/mL 1mL amp	Store at room temperature in outer box for light protection.
	200mg/mL 1mL amp (CD3)	**Controlled Drug (CD):** **Must be stored in CD Press**
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 injection 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.	
	Continuous SC Infusion/Short SC Infusion	
	Dilute with WFI or Sodium chloride 0.9% Give via a separate dedicated SC line – do not mix with other medicines	
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. This product is unlicensed	

Information provided relates to Phenobarbitone (Martindale)

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Phentolamine

Form	Phentolamine 5mg/mL solution for injection	Store in fridge at 2–8°C
Reconstitution	Already in solution (Dilute further for treatment of extravasation)	
Compatibility & Stability	Sodium chloride 0.9%	
Administration	**IV bolus**	
	Give required dose by IV bolus	
	SC – treatment of vasopressor* extravasation	
	Dilute 5mg(1mL) to 10mL with sodium chloride 0.9% Administer as multiple sub cut injections around site of extravasation Ideally injection is administered as soon as possible, but may be used up to 12 hours following injury	
Adverse Drug Reactions	Tachycardia and cardiac arrhythmias may occur with the use of phentolamine. When possible, defer administration of cardiac glycosides until cardiac rhythm returns to normal. Use with caution in patients with gastritis or peptic ulcer	
Monitoring	ECG/HR, Blood pressure, Resp rate	
Additional Information	**Contraindications** Myocardial infarction, history of myocardial infarction, coronary insufficiency, angina or other evidence suggestive of coronary artery disease, Hypotension, Hypersensitivity to phentolamine or related compounds • *Use for Extravasation of Adrenaline, Desmopressin, Dobutamine, Dopamine, Noradrenaline, Phenylephrine, Terlipressin • Extravasation injury from cytotoxic and other noncytotoxic vesicants in adults - UpToDate • Phentolamine is kept in **Pharmacy** and is stock in **CathLab**	

Information provided relates to Phentolamine Mesylate (Sandoz)

Phenylephrine

CAUTION: High Administration Risk Rating	
Form	• 10mg per 1ml ampoule (10 mg/mL)* • 500 microgram per 10mL Pre Filled Syringe (50 microgram/mL) • 2g in 20 mL vial (100 microgram/mL) (Theatres only)
Reconstitution	Already in solution ***Further dilute ampoules before administration**
Compatibility & Stability	Glucose 5% Sodium chloride 0.9%
Administration	**IV Injection**
	If available use the Pre Filled Syringe (500 microgram/10mL). If not available dilute 10mg (1ml of a 10mg/ml solution) to **100ml** compatible infusion fluid to give a 100 microgram/mL solution. Usual IV bolus = 0.1mg-0.5mg**.** Administer prescribed dose over 3-5 minutes. Injections should be repeated no more than every 15 minutes
	Continuous IV Infusion
	If a **central venous access device** is not available, use a large peripheral vein. Use a **100 microgram/mL** solution. Dilute 10mg (1ml of a 10mg/ml solution) to **100ml** compatible infusion fluid to give a 100 microgram/mL solution. Initial maximum rate 180 microgram/minute, adjusted to 30-60 microgram /minute according to response, via rate controlled infusion pump or syringe pump.
Extravasation	May cause tissue necrosis. Risk with extravasation resulting in tissue damage/necrosis if given peripherally as phenylephrine is a potent vasoconstrictor and has a low pH. If a **central venous access device** is not available, use a large peripheral vein. Monitor the insertion site closely (as may cause venous irritation) using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation. If extravasation occurs, use warm compress + Phentolamine or consider application of 2.5cm Nitroglycerin 0.2% paste to area of extravasation
Notes	• Pre Filled Syringe stock in ED/Theatres/CathLab • IAEM-Clinical-Guideline-Peripheral-Vasopressors-V1.0.pdf • Extravasation injury from cytotoxic and other noncytotoxic vesicants in adults - UpToDate

Information provided relates to Phenylephidrine (Aquettant, Beacon Pharmaceuticals)

Phenytoin

SALAD
Epilim® (sodium valproate) and **Epanutin®** (phenytoin)

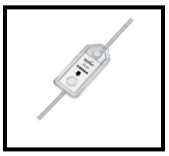
Phenytoin dosing is weight based; ensure accuracy of documented weight before administration

CAUTION: High Administration Risk Rating

CAUTION: Phenytoin may be administered as a loading dose followed by a maintenance dose. Double check the correct dose has been prescribed.

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

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

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® (Pfizer)

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	
See CUH Antimicrobial Guidelines on Eolas for further information	
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. To help reduce the risk of **stopper fragmentation** during use, it is recommended to use the following best practices: - Penetrate the stopper perpendicularly, avoiding any angle. - Avoid rotating the device during penetration. - Apply a steady, consistent force at a low speed. - When using an IV set, always utilize the same piercing point on the stopper. - Do not leave transfer devices or withdrawal spikes inserted into the stopper for extended periods.
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 (Gerard, Fresenius Kabi)

Posaconazole

Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
CAUTION: High Administration Risk Rating		
CAUTION: Posaconazole may be administered as a **loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.		
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 only**	
	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** 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	
Monitor	ECG, liver function, renal function, electrolytes, infusion site	
Additional Information Adverse Drug Reactions	• Posaconazole is usually prescribed as a **loading dose 300mg BD** (first 24 hours) followed by a **maintenance dose 300mg OD (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 • 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 (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,

	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® (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.

