

RECONSTITUTION AND DILUTION OF ANTIBIOTICS, HEPARIN & ACTRAPID 2015

This is an internal publication of Pharmacy Department, Hospital Sultanah Aminah Johor Bahru.

Enquiries are to be directed to the address below.

Drug Information Services
Pharmacy Department
Hospital Sultanah Aminah
80100 Johor Bahru
Tel: 07-2257000 ext 2916
Email: farmasihsajb@moh.gov.my

ACKNOWLEDGEMENT

This Reference is an initiative by the Pharmacy Department of Hospital Sultanah Aminah, Johor Bahru.

Contributors:

Dr Rooshaimi Merican Bt A. Rahim Merican
Director of Hospital Sultanah Aminah Johor Bahru

Dr. Siti Norlina Binti Md Said
Ketua Pegawai Farmasi

Pn Siti Rosnah Bt Suradi
Pegawai Farmasi U54

Pn. Haliza Bt Ab Jalal
Pegawai Farmasi U52

Pn. Ezatul Mazuin Ayla
Pegawai Farmasi U52

En. Mohd Shafie B. Zabidi
Pegawai Farmasi U52

En Tan Chee Chin
Pegawai Farmasi U48

Pn. Ng Wang Sing
Pegawai Farmasi U48

Pn Yeo Lee Ping
Pegawai Farmasi U44

Introduction

The *Reconstitution and Dilution of Antibiotics, Heparin & Actrapid* is a collection of summaries of information from the product inserts of respective medications and published literature on the pharmaceuticals of parenteral medications. The purpose of the protocol is to enable health care providers to have the relevant information for the benefit of patients.

The *Reconstitution and Dilution of Antibiotics, Heparin & Actrapid* contains a summary on each of the 44 antibiotics available in Hospital Sultanah Aminah as well as for Actrapid and Heparin. The list of drugs is arranged alphabetically by generic name. The information of product includes strength, packaging sizes, volumes, brand name and manufacturer. Besides that, instructions for reconstitution (when applicable) are included. Dilution, routes and rate of administration are clearly stated in this protocol as well. Other important information such as drug stability and storage requirement for the drug after reconstitution and dilution are also included.

If healthcare providers face any difficulty in interpreting the information in this protocol, please do not hesitate to call up the Pharmacy Department for further information.

Objectives

1. To provide a comprehensive reconstitution and dilution of Antibiotics, Actrapid & Heparin in HSAJB.
2. To avoid medication errors due to wrong dilution technique.
3. To ensure the efficacy of the drugs by keeping the reconstituted and diluted medications in the appropriate storage condition.

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
1	Acyclovir 250mg / vial (A*)	Zovirax / GSK	250mg/10ml	25ml/ml	IV Infusion: 5mg/ml NS, HS, Dext 4% NaCl 0.18%, Dext 2.5% NaCl 0.45%, Hartmann's Slow IV: Infusion over 1hour ¹	5mg/ml	Do not refrigerate ¹	12 hours ¹	Do not refrigerate ¹	12 hours (visible turbidity and crystallisation should be discarded) ¹
2	Amikacin 250mg/2ml OR 500mg/2ml ampoule (A)	Amicin / Biochem	NIL (IV Push /Rapid infusion not recommended) ²	125mg/ml OR 250mg/ml	IV Infusion: 0.25-5mg/ml using D5W, D5LR, NS ¹ Infants: IV Infusion over 1-2hours ^{1,2} ; Pediatrics & Adult: IV Infusion over 30-60mins ^{1,2}	10mg/ml ²	24 hours ⁴	24 hours ^{1,4}	24 hours (2 days for 0.25-5mg/ ml, In NS or D5W or LR ⁴)	24 hours (0.25-5mg/ ml, In NS or D5W or LR, 25°C) ^{1,4}

