

Medicines Update

Appendix 1 – International Practices of Aminoglycoside Administration (IV infusion and IV injection)

Aminoglycoside Administration – IV Infusion				
	United Kingdom	United States	Australia	New Zealand
Gentamicin	<ul style="list-style-type: none"> BNFC [1] – infuse over 20-30 minutes or over 60 minutes for once daily regimens Medusa Injectable Medicines Guide [2] – infuse over 30 minutes or 60 minutes for once daily regimens. Alder Hey Children’s NHS Foundation Trust [3] – infuse over 20 minutes PIER network (Wessex) – infuse over 30 minutes. [4] 	<ul style="list-style-type: none"> Pediatric Injectable Drugs: the teddy bear book – infuse over 30 – 120 minutes. [5] Lexicom – infuse over 30 – 120 minutes (usual infusion time is 30 – 60 minutes). Longer infusion times (60 -120 minutes) with high doses. [6] 	<ul style="list-style-type: none"> Queensland Children’s Hospital – infuse over 30 minutes. [7] Perth Children’s Hospital – infuse over 30 minutes [8] The Children’s Hospital at Westmead – infuse over 30 minutes. [9] Australian Medicines Handbook – infuse over 15-30 minutes. [10] Sydney Children’s hospital – may be given as a 30 minute infusion. [11] 	<ul style="list-style-type: none"> Starship Child Health – infuse over 30 minutes for once daily dosing. [12] Notes on Injectable Drugs – for once daily dose regimens infuse over 30 minutes (preferred method). [13]
Amikacin	<ul style="list-style-type: none"> BNFC [1] Medusa Injectable Medicines Guide [2] Scottish perinatal network [14] – for neonates. Great Ormond Street Hospital – for 20-30 mg/kg once daily doses, infuse over 30 minutes.[15] Leeds Centre for Cystic Fibrosis (adult and paediatric) [16] – infuse over 30-60 minutes. Alder Hey Children’s NHS Foundation Trust [3] – infuse over 20 minutes. 	<ul style="list-style-type: none"> Pediatric Injectable Drugs: the teddy bear book – infuse over 30 – 60 minutes. [17] Lexicomp – Infuse over 30 – 60 minutes, 20 minutes has been reported in neonates (1st line). [6] 	<ul style="list-style-type: none"> Perth Children’s Hospital – infuse over 30 -60 minutes. [18] The Children’s Hospital at Westmead – infuse over 30-60 minutes in children and 1-2 hours in infants. [9] Australian Medicines Handbook – infuse over 15-30 minutes. [10] Queensland Children’s Hospital – infuse over 30 minutes – 1 hour, or 1-2 hours in neonates and infants. [7] 	<ul style="list-style-type: none"> Australasian Neonatal Medicines Formulary – infuse over 60 minutes. [19] Starship Child Health – infuse over 30 minutes for once daily dosing. [12] Notes on Injectable Drugs – infuse over 30 – 60 minutes (children) or 60 – 120 minutes in infants (preferred method).[20]
Tobramycin	<ul style="list-style-type: none"> BNFC [1] Medusa Injectable Medicines Guide – once daily regimens [2] UK Cystic Fibrosis (CF) Trust antibiotic working group guidelines [21] – for 10 mg/kg once daily, infuse over 30 minutes Leeds Centre for Cystic Fibrosis (adult and paediatric) [16] – infuse over 30 minutes Alder Hey Children’s NHS Foundation Trust [3] – for 7mg/kg once daily or 10mg/kg once daily in CF, infuse over 20 minutes. 	<ul style="list-style-type: none"> Pediatric Injectable Drugs: the teddy bear book – infuse over 20 – 60 minutes. [22] Lexicomp – Infuse over 20 to 60 minutes. [6] 	<ul style="list-style-type: none"> Perth Children’s Hospital – infuse over 20 – 40 minutes. [23] The Children’s Hospital at Westmead – infuse over 30 minutes. [9] Australian Medicines Handbook – infuse over 15-30 minutes. [10] Sydney Children’s hospital – may be given as a 30 minute infusion. [11] Queensland Children’s Hospital – infuse over 30 minutes. [7] 	<ul style="list-style-type: none"> Australasian Neonatal Medicines Formulary – infuse over 30 minutes (20-60 minutes). [24] Starship Child Health – infuse over 30 minutes for once daily dosing. [12] Notes on Injectable Drugs – for once daily dose regimen infuse diluted over 20 – 60 minutes, preferably 60 minutes (preferred method). (25)