Propofol

Potential SALAD Ensure selection of the correct **strength** of propofol	
Form	10mg/mL (1%) in 20mL ampoules 10mg/mL (1%) in 50mL bottles 20mg/mL (2%) in 50mL bottles (Propofol-Lipuro®, **ITU and theatres only**)
Reconstitution	Already in solution- Shake before use Draw up using a 5 micron filter needle (ampoules) Propofol 1% May be diluted if required – final concentration should not be below 2mg/mL
Compatibility & Stability	Glucose 5% Sodium chloride 0.9%
Administration	**IV Injection**
	20mL vials propofol 1% used Administer required dose as a bolus IV injection
	IV Infusion (Continuous)
	50mL bottles used, given via syringe or volumetric infusion pump to control rate of infusion. Ensure selection of the correct **strength** of propofol – 1% or 2%
Monitoring	• Monitor ECG, oxygen saturation, end tidal carbon dioxide, blood pressure. • Triglycerides should be monitored at least every two days • **Propofol Infusion Syndrome** (PIS) is a rare complication of propofol. It is generally associated with doses of greater than 4mg/kg/hour and prolonged use greater than 48 hours • Characteristics of PIS include metabolic acidosis, rhabdomyolysis, hyperkalaemia, hepatomegaly, renal failure, hyperlipidaemia, cardiac arrhythmia and cardiac failure
Additional Information	• Vials or bottles once opened should be discarded after 12 hours- if diluted, discard after six hours. • A microbiological filter is not recommended. • Due to the risk of propofol infusion syndrome, the maximum dosage should not be exceeded. • The duration of administration must not exceed 7 days. • Propofol products contain soya-bean oil and egg derivatives. The Royal College of Anaesthetists advises it is safe to use propofol in adult patients hypersensitive to peanuts, soya and egg but more studies are required in children.

Information provided relates to Propofol 1% (Fresenius Kabi) Propofol 2%–Lipuro (Braun)

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 (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. The solution should be clear and colourless. Inspect visually for particulate matter or discoloration prior to administration and discard if present. **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	**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® (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		
Reserve Antimicrobial (except for TB use) See CUH Antimicrobial Guidelines on Eolas for further information		
Form	600mg powder and 10mL Solvent for Concentrate for Solution for Infusion	Store vials below 25°C
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%	
Administration	**IV Infusion**	
	Dilute required volume of reconstituted solution with 500mL of compatible infusion fluid and administer over 2 - 3 hours. : **Fluid Restriction:** dilute to a maximum concentration of 6mg in 1mL with compatible fluid. For example, add 600mg to 100mL of sodium chloride 0.9% or glucose 5%. Monitor for precipitation, as this solution may be less stable.	
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® (Sanofi Aventis)

Risankizumab (Skyrizi®)

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

CAUTION: High Administration Risk Rating

Form	Each vial contains 600 mg of risankizumab concentrate for solution for infusion in 10.0 mL of solution.	**Store in a refrigerator 2-8°C**
Reconstitution	• Already in solution. • The solution is colourless to slightly yellow and clear to slightly opalescent • **MUST be further diluted before administration** • **Do not shake the vial**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV Infusion**	

Dose	Volume to remove from 250mL bag	Volume Skyrizi® to add to bag
600mg	10mL	10mL
1200mg	20mL	20mL

- Remove appropriate volume from 250mL bag compatible fluid (see table above).
- Use one 10mL syringe to withdraw 600mg from the risankizumab vial.
- Inject the 10mL from the vial into the bag slowly.
- Mix the contents of the bag gently.
- Protect the infusion bag from light
- Temporarily remove IV bag light protection covers for the time needed to check for presence of visible particulates in the bags and then recover. If particulates are observed do not proceed
- Prior to the start of the intravenous infusion, the content of the intravenous infusion bag or glass bottle should be at room temperature.
- Each patient should be closely observed for the first 20 minutes of infusion, especially the first time the patient receives it.
- The whole content of the IV bag is to be infused.
- Infuse the diluted solution intravenously over a period of at least one hour for the SKYRIZI 600 mg dose; at least two hours for the SKYRIZI 1,200 mg dose

Monitoring	In patients with a chronic infection, a history of recurrent infection, or known risk factors for infection, risankizumab should be used with caution. Treatment with risankizumab should not be initiated in patients with any clinically important active infection until the infection resolves or is adequately treated.
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	The most frequently reported adverse reactions were upper respiratory infections Patients treated with risankizumab should be instructed to seek medical advice if signs or symptoms of clinically important chronic or acute infection occur. If a patient develops such an infection or is not responding to standard therapy for the infection, the patient should be closely monitored and risankizumab should not be administered until the infection resolves.