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
3	Amoxicillin sodium 1000mg & Potassium clavulanate 200mg (Augmentin 1.2g/vial) (A)	Co-amoxiclav / Karnataka	1.2g/20ml WFI (final volume 20.9ml) ¹ IV Push over 3-4min (use within 20mins of reconstitution) ¹	NA	Without delay, 1.2g reconstituted solution qs ad 100ml using WFI or NS infuse over 30-40min (use within 4hours of reconstitution) ¹	NA	Discard unused reconstituted drug	Discard unused reconstituted drug	NA, Do not refrigerate	5-25°C ⁶ : 4 hours ¹
4	Amphotericin B 50mg / vial (Fridge Item and protect from light) ⁶ (A)	Photericin B / Cipla	50mg/10ml WFI (shake until clear solution) ¹	5mg/ml ¹	Test dose: 1mg/20ml using D5W infuse over 20-30mins ¹ IV Infusion: 0.1mg/ml using D5W infuse over 2-6hours ¹ (Protect from light during infusion)	Test dose:0.05mg/ml ¹ IV Infusion: 0.1mg/ml ¹	7 days ⁶	24 hours (Store in dark) ⁶	NA, Discard unused diluted drug	NA, Discard unused diluted drug
5	Ampicillin sodium 500mg (B)	Stadacillin / Sandoz	500mg/5ml WFI for IM & IV Push over 3-5min ¹ (use within 1hr of reconstitution) ⁶	100mg/ml ¹	IV infusion : 30mg/ml ⁶ using NS infuse over 15-20min ¹	30mg/ml ⁶	Discard unused reconstituted drug	Discard unused reconstituted drug	30mg/ml: 48hours (4°C) ⁶ ; up to 20mg/ml: 72 hours (4°C) ⁶	8 hours (25°C) ⁶

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
6	Ampicillin sodium 1000mg & Sulbactam sodium 500mg (Unasyn 1.5g) (A)	Karnataka	1.5g/3.2ml WFI ¹ (final volume 4ml) ⁶ (allow foaming to dissipate) ¹ for: IV Push over 3min ¹ Deep IM (If pain, 0.5% sterile solution for injection of lignocaine HCL anhydrous may be use for reconstitution) ¹ (Use within 1hr of reconstitution) ⁶ (Use within 1 hour of reconstitution) ⁶	375mg/ml ⁶	IV Infusion: 1.5g in 50-100ml NS (15-30mg/ml) ⁶ infuse over 15-30min ¹	3-45mg/ml ⁶	Discard unused reconstituted drug	Discard unused reconstituted drug	30mg/ml: 72 hours (4°C) ⁶ ; 45mg/ml: 48 hours (4°C) ⁶	8 hour ⁶

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
7	Anidulafungin 100mg (Fridge item) (A*)	Eraxis / Pfizer	100mg/30ml WFI (to be further diluted before use) ¹	3.33mg/ml ¹	<u>Dose 100mg:</u> 100mg/30ml WFI + 100ml NS or D5W infuse over 1.4ml/ min (minimum duration of infusion: 90min) ¹ <u>Dose 200mg:</u> 200mg/60ml WFI + 200ml NS or D5W infuse over 1.4ml/ min (minimum duration of infusion: 180min) ¹ Rate of infusion should not exceed 1.1mg/min. ¹	0.77mg/ml ¹	24 hours ¹	24 hours ¹	48 hours ¹ (can up to 72 hours if stored frozen) ¹	48 hours ¹
8	Azithromycin 500mg (A*)	Azee / Cipla	500mg/4.8ml WFI (shake until dissolve) ⁶ (should NOT be given as bolus or IM) ^{1,5}	100mg/ml	IV infusion: 500mg/5ml qs 250ml NS,D5W or LR (2mg/ml) infuse over 1 hour OR 500mg/5ml qs 500ml NS, D5W or LR (1mg/ml) infuse over 3 hours ^{1,5}	1-2mg/ml ^{1,5}	24 hours ¹	24 hours ¹ (<25°C)	24 hours ¹ (7days ⁶ ONLY if reconstitution and dilution under controlled and validated aseptic conditions) ¹	24 hours ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
9	Benzyl Penicillin Sodium BP 1.0 Mega Units (600mg) or 5.0 Mega Units (3.0g) (Penicillin G Sodium or C-Pen) (B)	Karnataka	600mg/2ml WFI; 3g/10ml WFI ¹ for IM or IV ⁶	NA	Dose ≥ 10,000,000 units, may dilute in 1 or 2 L infusion ⁶	NA	6 days (2-8°C) ¹	2 days (28-32°C) ¹	NA	24 hours ⁶