Medicines Update

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	United Kingdom	United States	Australia	New Zealand
Gentamicin	<ul style="list-style-type: none"> • BNFC [1] • Medusa Injectable Medicines Guide [2] • Alder Hey Children's NHS Foundation Trust [3] – for neonates and patients on multiple daily dosing regimens • Oxford University Hospitals NHS Trust [26] – for neonates • PIER network (Wessex) [4] 	<ul style="list-style-type: none"> • Lexicomp – not 1st line but it has been reported in paediatric patients receiving $\leq 4\text{mg/kg/dose}$ [6] 	<ul style="list-style-type: none"> • Sydney Children's hospital – may be administered as a slow push over 3-5 minutes. [11] • Perth Children's hospital – doses $\leq 120\text{mg}$ (higher doses may be given to those who are critically unwell) [8] • The Children's Hospital at Westmead (preferred method) [9] • Australian Medicines Handbook – doses $<120\text{mg}$ may be given as an IV injection over 3-5 minutes, although it acknowledges that bolus administration of all doses is widely used in clinical practice without evidence of clinical toxicity. [10] 	<ul style="list-style-type: none"> • Australasian Neonatal Medicines Formulary – over 5 minutes. [27] • Notes on Injectable Drugs – only if intermittent intravenous infusion is not possible – for once daily and multiple daily dose regimen (undiluted or in up to 20ml NaCl 0.9% over at least 3 minutes). [13]
Amikacin	<ul style="list-style-type: none"> • BNFC [1] • Medusa Injectable Medicines Guide [2] – for doses $\leq 15\text{ mg/kg}$ • UK Cystic Fibrosis Trust antibiotic working group guidelines [21] – for 10mg/kg 8 hourly • Alder Hey Children's NHS Foundation Trust [3] – for neonates but short infusion usually preferred • Great Ormond Street Hospital – for 10-15 mg/kg once daily doses [15] 	<ul style="list-style-type: none"> • Lexicomp – some reports of slow injection (over 1-5 minutes) but not 1st line. [6] 	<ul style="list-style-type: none"> • Australian Medicines Handbook - Doses $<500\text{mg}$ can be given as an IV injection over 3-5 minutes. [10] 	<ul style="list-style-type: none"> • Notes on Injectable Drugs – for multiple daily dose regimen administer undiluted or dilute in compatible fluid over 3 – 5 minutes (IV infusion is preferred). [19]
Tobramycin	<ul style="list-style-type: none"> • BNFC [1] • Medusa Injectable Medicines Guide – multiple-dose regimens [2] • UK Cystic Fibrosis Trust antibiotic working group guidelines [21] – for 3.3 mg/kg 8 hourly • Alder Hey Children's NHS Foundation Trust [3] – for neonates on extended interval dosing 	<ul style="list-style-type: none"> • Lexicomp – some reports of slow injection ($\leq 5\text{ minutes}$) but not 1st line. [6] 	<ul style="list-style-type: none"> • Sydney Children's hospital – may be administered as a slow push over 3-5 minutes. [11] • Perth Children's Hospital - doses $\leq 120\text{mg}$ [23] • Australian Medicines Handbook – doses $<120\text{mg}$ may be given as IV injection over 3-5 minutes. [10] 	<ul style="list-style-type: none"> • Notes on Injectable Drugs – for multiple daily dose regimes administer undiluted over 3 – 5 minutes. [24]