Disposal	Dispose of infusion bag and administration set in purple-lidded bin.
Additional Information	Risankizumab is indicated for the treatment of patients 16 years and older with moderately to severely active Crohn's disease who have had an inadequate response to, lost response to, or were intolerant to conventional therapy or a biologic therapy, or if such therapies are not advisable.

Information provided relates to Skyrizi® (AbbVie)

Rituximab

Reduce direct handling to a minimum and wear appropriate protective clothing.		
CAUTION: High Administration Risk Rating		
Form & Storage	Prepared in Pharmacy Aseptic Unit for inpatients	Store in a fridge at 2 - 8°C
Reconstitution	N/A	
Compatibility & Stability	Follow storage instructions provided by pharmacy.	
Administration	**IV Infusion**	
	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® (Roche) and Ruxience (Pfizer)

Rituximab –Infusion unit ONLY

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

Caution High Administration Risk rating

Form & Storage	Each Mabthera® and Ruxience® vial contains 500mg rituximab in 50mL (10mg/mL).	**Store in a refrigerator (2°C – 8°C).** Keep the vial in the outer carton in order to protect from light
Reconstitution	Already in solution **MUST be further diluted before administration** **Contact pharmacy for dilution info for doses other than 500mg or 1000mg**	

Dose

Dose	No. of 500mg Mabthera® vials or Ruxience 500mg vials	Volume of Mabthera® or Ruxience solution	Sodium Chloride 0.9% volume
500mg	1	50mL	250mL
1000mg	2	100mL	500mL

Compatibility & Stability: Sodium chloride 0.9%

Administration

IV Infusion

- **500mg dose**: Add 50mls Rituximab to 250mls NaCl 0.9% **using the chemo-clave system.**
- **1000mg dose:** Add 100mls Rituximab to 500mls NaCl 0.9% **using the chemo-clave system**.

The dose and schedule of Rituximab is individualized for each patient and defined by the consultant's clinical judgment and patient's underlying condition

See **Rituximab Prescription and Administration Record** and **PPG-CUH-PHA-23 Prescribing, Administration & Monitoring Guidelines for Adult Patients Receiving Rituximab for Renal/Respiratory/Rheumatology/Neurology indications** for information on Administration

First infusion (all indications):

- Start the infusion at a rate of 50mg/hour for 30 minutes.
- Rate may be increased by increments of 50mg/hour every 30 minutes, if tolerated, to a maximum of 400mg/hour

Second and subsequent infusions

- Can be infused at an initial rate of 100mg/hour, and increased by 100mg/hour increments at 30-minute intervals, to a maximum of 400mg/hour

See rate sheets below
Guidelines for administering Rituximab 1000mgs/600mls or 375mgs/m²
For Rheumatoid Arthritis only: Rituximab rapid rate for second and subsequent cycles.

Monitoring	• Apply BP cuff to opposite arm and oxygen saturation probe and set for half hourly intervals to coincide with rate increase (see flow sheet) Monitor IV site for infiltration
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes. NB: **vials dispensed for individual patients must be used for the named patient only.**
Adverse Drug Reactions	• Infusion Rate Reaction symptoms mainly comprised fever, chills and rigors. Other symptoms included flushing, angioedema, bronchospasm, vomiting, nausea, urticaria/rash, fatigue, headache, throat irritation, rhinitis, pruritus, pain, tachycardia, hypertension, hypotension, dyspnoea, dyspepsia, asthenia • Mild or moderate infusion-related reactions (IRR) usually respond to a reduction in the rate of infusion. The infusion rate may be increased upon improvement of symptoms. • Patients who develop evidence of severe reactions, especially severe dyspnoea, bronchospasm or hypoxia should have the infusion interrupted immediately. • Cardiac disorders: Angina pectoris, cardiac arrhythmias such as atrial flutter and fibrillation, heart failure and/or myocardial infarction have occurred in patients treated with rituximab. Therefore, patients with a history of cardiac disease should be monitored closely. • Infections: Serious infections, including fatalities, can occur during therapy with rituximab. Rituximab should not be administered to patients with an active, severe infection. • Hypotension: Since hypotension may occur during rituximab administration, consideration should be given to withholding anti-hypertensive medicines 12 hours prior to the rituximab infusion.
Additional Information	Patient Alert Cards are available MabThera Ruxience

Information provided relates to MabThera® (Roche) and Ruxience® (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 & Storage	8.4% w/v Sodium Bicarbonate in 100mL bottle containing 1mmol/mL sodium bicarbonate.	Do not store above 25°C
Reconstitution	Already in solution Do not use if the solution is unclear or contains precipitate. **May dilute further prior to administration.**	
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%	
Administration	**IV bolus**	
	Emergency use only. May be given undiluted over at least 3 minutes. Immediately follow by sodium chloride 0.9% flush. Doses may be given at 10 mins intervals	
	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, add 88mL of sodium bicarbonate 8.4% to the 500mL bag. Mix well by inverting the bag several times. Final volume of infusion prepared is 588mL of sodium bicarbonate 1.26% containing 88mmol bicarbonate (approx. 0.15mmol in 1mL) • Max infusion rate 10mL/kg/hour of a 1.26% solution (equivalent to 1.5mmol/kg/hour) **Central** Concentrations greater than 1.4% w/v should be given via central line. Max infusion 1.5mmol/kg/hour	
Monitoring	Patient monitoring should include regular checks of acid-base balance, serum electrolyte concentrations and fluid balance.	
Extravasation	Extravasation of higher strength solutions (more than 1.4% w/v) is likely to cause tissue damage, due to high osmolarity.	
Additional Information	Hypokalaemia or hypocalcaemia should be corrected before beginning alkalinising therapy. Dilution of the 8.4% sodium bicarbonate solution is **unlicensed**	