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
10	Caspofungin acetate 70mg vial & 50mg vial (A*)	Cancidas / MSD	70mg/10.5ml WFI or NS ¹ ; 50mg/10.5ml WFI or NS ¹	7.2mg/ml (70mg vial) ¹ ; 5.2mg/ml (50mg vial) ¹	70mg (from one 70mg vial): Withdraw two separate 5ml reconstituted solution and add to each of two separate drips of 100ml NS or LR (final concentration 0.33mg/ml) ¹ 50mg (from one 50mg vial): Withdraw 10ml reconstituted solution add to 100ml NS or LR (final concentration 0.33mg/ml) ¹ 35mg (from one 50mg vial): Withdraw 7ml reconstituted solution add to 100ml NS or LR (final concentration 0.33mg/ml) ¹	0.33-0.45mg/ml ¹	24 hours ¹	24 hours ¹	48 hours ¹	24 hours ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
11	Cefazolin Sodium 500mg (A)	Cefazolin Sandoz/ Norvatis	IV push only for dose ≤ 1g: Dissolve 1g in 4ml WFI/NS. ¹ Further dilute with 5ml WFI and infuse over 3-5mins ⁶ IM: Into major muscle mass only. Dissolve 1g in 4ml 0.5% lidocaine solution. ¹	NA	IV Infusion for dose >1g: using 50ml or 100ml NS ⁶ infuse over 20-30mins ¹	69mg/ml ^{5,6}	Discard unused reconstituted drug	Discard unused reconstituted drug	Discard unused diluted drug	Discard unused diluted drug
12	Cefepime 1g (A*)	Forpar/ Cipla OR Megapime / Alkem Lab	1g/10ml WFI, D5W, NS (IV push not a general method ²)	90mg/ml	10-40mg/ml using D5W, D10W, D5NS, D5LR, NS IV Infusion over 30 mins ^{1,2}	160 mg/ml ² (10-40mg/ml for IV Infusion ²)	7 days ⁴ (2-8°C) ¹	24 hours ⁴ (<25°C) ¹	7 days ⁴ (1-40mg/ml, 2-8°C) ¹	24 hours ⁴ (1-40mg/ml, <25°C) ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	RT	2-8°C (Fridge)
13	Cefoperazone 1g (A)	Bicafar / Duopharma OR	1g/10ml WFI, D5W, D10W, D5NS, NS IV push over 3-5mins ¹ IM: If final concentration $\geq 250\text{mg/ml}$, 1g/2.6ml WFI (agitate until dissolve), then add 0.9ml 2% lidocaine to become final volume 4ml (250mg/ml) ¹	100mg/ml	IV Infusion: 10-50mg/ml using D5W, D10W, D5LR, LR, D5NS, D5 ¼ NS, NS ¹ Infuse over 15-60 mins ¹	10 - 50mg/ml ¹	5 days	24 hours ¹	5 days (300mg/ml, 2-8°C) ¹	24 hours (300mg/ml, 15-25°C) ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	RT	2-8°C (Fridge)
14	Cefotaxime 1g (A)	Rekaxime / Duopharma OR Claraxim / Siam Bheasach	1g/10ml WFI, D10W	100mg/ml	IV Push (≤500mg): No dilution, over 3-5 mins ^{1,2}	IV Push: 200mg/ml ²	24 hours ¹ (7-10 days ⁴)	12-24 hours ⁴	24 hours ¹ (5 days ≤22°C ²) (5 days In NS or D5W ⁴)	(24 hours 5°C ²) (24 hours In NS or D5W ⁴)
					IV Infusion (500mg): 20-50mg/ml using D5W, D10W, D5 ¼ NS, D5 ½ NS, D5NS, NS ¹ IV Infusion over 2ml/min at 20-50mg/ml ¹ (over 20-30mins at 10-60mg/ml) ²	IV Infusion: 73mg/ml ²				
15	Ceftazidime 1g (A)	Cefatum / Duopharma OR Fortum™ / GSK OR Vaxcel / Kotra	1g/10ml WFI	90mg/ml	IV Push (≤500mg): No dilution, over 3-5 mins ²	IV Push : 100-200mg/ml ²	Cefatum: 7 days (2-8°C) ¹ Others: 3 days ⁴	12 hours ^{1,4}	Cefatum: 7 days (2-8°C) ¹ Others: 3 days ⁴	12 hours ^{1,4}
					IV infusion (>500mg): 1-40mg/ml using D5W, D5 ¼ NS, D5 ½ NS, D5NS, NS ¹ IV Infusion over 15-30 mins ¹ (1-40mg/ml) ²	IV Infusion: 1-40mg/ml ^{1,2}				

