CIPROFLOXACIN

This drug must be guardrailed

Trade Name	Ciproxine® 250mg/5mL oral solution (Bayer)* Ciprofloxacin(e)® 200mg/100mL (Fresenius Kabi)*
Class	Antibiotic (quinolone)
Mechanism of Action	Inhibits DNA-gyrase and relaxation of supercoiled DNA promoting breakage of double stranded DNA
Indications **Individual ID approval required for full treatment course**	**Indication 1:** Cystic Fibrosis for pseudomonas infections **Indication 2:** Bacterial infection with sensitive organisms E coli, Shigella, Salmonella, Klebsiella, Enterobacter, Serratia, Proteus, Yersinia, Pasturella, Haemophilus, Pseudomonas, Campylobacter, Legionella, Neisseria, Moraxella, Acinetobacter, Brucella, Staphylococcus, Listeria, Corynebacterium, Chlamydia).
Contraindications	Known family history of allergy to ciprofloxacin or other quinolone antibiotics **Use with caution:** In neonates and children due to results of pre-clinical trials on animals that showed evidence of arthropathy of weight-bearing joints in immature animals. Quinolones may cause CNS stimulation, use with caution in patients with a history of epilepsy or seizures (quinolone antibiotics lower seizure threshold). In babies receiving phototherapy for jaundice as ciprofloxacin increases the light sensitivity of the skin.
Supplied As	Ciprofloxacin Liquid 250mg/5mL(= 50mg/mL) Ciprofloxacin Infusion 200mg/100mL –colourless solution
Dilution	IV solution is usually infused undiluted
Dosage ***Must chart guardrail and use Alaris pump***	**Please discuss dosing with ID consultant prior to use** **Indication 1:** IV 20mg/kg/day Oral 40mg/kg/day **Indication 2:** IV 10mg/kg/dose Oral 15mg/kg/dose
Guardrails	Concentration: 2mg/mL Soft Alert Min: 5mg/kg/hr Hard Alert Max: 15mg/kg/hr Soft Alert Max: 10mg/kg/hr Default Setting: 20mg/kg/hr
Interval	**IV:** 12 hourly in the first month, then 8 hourly **Oral**: 12 hourly in the first month, then 8 hourly (giving oral doses with food may help to reduce stomach upset)
Administration	**IV:** infusion over 60 minutes to avoid venous irritation

Compatible With	**Solution:** 0.9% sodium chloride, 5% & 10% dextrose, Ringer's solution, Lactated Ringer's. **Y-site compatibility with;** Amikacin, amiodarone, atracurium, aztreonam, calcium gluconate, caspofungin, ceftazidime, dexmedetomidine, digoxin, diltiazem, diphenhydramine, dobutamine, dopamine, fluconazole, gentamicin, lidocaine, linezolid, lorazepam, metoclopramide, metronidazole, midazolam, milrinone, noradrenaline, octreotide, pancuronium, potassium acetate, potassium chloride, promethazine, ranitidine, remifentanil, sodium chloride, tacrolimus, tobramycin, vancomycin, vasopressin, and verapamil
Incompatible With	**IV:** Due to the acidic pH of ciprofloxacin IV solution other infusions should, if possible, be temporarily discontinued whist ciprofloxacin is being administered. **Incompatible with;** Aciclovir, aminophylline, amphotericin B, ampicillin/sulbactam, azithromycin, cefepime, cefuroxime, clindamycin, dexamethasone, furosemide, heparin, hydrocortisone sodium succinate, magnesium sulphate, methylprednisolone, meropenem, pantoprazole, phenytoin, piperacillin, potassium phosphate, propofol, sodium bicarbonate, and sodium phosphate. Note: reports on compatibility of ciprofloxacin with TPN are variable and the compatibility with SMOF lipid has not been tested. Infuse ciprofloxacin in a separate line to these solutions.
Interactions	**IV:** ciprofloxacin iv may decrease phenytoin concentrations **Oral:** Iron, zinc, calcium, multivitamins and antacids or other drugs containing magnesium, aluminium or calcium may reduce the absorption of ciprofloxacin, - avoid taking these preparations within 2 hours of ciprofloxacin. (Note: this warning re antacids does not apply to ranitidine or omeprazole) Ciprofloxacin is a strong inhibitor of CYP1A2 and may increase levels of caffeine and cyclosporin.
Monitoring	Renal function, hepatic function, full blood count
Stability	**IV:** Discard premade bag after each dose Use a new bag for each dose as bags are not made for multiple use **Oral:** liquid stable for 14 days after reconstitution at room temp
Storage	**IV:** Discard remaining solution immediately after use **Oral:** Room temperature

Adverse Reactions	Stomach upset, dark urine, rash, hypoglycaemia, arthralgias/tendonitis, photosensitivity reactions, thrombophlebitis, altered kidney function, pancreatitis, cardiac arrhythmias including QT prolongation.
Metabolism	Ciprofloxacin is well absorbed orally and widely distributed throughout the tissues. It is metabolised by the liver to 4 active metabolites. Half life =4-5 hours. 30 - 50% renally excreted as unchanged drug the remainder is excreted in faeces and bile.
Comments	***July 2023:** Supply of ciprofloxacin IV and oral liquid in NZ is currently extremely limited. The intravenous and oral liquid forms of ciprofloxacin currently available are all section 29 products (not registered for use in NZ). Use should be limited to those infections for which there are no other alternative treatments. Maintain oral hydration to reduce risk of crystalluria. Sodium content of Kabi Fresenius ciprofloxacin Infusion = 15.1mmol/ 100mL Note: pH of Ciprofloxacin Infusion = 3.9 – 4.5 (solubility reduced at pH 5-9)
References	1. Frank Shann: "Drug Doses" booklet; 1998 (10th Ed.):26. 2. Neonatal Formulary The Northern Neonatal Network. BMJ 2000. 3. Hull D et al. Eds. Medicines for Children RCPCH 1999.0 4. www.medsafe.govt.nz 5. Lacy et al. Paediatric Dosage Handbook 6th Edition 1999/2000. 6. NZHPA Notes on Injectable Drugs 5th Edition 7. Trissell Handbook of Injectable Drugs 10th Edition 8. www.nzf.org.nz 9. https://www.micromedexsolutions.com/micromedex2/librarian/PFActionId/evidencexpert.GetNeofaxDrugMonograph?navitem=neofaxDrugMonographDocRetrieval&drugName=Ciprofloxacin&tabSelected=neonatal#
Updated By	B Robertshawe, P Schmidt November 2005; May 2006 A Lynn, B Robertshawe September 2009, April 2012 A Lynn, B Robertshawe Nov 2012 (re-order profile, discard bag) A Lynn, Tony Walls (Paed ID) July 2013 (PHARMAC update Ab approvals) A Lynn, M Wallenstein, B Robertshawe November 2020. A Lynn, B Robertshawe Oct 2023. (routine review)