Information provided relates to 8.4% w/v Sodium Bicarbonate Intravenous Infusion (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 Thiosulfate

Be aware of 2 different concentrations available e.g. 25g 50% w/v = 50mL 25g 25% w/v = 100mL	
Form	• 10g in 20mL (500mg/mL) 50% w/v • 5g in 10mL (500mg/mL) 50% w/v • 12.5g in 50mL (250mg/mL) 25% w/v
Reconstitution	Already in solution
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**Slow IV injection –** Cyandide poisoning • May be administered undiluted over 10 minutes • Administer via a large peripheral vein or a central line • Refer to TOXBASE for dose in cyanide poisoning **IV Infusion** (unlicensed) – Calciphylaxis[1] • Administer over 30 to 60 minutes • In patients who experience gastrointestinal side effects, the duration of infusion can be increased by an additional 30 to 60 minutes. • If on haemodialysis, administer during the last hour of, or after the haemodialysis session
Extravasation	Sodium thiosulfate 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. Re-site cannula at first signs of inflammation.
Monitoring	Monitor for injection site irritation, blood pressure, oxygen saturations.
Adverse effects	• pain at injection site • hypernatraemia • headache, disorientation • hypotension • nausea, vomiting, diarrhoea • diuresis • salty taste in the mouth • warm sensation over the body • metabolic acidosis
Additional Information	Sodium thiosulfate (HOPE 250mg in 1mL ampoules) contains approximately potassium 0.06mmol in 1mL. This may exceed the usual potassium administration rates, especially if given peripherally. 1. Calciphylaxis Beaumont Hospital, Dublin 2. Calciphylaxis (calcific uremic arteriolopathy) - UpToDate

Information provided relates to Sodium Thiosulphate (Cangene Biopharma, Martindale Pharma, HOPE Pharmaceuticals)

Sodium Valproate

SALAD **Epilim®** (sodium valproate) and **Epanutin®** (phenytoin)	
Sodium valproate dosing may be weight based; ensure accuracy of documented weight before administration	
Form	400mg dry powder vial & 4mL solvent
Reconstitution	Add 3.8mL WFI provided. • Draw up using a 5 micron filter needle • Use gloves when opening ampoules The total volume of the reconstituted solution is 4.15 ml with a concentration of **100 mg/ml.** 4 ml of the reconstituted solution for injection (100 mg/ml) can be withdrawn from the vial.
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® (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 IV

<table>
<tr><td colspan="3">CAUTION: High Administration Risk Rating</td></tr>
<tr><td>Form</td><td>5mg in 1mL ampoule</td><td>Do not store above 25°C. Keep the vial in the outer carton to protect from light.</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
Dilute further before administration.</td></tr>
<tr><td>Compatibility & Stability</td><td colspan="2">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 colspan="2">IV Infusion only
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 colspan="2">Extravasation may cause tissue damage due to the low pH of the solution.</td></tr>
<tr><td>Additional Information</td><td colspan="2">The concentration of a solution for infusion should be within the range 0.004 - 0.1 mg/mL (4-100 microgam/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.
See below CUH-PPG-C-PHA-32 (QPulse) for Sublingual Tacrolimus for Renal Transplant Patients</td></tr>
</table>

Information provided relates to Prograf® (Atellas Pharma)

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

Tacrolimus (Sublingual) for Renal Transplant Patients

Caution	**Wear a mask and powder free nitrile gloves when handling and opening capsules**
Indication	If a patient is unable to swallow capsules orally, tacrolimus can be administered sublingually on the advice of the Renal team.
Dose	The oral tacrolimus dose may need to be adjusted based on patient specific factors. Dose conversion ratios of 1:1 and 2:1 have been reported in the literature [1,2] **1:1 Conversion** **Prograf® 2mg BD PO = Prograf® 2mg BD Sublingually** **2:1 Conversion** **Prograf® 2mg BD PO = Prograf® 1mg BD Sublingually** Please note Advagraf® (prolonged release tacrolimus) is not suitable for sublingual administration. The formulation should be first converted to immediate release tacrolimus (Prograf®) and then prescribed sublingually as above.
Administration and handling	• When handling and opening capsules, powder free nitrile gloves and a mask should be worn • Capsules should be opened and the contents placed under the tongue and allowed to dissolve completely. • Avoid swallowing for 5-15 minutes. • Avoid any oral intake for 15-30 minutes. • Avoid mechanical suctioning for at least 30 minutes after administration.
Additional information	• The administration of tacrolimus sublingually renders the formulation an unlicensed medicine. • Sublingual administration should only be considered for short term use on the advice of the renal team. • Switching between tacrolimus brands and routes of administration requires careful supervision and therapeutic monitoring by an appropriate specialist. • Dosing must be individualized, taking into consideration concomitant interacting medications, and adjusted to target levels based on therapeutic drug monitoring. • Please contact the pharmacy department if further information is required.