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	RT	2-8°C (Fridge)
16	Ceftriaxone 1g (A)	Unocef / CCM Duopharma	1g/9.6ml WFI, D5W, D10W, NS (IV Push no clear evidence) ¹	100mg/ml ¹	IV Infusion: 10-40mg/ml using WFI, D5W, D10W, NS ¹ IV Infusion over 30 mins ^{1,2}	10 - 40 mg/ml ^{1,2}	7 days (10 days In WFI or D5W or NS,100mg/ml 4°C ^{1,4})	48 hours (In WFI or D5W or NS, 100mg/ml, 25°C) ⁴	7 days (10 days in WFI or D5W or D10W or NS,10-40mg/ml 4°C) ^{1,4} (in glass/pvc ¹)	48 hours (In WFI or D5W or D10W or NS, 10-40mg/ml, 25°C) ⁴ (3 days In WFI or D5W or D10W or NS, 10-40mg/ml 25°C ^{1,4}) (in glass/pvc ¹)
17	Cefuroxime 750mg (A)	Cefuroxime/ Pharmaniaga	750mg/7.5ml WFI	100mg/ml ¹	IV Push (≤500mg): No dilution, over 3-5 mins ¹ IV infusion (>500mg): 30mg/ml using D5W, D10W, D5 ¼ NS, D5 ½ NS, D5NS, LR, NS ² IV Infusion over 30 ¹ -60 mins ²	IV Push: 50-100 mg/ml ² IV Infusion: 30 mg/ml ²	48 hours ⁴	Cefuroxime: 24 hours ¹ (24hours ⁴)	48 hours (7 days In D5W or NS ⁴)	24 hours ⁴ (24 hours In D5W or NS ⁴)

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
18	Ciprofloxacin 200mg/100ml NS drip (0.2%w/v) Each 100ml contains Ciprofloxacin Lactate 254mg (A)	Ciproxol / Ain Medicare	NIL	NA	IV infusion over 60mins ⁶	1-2mg/ml ⁶	Protect from light. Do not refrigerate ¹	Discard unused drug	Protect from light. Do not refrigerate ¹	Discard unused drug

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
19	Clindamycin phosphate 150mg/ml (A*)	Tidact / Yung Shin	Single IM Injection should not exceed 600mg ¹ Must be diluted prior IV Administration ¹	NA	May administer as a single rapid infusion at first dose and followed by continuous IV infusion. Rapid infusion rate at 10-20mg/min for 30min followed by maintenance rate at 0.75 - 1.25mg/min. ¹ IV Infusion: Dilute using D5W or NS. Do not administer more than 1200mg in single 1 hour infusion ¹ <u>300mg</u> in 50ml infuse over 10mins ¹ <u>600mg</u> in 50ml infuse over 20mins ¹	18mg/ml ¹	Do not refrigerate ¹	24 hours ¹	Do not refrigerate ¹	24 hours ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
					900mg in 100ml infuse over 30mins ¹ 1200mg in 100ml infuse over 40mins ¹ (IV Infusion rate not more than 30mg/min.) ¹					
20	Cloxacillin sodium 500mg (B)	Karnataka	IV Push: 250mg/4.9ml WFI (50mg/ml) OR 500mg/4.8ml WFI (100mg/ml) ⁶ Infuse over 2-4mins ^{6,7} IM: 250mg/1.9ml WFI (125mg/ml) OR 500mg/1.7ml WFI (250mg/ml) ⁶	IV Push: 50mg/ml OR 100mg/ml ^{6,7} IM: 125mg/ml OR 250mg/ml ^{6,7}	IV Infusion: 1-2mg/ml using NS, D5W over 30-40mins ^{6,7}	1-2mg/ml ⁷	48 hours ^{6,7}	24 hours ^{6,7}	24 hours ⁶	12 hour ⁷

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
21	Colistimethate Sodium 1 million International Unit (1MIU) or 2 Million International Unit (2MIU) Polymycin E (A)	Colomycin / Penn	1 MIU/ 2ml WFI, NS; 2 MIU/4ml WFI, NS for nebuliser or deep IM ¹ (IV administration is preferred over IM ²) or IV push over 3-5mins ⁶	NA	NA	NA	Use Immediately ¹ Solution for Inhalation: 24 hours ¹	Discard unused reconstituted drug	Discard unused diluted drug	NA, Discard unused diluted drug

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
22	Doripenem 500mg (Doripenem monohydrate) (A*)	Doribax/ Shionogi	500mg/10ml WFI, NS (shake to form suspension, MUST BE FURTHER DILUTED for injection) ¹	50mg/ml ¹	IV infusion: Withdraw the solution from vial and infuse to 100ml NS, D5W (D5W solution for injection should not be used for infusion greater than 1 hr) ¹ <u>Dose 500mg:</u> Infuse all solution. ¹ <u>Dose 250mg:</u> Discard 55ml from final solution & infuse the remaining solution. ¹ IV Infusion over at least 1 hour ¹	4.5mg/ml ^{1,5}	1 hour (<30°C) ¹	1 hour (<30°C) ¹	NS: 72 hours ¹ D5: 24 hours ¹ (Once removed from the refrigerator, infusion should be completed within room temperature stability time, provided the total refrigeration time, time to reach room temperature and infusion time does not exceed refrigeration stability time) ¹	NS: 12 hours ¹ D5: 4 hours ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
23	Ertapenem 1g (A*)	Invanz / Merck	IM: 1g/ 3.2ml 1.0% or 2.0% lidocaine HCl injection (without epinephrine). Shake well. Use within 1 hour. ¹ (Reconstituted solution should not be administered intravenously) ¹	NA	IV infusion: 1g/10ml WFI, NS, Bacteriostatic WFI (DO NOT USE DEXTROSE). Shake well. Immediately transfer to 50ml NS. ¹ Infuse over 30 mins. ¹	20mg/ml ¹	NA, Discard unused reconstituted drug	NA, Discard unused reconstituted drug	24 hours (5°C). Use within 4hours after removal from refrigeration ¹	6 hours (25°C)

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
24	Erythromycin 500mg (=Erythromycin Lactobionate 744.1mg) (A*)	Fisiopharma	IV Push is not recommended ¹	NA	Reconstitute with 10ml WFI (50mg/ml). IV infusion: Dilute with at least 100ml NS to 5mg/ml. ¹ May also dilute with D5W provided they are neutralized (stability of Erythromycin Lactobionate by additional 5ml of sterile 8.4% sodium bicarbonate solution for 1 litre of D5W prior to addition of Erthromycin. ¹	1-5mg/ml (Higher concentration may result in pain along the vein) ¹	Use immediately	Use immediately	Use immediately	Use immediately

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
					IV infusion Rate : 1-2g of Erythromycin daily over 20-60 mins every 6hours or over 24 hours. (Rapid infusion is more likely to be associated with arrhythmias or hypotension) ¹					
25	Fluconazole 100mg/50ml (A)	Diflucan / Pfizer	NIL	2mg/ml	Maximum infusion rate: 10ml/min	NA	Single use only ¹	Do not freeze ¹	Single use only ¹	Do not freeze ¹
26	Ganciclovir 500mg (A*)	Cymevene/ Roche	500mg / 10ml WFI	50mg/ml ¹	IV infusion: the required dose diluted in 50-250ml (usually 100ml) NS, D5W, LR ⁶ IV infusion over 1 hour ¹	10mg/ml ¹	should not refrigerated	12 hours ¹	24 hours ¹	NA