References:

1. Up to date - www.uptodate.com. Accessed on: 06/04/23
2. Renal Drug Database https://renaldrugdatabase.com/tacrolimus Accessed on 06/04/23

Prepared by Meghan Kearney, Pharmacist; Reviewed by Anna Keating, Senior Pharmacist
Pharmacy Department and Department of Renal Medicine, Cork University Hospital, February 2023

Taurolock® Urokinase

Used as a catheter lock solution only: **NOT FOR SYSTEMIC INJECTION**		
Form	Taurolock 25,000 vial with 5mL solvent ampoule -Vial contains Urokinase powder -Solvent ampoule contains TauroLock	Store at room temperature
Reconstitution	Add 5mL from Taurolock ampoule to the vial containing the powder	
Compatibility & Stability	N/A	
Administration	**Catheter lock: NOT FOR SYSTEMIC INJECTION** • Flush the device with 10mL Sodium chloride 0.9% • Instil into the line slowly (not more than 1mL per second), in a quantity sufficient to fill the lumen completely • TauroLock Urokinase will remain inside the access device until the next treatment (for a maximum of 30 days) • Prior to the next treatment, TauroLock Urokinase must be aspirated and discarded • Flush the device with 10mL Sodium chloride 0.9%	
Adverse Drug Reactions	Anaphylaxis (rare)Bleeding (very rare) mild hypocalcaemia (common) **Anaphylaxis** can be a concern with this product- ensure adrenaline, corticosteroids, antihistamine and paracetamol are available	
Contraindications	Patients with known allergy to tauroldine, citrate or urokinase. Patient currently taking medication with known interaction to tauroldine, citrate or urokinase. Patients with increased bleeding risk.	
Additional Information	• TauroLock Urokinase is licensed to ensure patency and provide infection control in the device. • Taurolidine is a broad spectrum antibiotic and antiendotoxin, which provides cover against gram-positive and gramnegative organisms, anaerobes and fungi. Citrate is used as an anticoagulant but can also help improve antimicrobial activity. • It is instilled in the device lumen between treatments in order to make the internal flow passages resistant to clot formation and hostile to bacterial and fungal growth • The solution is withdrawn prior to the next treatment	

Information provided relates to Taurolock® (TauroPharm)

Teicoplanin

Teicoplanin dosing is weight based; ensure accuracy of documented weight before administration		
Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
CAUTION: Teicoplanin is administered as a **loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.		
Form	200mg and 400mg vial with diluent	Store below 25°C
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 full dose of 200mg or 400mg will be obtained if 3mL is withdrawn (there is calculated excess in each vial)	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Injection** (Preferred route for doses up to 800mg)	
	Give slowly over 3-5 minutes.	
	IV Infusion (doses > 800mg)	
	Dilute dose in 100mL infusion fluid and give over 30 minutes. **Fluid restriction**: Can dilute in 50mL	
	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. • **Loading dose** q12h for 5 doses followed by **Maintenance dose** q24h	

Information provided relates to Targocid® (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 (Glypressin®) 1mg in 5mL ampoule (EVER Pharma)	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® (Ferring) and Terlipressin (EVER Pharma)

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.

Thiamine (Vitamin B1)

Form	100mg per 2mL ampoule (50mg/mL)
Reconstitution	Already in solution Draw up using a 5 micron filter needle **Dilute further before administration**
Compatibility & Stability	Sodium chloride 0.9% Glucose 5%
Administration	**IV infusion** Draw up dose required and add to 100mL infusion fluid Give over 30 minutes using an infusion pump A 50mL infusion may be used if required (eg fluid restriction) but the residual volume in the infusion line must be flushed through at the same rate to avoid significant underdosing.
Adverse Drug Reactions	Acute reactions: • hypersensitivity reactions ranging in severity from very mild to, very rarely fatal anaphylactic shock • bronchospasm, shortness of breath • rash • flushing Facilities for treating anaphylaxis should be available when administering this preparation
Extravasation	Thiamine 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.
Additional Information	• See **CUH Recommendations for Thiamine prescribing due to Pabrinex® supply disruption 2025/2026**. • Store in original packaging to protect from light • This is an unlicensed medicine in Ireland

Information provided relates to Vitamin B_1-ratiopharm® manufactured by Ratiopharm

Tigecycline

Reserve Antimicrobial See CUH Antimicrobial Guidelines on Eolas for further information		
CAUTION: Tigecycline is administered as a **loading dose** followed by a **maintenance dose**. Double check the correct dose has been prescribed.		
Form	Vial containing 50mg dry powder	Store vials below 25°C
Reconstitution	Reconstitute each vial with 5.3mL of compatible fluid and swirl gently to dissolve. This gives a 10mg/mL solution. 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. **Dilute further before administration.**	
Compatibility & Stability	Sodium Chloride 0.9% Glucose 5%	
Administration	**IV Infusion**	
	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.	
Extravasation	Extravasation may cause tissue damage due to low pH.	
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="3">Tobramycin dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="3">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td colspan="3">CAUTION: High Administration Risk Rating</td></tr>
<tr><td>Form</td><td>80mg per 2mL vial</td><td>Store vials below 25°C</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Already in solution</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">
<table>
<tr><th>Multiple Daily Dosing</th><th>Once Daily Dosing</th></tr>
<tr><td><u>IV Infusion</u>
Dilute in 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>
Fluid Restriction: A 50mL infusion may be used if required
</td></tr>
<tr><td>Monitoring</td><td colspan="2">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 colspan="2">Extravasation may cause damage due to low pH.</td></tr>
<tr><td>Additional Information</td><td colspan="2">• 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 2ºC-8ºC. 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 **Dilute further before administration**	
Compatibility & Stability	Sodium Chloride 0.9% **ONLY**	
Administration	**IV Infusion** • Withdraw a volume of sterile, sodium chloride 0.9% from a 100 mL infusion 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.	
Monitoring	• Pre and post infusion vital signs • In advance of first infusion, blood tests are taken by GP/Phlebotomy (Full Blood Count, Renal/Liver/Bone profile, C Reactive Protein) • Bloods for subsequent infusions are taken on cannulation and used as a baseline for the next infusion • If after 3 months of infusions, the patient's bloods fall within the established parameters outlined in 7.2.4 it is acceptable with the Rheumatology team for blood testing on cannulation every 2 months (retrospective) • If the patient presents to the unit and meets any of the criteria in *__7.7,__ medical review may be required prior to reconstituting medication for infusion • Monitor for signs and symptoms of infection • Monitor for signs and symptoms of hypersensitivity or infusion related reactions (anaphylaxis, hypotension, puritis, rash, urticarial or wheezing); most hypersensitivity reactions occur between second and fourth infusion • Urinalysis required only if patient is symptomatic • Monthly weight to calculate drug dosage	

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	Store at room temperature
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 undiluted as 100mg in 1mL solution. Slow IV injection at a rate of 100mg/minute (1mL/minute). If necessary dilute with a convenient volume of compatible fluid to aid slow administration.	
	IV Infusion - unlicensed route	
	Add required dose to a convenient volume and give over at least ten minutes e.g. 1g in 100mL compatible fluid over at least 10 minutes	
	Continuous IV Infusion – unlicensed route	
	Following initial treatment by intravenous injection/infusion, 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.	
	Nebulisation –unlicensed route	
	Give undiluted 500mg (5mL) via nebulizer 3 times daily for up to 5 days	
Monitor	Hypersensitivity reactions, blood pressure	
Extravasation	Tranexamic acid has a high osmolality 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	Rapid administration may cause hypotension and loss of consciousness	

Information provided relates to Cyklokapron® (Pfizer)

Ublituximab (Briumvi®)

Reduce direct handling to a minimum and wear appropriate protective clothing **Check which form before administering – SC or IV**		
CAUTION: High Administration Risk Rating		
Form & Storage	Briumvi® Concentrate for solution for infusion Each vial contains ublituximab 150mg in 6mL (25mg/mL)	Refrigerate unopened vials at 2°C - 8°C and protect from light.
Reconstitution	Already in solution Do not shake the vial **Dilute further before administration**	
Compatibility & Stability	Sodium Chloride 0.9%	
Premedication	Administer premedication as charted **Methylprednisolone 100mg/100mL Sodium chloride 0.9% IV over 30 minutes** completed at least 30 minutes prior to infusion **Chlorphenamine 10mg IV** at least 30 minutes prior to infusion **Paracetamol 1G PO** at least 30 minutes prior to infusion	
Administration	**IV Infusion**	
	First infusion Add contents of one vial, 6mL (150 mg) to 250 mL fluid – see infusion rate sheets below Duration 4 hours **Second and subsequent infusions** Add contents of 3 vials, 18mL (450 mg) to 250mL – see infusion rate sheets below Duration 1 hour	
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.	
Monitoring	Patients should be observed during treatment and monitored for at least one hour after the completion of the first two infusions. Subsequent infusions do not require monitoring post-infusion unless IRR and/or hypersensitivity has been observed. Physicians should inform patients that IRRs can occur up to 24 hours after the infusion.	
Adverse Drug Reactions	**Infusion Related 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.	
Additional Information	The first dose is administered as a 150 mg intravenous infusion (first infusion), followed by a 450 mg intravenous infusion (second infusion) 2 weeks later. Subsequent doses are administered as a single 450 mg intravenous infusion every 24 weeks. The first subsequent dose of 450 mg should be administered 24 weeks after the first infusion.	

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

	A minimal interval of 5 months should be maintained between each dose of ublituximab.