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
27	Gentamicin 80mg/2ml (B)	Garasent / Duopharma	NIL	40mg/ml	IV Infusion: 1mg/ml using D5W, NS ¹ IV Infusion over 20-30 mins ¹ (IV Push not recommended) ²	1mg/ml ¹ (40mg/ml ²)	Not recommended to refrigerate premixed vial ⁴	NIL INFO	24 hours (In NS or D5W) ⁴	24 hours (In NS or D5W) ⁴
28	Imipenem 500mg + Cilastatin 500mg (A*)	Tienam / Merck (MSD)	(Tienam available as IV infusion only) ¹	-	IV Infusion: Reconstitute 500mg with 10ml NS ¹ (from 100ml NS drip), shake well and transfer back to the same '100ml NS drip' Other compatible diluents: D5W, D10W, D5 ¼ NS, D5 ½ NS, D5NS <u>Dose ≤500mg:</u> IV Infusion over 20-30 mins <u>Dose >500mg:</u> IV Infusion over 40-60 mins If patient develops nausea, rate of infusion may be slower. ¹	5mg/ml ²	24 hours (4°C) ^{1,4}	4 hours (25°C) ^{1,4}	24 hours (4°C) ^{1,4}	4 hours (25°C) ^{1,4}

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
29	Kanamycin sulfate 1g (A*)	Kanamycin/ Yung Shin	1g/3ml	NA	IV Infusion: 2.5-5mg/ml using NS, D5W, D10W, D5NS, LR ⁶ Infuse over 30-60min ⁶	2.5-5mg/ml ⁶	24 hours ⁶	24 hours ⁶	24 hours ⁶	24 hours ⁶
30	Linezolid 600mg/300ml infusion bag (A*)	Zyvox / Fresenius Kabi	NIL	2mg/ml	IV Infusion over 30-120mins ¹ Keep infusion bags in the overwrap until ready to use in RT ¹	2mg/ml ¹	Do not refrigerate ¹	Discard unused drug ¹	Do not refrigerate ¹	Discard unused drug ¹
31	Meropenem 500mg or 1g (A*)	DBL™ Meropenem/ Hospira (WARNING: stability change according to brand)	500mg/10ml WFI; 1g/20ml WFI Shake well before use. IV Push over 5 mins ^{1,2}	50mg/ml ¹	IV Infusion: May reconstitute with NS and dilute to 1-20mg/ml using NS ¹ IV Infusion over 15-30 mins ^{1,2} Other compatible diluents (lower stability, must not be stored) : D5W, D10W, D5 ¼ NS, D5NS	50mg/ml ²	24 hours in WFI/NS ¹	8 hours in WFI/NS ¹	24 hours in NS ¹	8 hours in NS ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
32	Metronidazole 500mg/100ml drip (A)	Metronol / Ain Medicare	NIL	NA	IV Infusion over 20-30mins ¹	5mg/ml ¹	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹
33	Moxifloxacin HCl 400mg/250ml (A*)	Avelox / Bayer	NIL	NA	IV Infusion over 60mins ¹	NA	Not recommended to store in fridge ¹	24 hours ¹	Not recommended to store in fridge ¹	24 hours ¹
34	Penicillin G Benzathine 2.4 Mega Units (Benzathine Penicillin 2.4MIU/1.8g) (B)	Karnataka	IM: 2.4MU/8ml WFI ¹ (Use immediately) ⁵	NA	DO NOT INJECT INTO OR NEAR AN ARTERY OR A NERVE ⁵	NA	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹
35	Pentamidine isethionate 300mg (A*)	Hospira	300mg/3-5ml WFI (Direct bolus injection and rapid administration must not be used) ¹	60-100mg/ml ¹	IV infusion: 1-2.5mg/ml using D5W or NS. ¹ Infuse over 60mins ¹	1-2.5mg/ml ¹	24 hours ¹	24 hours ¹	24 hours ¹	24 hours ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
36	Polymyxin B sulphate 500,000 units (A)	Samarth	IT: 500,000units/ 10ml NS ¹ IM: 500,000units/2ml WFI,NS or 1% procaine HCl (not recommended routinely because of severe pain at injection site, particularly in infants and children) ¹ Ophthalmic: 500,000units/20- 50ml WFI or NS ⁵	IT: 50,000units/ml ¹ IM: 250,000units/ ml ¹ Ophthalmic: 10,000- 20,000units/ml or 0.1%-0.25% ⁵	Continuous IV Infusion: 500,000units in 300- 500ml D5W ¹ infuse over 60-120 mins ⁵	NA	72 hours ⁵	NA	72 hours ⁵	NA
37	Procaine Penicillin 4 Mega Units (Procaine Benzylpenicillin BP 3.0g + Benzylpenicillin Sodium BP 0.6g) (Penicillin Procaine) (B)	Fortified Procaine Benzyl Penicillin / Karnataka	IM: 4Mega Units/ 10ml WFI ¹	NA	DO NOT INJECT INTO OR NEAR AN ARTERY OR A NERVE ⁵	NA	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
38	Quinine Dihydrochloride 600mg/2ml (B)	Malakin/ Duopharma	NIL	NA	IV infusion: Dilute the required dose with 250 - 500ml of diluents (D5W, D5NS, NS) ⁵ , infuse over 4 hours ¹ .	NA	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹	Discard unused drug ¹
39	Streptomycin Sulfate 1g (B)	Streptin / SM	IM: 1g/4.2-4.5ml of NS/WFI (200mg/ml) or 1g/3.2-3.5ml of NS/WFI (250mg/ml)	200-400mg/ml ⁵	Intermittent IV Infusion: Dilute to 100ml NS/ D5W, infuse over 30min ⁵	NA	24 hours ¹	NA	24 hours ⁵	NA