Information provided relates to Briumvi® (Neuraxpharm Pharmaceuticals)

Briumvi: Infusion time 4 hours
Day 1 Date:_____First dose 150mg/250ml (Conc. 25mg/ml)

TIME		Rate mL/hr	VTBI (30min)	Temp	B/P	R/R	Pulse	O2 sats	PVAD Checked	Initials
	0-30 min	10mL/hr	5mL							
	30-60 min	20mL/hr	10mL							
	60-120 min	35mL/hr	35mL							
	120-180 min	100mL/hr	100mL							
	180-240 min	100mL/hr	100mL							

Briumvi: Infusion time 1 hour (Second and subsequent infusions)
Date:_____ 450mg/250ml

TIME		RATE	VTBI (30mins)	Temp	B/P	R/R	Pulse	O2 sats	PVAD checked	Initials
	0-30 min	100mL/hr	50mL							
	30-60 min	400mL/hr	200mL							

Ustekinumab (Stelara®)

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

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

Caution High Administration Risk rating

Form & Storage	Each vial contains 130mg ustekinumab in 26mL (5mg/mL).	Store in a refrigerator (2°C – 8°C). Do not freeze. Keep the vial in the outer carton in order to protect from light
Reconstitution	Already in solution **MUST be further diluted before administration**	
Dose		

Body weight of patient	Recommended dose	No. of 130mg Stelara® vials	Volume of Stelara®
≤ 55kg	260mg	2	52mL
55kg to ≤ 85kg	390mg	3	78mL
>85kg	520mg	4	104mL

Compatibility & Stability	Sodium chloride 0.9%
Administration	**IV infusion** • Withdraw and discard a volume of the sodium chloride 0.9% solution from the 250 mL infusion bag equal to the volume of Stelara® to be added. • The final volume in the infusion bag should be 250 mL. Gently mix • Administer the diluted solution over a period of at least one hour. • Use only an infusion set with an **in-line filter** (pore size 0.2 micrometer). This filter **B Braun Sterifix® 0.2µ Ref 4099303** is available to order from stores
Monitoring	• Pre and post vital signs
Documentation Requirements	Document batch numbers and expiry dates of vials in medical notes.
Adverse Drug Reactions	Monitor carefully during and for an hour after the infusion for hypersensitivity reactions.
Additional Information	STELARA® may increase the risk of infections and reactivation of latent infections. The first subcutaneous dose should be given at week 8 following the intravenous dose.

Information provided relates to Stelara® (Janssen-Cilag)

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 **Dilute further before administration**
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, as per chemotherapy regimen.
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® (Baxter)

Vancomycin

<table>
<tr><td colspan="3">Vancomycin dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="3">CAUTION: High Administration Risk Rating</td></tr>
<tr><td colspan="3">CAUTION: Vancomycin is administered as a loading dose followed by a maintenance dose. Double check the correct dose has been prescribed.</td></tr>
<tr><td>Form</td><td>500mg and 1g vials</td><td>Store below 25°C</td></tr>
<tr><td>Reconstitution</td><td colspan="2">Add 10mL WFI to 500mg vial
Add 20mL WFI to 1g vial
Further dilution essential before 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
After reconstitution as above, dilute each 500mg with at least 100mL compatible infusion fluid, and infuse at a rate not exceeding 10mg/min.

<table>
<tr><th>Dose</th><th>Suggested dilution</th></tr>
<tr><td>500mg</td><td>100mL</td></tr>
<tr><td>750mg-1.25g</td><td>250mL</td></tr>
<tr><td>1.5-2g</td><td>500mL</td></tr>
</table>

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 restriction: a concentration of up to 10mg per ml may be used- however, this may increase the rate of infusion related reactions.
This concentration (10mg/mL) must be administered via a central line at a rate not exceeding 10mg/min.

<table>
<tr><th>Dose</th><th>Suggested dilution via central line</th></tr>
<tr><td>500mg</td><td>50mL</td></tr>
<tr><td>1g</td><td>100mL</td></tr>
<tr><td>1.25g</td><td>125mL</td></tr>
<tr><td>1.5g</td><td>150mL</td></tr>
<tr><td>2g</td><td>200mL</td></tr>
</table></td></tr>
<tr><td>Monitoring</td><td colspan="2">Vancomycin blood level monitoring is required to ensure efficacy and minimise toxicity.
The first pre-dose (trough) level should be taken on day 3 of treatment.
In renal impairment, the first level should be taken on day 2 of treatment.
Level to be taken within two hours of next due dose (preferably just prior to next dose)
When therapeutic range achieved, levels should be repeated every 3 days (eGRF >50ml/min) or every day in renal impairment.
High or Low levels: Post dose adjustment, levels should be repeated 24 hours later to ensure levels are therapeutic.</td></tr>
</table>

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

	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.