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
40	Sulfamethoxazole 400mg and trimethoprim 80mg/5ml ampoule (A)	DBL Sulfamethoxazole 400mg and trimethoprim 80mg / Hospira	Do not give as IV bolus or rapid infusion. ⁵	NA	IV infusion: Dilute 1ml to at least 25ml infusion solution and shake well. (If turbidity or crystallisation, must be discarded). ¹ IV Infusion over 30mins (do not exceed 1.5hours) ¹ <u>Fluid restriction:</u> Dilute each 5ml to 75ml infusion solution ⁵ Compatible infusion solutions: NS, D5W, D10W, 4%Dext/0.18%NaCl, 2.5% Dext/0.45%NaCl, 0.45% NaCl, Hartmann's Inj. ¹	NA	Do not refrigerate ¹	Discard unused drug	Do not refrigerate ¹	24 hours (all infusion solutions except Hartmann's Inj which is stable for 8hours) ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
41	Sulperazone 1g (Cefoperazone 500mg + Sulbactam 500mg) (SUPPLY IV INFUSION) (A)	Vaxcel Cefobactam/ Kotra OR Sulperazon / Pfizer	1g/3.4ml WFI, D5W, NS	1g/3.4ml (125mg/ml+125mg/ml)	IV Push over ≥ 3 mins ¹ IV Infusion: 50mg/ml using WFI, D5W, NS (to be DILUTED WITH THE SAME SOLUTION ¹) IV Infusion over 15-60 mins ¹	10mg cefoperazone and 5mg sulbactam per ml to 250mg cefoperazone and 125mg sulbactam per ml ¹	NIL INFO	24 hours ¹	24 hours	NIL INFO
42	Tazocin 4.5g (Piperacillin 4000mg + Tazobactam 500mg) (A*)	Tazpen / Agila OR Tazocin / Wyeth	4.5g/ 20ml WFI, D5W, NS (Not administered by IV Push) ²	200mg/ml (piperacillin component)	20mg/ml (piperacillin component) using WFI, D5W, NS, LR IV Infusion over 30 mins ^{1,2}	200mg/ml; however, 20mg/ml preferred (piperacillin component) ²	48 hours (2-8°C) ¹ (In NS or D5W) ⁴	24 hours ⁴ (<25°C) ¹	48 hours (7days In NS or D5W) ⁴	24 hours (In NS or D5W) ⁴