Information provided relates to Vancocin® (Flynn Pharma) and Vancomycin (Gerard and 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. **Must be diluted further before administration**	
Compatibility & Stability	Sodium Chloride 0.9% ONLY	
Administration	**IV Infusion**	
	Invert the vial gently three times before withdrawing 5mL (300mg) 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	
Monitoring	• Vital signs pre and post infusion • All patients should be observed continuously during each infusion • Patients are observed for one hour after the first two infusions for signs and symptoms of acute hypersensitivity reactions • Observation is not required for subsequent infusions unless clinically indicated (These are directives given by Gastroenterology Consultants) • Before the first three infusions, Full Blood Count, Renal/Liver/Bone profile, C Reactive Protein are taken by phlebotomy/GP • Bloods for subsequent infusions are taken on cannulation and are used as a baseline for the next infusion if the patient is well. • If after the induction phase (week 14), the patient's bloods fall within the established parameters outlined in 7.8, it is acceptable with the Gastroenterology team for blood testing on cannulation up to every 8 weeks (retrospective) • If the patient presents to the unit and meets the criteria in 7.7*, medical review may be required prior to reconstituting medication for infusion	

	• Monitor for signs and symptoms of a hypersensitivity reaction (bronchospasm, dyspnoea, hypertension, rash, chest tightness, urticaria, wheezing) during the infusion and after completion • Assess neurologic status frequently, withhold treatment if PML is suspected • Monitor for signs and symptoms of liver injury (elevated bilirubin, elevated liver function tests, and jaundice). Discontinue in patients with jaundice or other evidence of significant liver injury • Monitor for signs and symptoms of infection
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® (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.

Vitamins B & C

See Pabrinex®(Vitamins B & C)

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="3">Voriconazole dosing is weight based; ensure accuracy of documented weight before administration</td></tr>
<tr><td colspan="3">Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas for further information</td></tr>
<tr><td colspan="3">CAUTION: High Administration Risk Rating</td></tr>
<tr><td colspan="3">CAUTION: Voriconazole is administered as a loading dose followed by a maintenance dose. Double check the correct dose has been prescribed.</td></tr>
<tr><td>Form</td><td>200mg dry powder vial</td><td>Store below 25°C</td></tr>
<tr><td>Reconstitution</td><td colspan="2">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 colspan="2">Glucose 5%
Sodium Chloride 0.9%</td></tr>
<tr><td>Administration</td><td colspan="2">IV Infusion only
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>Extravasation</td><td colspan="2">Extravasation may cause tissue damage due to low pH.
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>Monitor</td><td colspan="2">Monitor for electrolyte disturbances (hypokalaemia, hypomagnesemia, hypocalcaemia) before and during voriconazole therapy, liver function, renal function. Monitor infusion site.</td></tr>
<tr><td>Additional Information</td><td colspan="2">• 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.
• Electrolyte disturbances such as hypokalaemia, hypomagnesaemia and hypocalcaemia should be monitored and corrected, if necessary, prior to initiation
• In patients with renal impairment (creatinine clearance less than 50mL/minute) use intravenous infusion only if the potential benefit outweighs the risk, and monitor renal function (risk of accumulation of excipient, sulfobutylether beta cyclodextrin sodium (SBECD)
• Never administer Voriconazole as an IV bolus.</td></tr>
</table>

	• 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.

Information provided relates to Vfend® (Pfizer)

Zanamivir

Reserve Antimicrobial
See CUH Antimicrobial Guidelines on Eolas 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.

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

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

Information provided relates to Dectova® (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

Note: Do not use Zerlinda 4mg/ 100mL Pre-Made bags for 5mg doses

Form

There are two preparations currently available in CUH:
1. Zerlinda 4mg/100mL solution for infusion (for 4mg doses and less)
2. Zoledronic Acid 4mg/5mL concentrate for solution for infusion (for 5mg dose only)

Reconstitution

Already in solution
1. Zerlinda product ready for infusion
2. Zoledronic Acid (Mylan & Teva) 4mg/5mL vials must be diluted further prior to administration

Compatibility & Stability

Sodium chloride 0.9%
Glucose 5%

Administration

Patients must be well hydrated prior to and following administration.

1. Zerlinda solution for infusion (IV Infusion)

Give dose over at least 15 mins

Preparation of infusion for doses less than 4mg		
Dose of zoledronic acid (mg/100mL)	**Volume to be removed from ready-to-use bag (mL)**	**Replace with following volume of sodium chloride 0.9% or glucose 5% (mL)**
3.5mg	12ml	12ml
3.3mg	18ml	18ml
3mg	25ml	25ml

2. Zoledronic Acid 4mg/5mL concentrate (IV Infusion)

Dilute required dose with 100mL compatible fluid
Give over at least 15 minutes.

Dose	Volume of concentrate
5mg	6.3mL

Monitoring

- Monitor serum electrolytes, calcium, phosphate and magnesium.
- Monitor renal function.

Adverse effects

The following are the important identified risks with zoledronic acid in the approved indications:
- Renal function impairment, osteonecrosis of the jaw, acute phase reaction, hypocalcaemia, atrial fibrillation, anaphylaxis, interstitial lung disease.

Information provided relates to Zoledronic Acid (Mylan & Teva) Zerlinda (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

VI. 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)
Alteplase (ED)
Atenolol (ED)
Atracurium
Cangrelor (CCU)
Digifab (ED)
Dobutamine
Dopamine
Droperidol(ED)
Eptifibitide (CCU)
Esmolol
Ibutilide (CCU)
Ketamine
Milrinone
Recuronium
Sodium Nitroprusside
Sugammadex
Thiopentone
Vecuronium
Vasopressin
Vernakalant (CCU)

ITU Specific:
Dexmedetomidine
Epoprostenol
Remifentanil