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
43	Tigecycline 50mg/5ml (A)	Tyagcil / Wyeth	50mg/5.3ml NS, D5W (Gently swirl until dissolve)	10mg/ml ¹	IV Infusion: For <u>50mg</u> dose, withdraw 5ml from vial and add to 100ml infusion solution. ¹ For <u>100mg</u> dose, withdraw 10ml from vial and add to 100ml infusion solution. ¹ IV Infusion over 30-60mins. ¹	0.5-1mg/ml ¹	48 hours (2-8°C) ¹	6 hours ¹	48hours (2-8°C) ¹	24 hours (6 hours in vial and remaining 18 hours in infusion solution) ¹

NO	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	Final IV Infusion Max Concentration	Stability of Reconstituted Solution		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
44	Vancomycin 500mg (A)	Vancotex / Fisiopharma OR Vancomycin HCL / Hospira	500mg/10ml WFI, D5, NS (IV Push not recommended) ²	50mg/ml ¹	5mg/ml using D5W, D5NS, D5LR, LR, NS Adult/ Pediatric/ Neonates: IV Infusion over ≥1 hour ^{1,2} (or slow rate at ≤10mg/min in adult) ^{1,2} (Rapid infusion over ≤1hr may cause Red Man Syndrome. Prevention: Lengthen infusion to ≥2hours and/or pretreatment with antihist/ H ₂ -antagonist ²)	5mg/ml ^{1,2}	7 days	24 hours	7 days	24 hours

No	Active Ingredient & Category of Prescribers	Brand Name / Manufacturer	Reconstitution for IV Push(bolus)/ IM/ IT & Rate of injection	Strength after reconstitution	Dilution of IV Infusion & Rate of Infusion	IV Infusion Max Concentration	Stability of Opened Vials		Stability of Diluted Solution	
							2-8°C (Fridge)	RT	2-8°C (Fridge)	RT
45	Actrapid100IU/ml (1000IU/10ml Vial) (Fridge item) (B)	Actrapid / Novo Nordisk	NA	NA	IV Infusion: 0.05-1.0 IU/ml NS, D5W, D10W ¹	0.05-1 IU/ml ¹	24 hours (Insulin solution should not be used if they do not appear clear and colourless) ¹	NA	24 hours (Insulin solution should not be used if they do not appear clear and colourless) ¹	NA
46	Heparin Sodium 5000IU/ml vial (B)	Heparinol / Ain Medicare	May be administered by deep Subcutaneous injection, by intermittent injection undiluted and diluted. ⁵ Intramuscular should not be used because of pain and hematoma formation. ⁶	NA	Intermittent IV Infusion: Dilute in 50-100ml D5W or NS. Continuous IV Infusion: Dilute in 1L Container should be Inverted at least 6 times after heparin sodium addition to prevent pooling. Discard if discolored or contains precipitation	1-32units/ml ⁶	Do not refrigerate after opening ¹	7 days	Do not refrigerate after opening ¹	24 hours ⁵

List of Abbreviations

NO.	Abbreviations	Interpretation
1	D5NS	5% Dextrose in Normal Saline
2	D5 ½ NS	5% Dextrose in 0.45% Sodium Chloride
3	D5 ¼NS	5% Dextrose in 0.225% Sodium Chloride
4	D5LR	5% Dextrose in Lactated Ringer's Solution
5	D5W	5% Dextrose in Water
6	D10W	10% Dextrose in Water
7	HS	1/2 Normal Saline (0.45% sodium chloride)
8	LR	Lactated Ringer's Solution
9	NA	Not Available/ Not Applicable
10	NS	Normal Saline (0.9% sodium chloride)
11	RT	Room Temperature
12	WFI	Water For Injection

References

1. Product leaflets
2. Pediatric injectable drugs the Teddy bear book),9th edition. Stephanie J. Phelps; Emily B. Hak; Catherine M. Crill
3. Pocket guide to injectable drugs, companion to the handbook on injectable drugs, 15th edition. Lawrence A.Trissel
4. Lexi-Drugs. Lexi-Select, Version: 1.3.1(81), www.lexi.com/individuals/iphone
5. Micromedex Android Mobile Application Version 1.7b63 Content version v1631
6. Handbook on Injectable Drugs, 13th Edition. Lawrence A. Trissel, American Society of Health-system Pharmacists
7. Lexicomp iphone version: 2.3.0 2015