Medicines Update

References - Appendix 1

- 1) Paediatrics Formulary Committee. BNF for Children (online). London: BMJ Group, Pharmaceutical Press, and RCPCH Publications. Available from: <https://www.medicinescomplete.com/#/> [Accessed 8 Oct 2023].
- 2) NHS Injectable Medicines Guide (Medusa), 2020. Available from: <https://www.medusaimg.nhs.uk/> [Accessed 8 Nov 2023].
- 3) Alder Hey Children's NHS Foundation Trust Medicines Information. Personal communication. 2023.
- 4) Paediatric Innovation, Education and Research (PIER) Network. Gentamicin dosing in children, 2018. Available from: https://www.piernetwork.org/uploads/4/7/8/1/47810883/pier_gentamicin_guidelines_final_feb_2018_copy.pdf [Accessed 1 Dec 2022].
- 5) Phelps SJ, Hageman TM, Lee KR, *et al*. Gentamicin Sulfate. In: Pediatric injectable drugs: the teddy bear book. Bethesda: American Society of Health-System Pharmacists; 2018. p 438–41.
- 6) Post T, editor. Pediatric drug information. Lexicomp®. In: UpToDate. Waltham, MA: Wolters Kluwer Health. Available from: <http://www.uptodate.com/> [Accessed 8 Nov 2022].
- 7) Children's Health Queensland Hospital and Health Service. Intravenous Aminoglycoside therapy (Amikacin, Gentamicin and Tobramycin). Paediatric Medication Guideline 2023. Available from: https://www.childrens.health.qld.gov.au/_data/assets/pdf_file/0031/176917/paed-tobramycin-gentamicin-therapeutic-drug-monitoring.pdf [Accessed 6 Dec 2023].
- 8) Perth Children's Hospital. Children's Antimicrobial Management Programme (ChAMP). Gentamicin (intravenous) Monograph – Paediatric 2022. Available from: <https://pch.health.wa.gov.au/~media/Files/Hospitals/PCH/General-documents/Health-professionals/ChAMP-Monographs/Gentamicin.pdf> [Accessed 6 Dec 2023].
- 9) The Children's hospital at Westmead. Aminoglycoside dosing and Monitoring 2021. Available from: <https://www.schn.health.nsw.gov.au/policies/pdf/2011-8018.pdf> [Accessed 6 Dec 2023].
- 10) *Australian Medicines Handbook*. Adelaide: Australian Medicines Handbook Pty Ltd; 2023.
- 11) Sydney Children's Hospital. Aminoglycoside Therapy – Practice Guideline. 2021. Available from: <https://www.schn.health.nsw.gov.au/policies/pdf/2012-7008.pdf> [Accessed 6 Dec 2023].
- 12) Starship Hospital, Auckland. Aminoglycosides Clinical Guideline 2021. Available from: <https://starship.org.nz/guidelines/aminoglycosides/> [Accessed 8 Nov 2023].
- 13) New Zealand Hospital Pharmacists' Association (Inc.). *Notes on Injectable Drugs*. Gentamicin. 2020.
- 14) West of Scotland NEONATAL Parenteral Drug Monographs. Amikacin. 2019; Available from: https://www.perinatalnetwork.scot/wp-content/uploads/2022/06/Amikacin-WoS_PI.pdf [Accessed 6 Dec 2023].
- 15) Great Ormond Street Hospital for Children NHS Foundation Trust. Amikacin Guidelines, 2014. Available from: <https://goshintensiveware.files.wordpress.com/2017/08/amikacin.pdf> [Accessed 7 Nov 2023].
- 16) Leeds Centre for Cystic Fibrosis & Leeds Children's Hospital. INTRAVENOUS Antibiotic Guidelines for Patients with Cystic Fibrosis at Leeds Cystic Fibrosis Units (Adult and Paediatric), 2019. Available from: <http://www.leedsformulary.nhs.uk/docs/5.1CysticFibrosisAntibioticVDoses.pdf> [Accessed 7 Nov 2023].
- 17) Phelps SJ, Hageman TM, Lee KR, *et al*. Amikacin Sulfate. In: *Pediatric injectable drugs: the teddy bear book*. Bethesda: American Society of Health-System Pharmacists; 2018. p42–5.
- 18) Perth Children's Hospital. Children's Antimicrobial Management Programme (ChAMP). Amikacin Monograph – Paediatric, 2022. Available from: <https://pch.health.wa.gov.au/~media/Files/Hospitals/PCH/General-documents/Health-professionals/ChAMP-Monographs/Amikacin.pdf> [Accessed 6 Dec 2023].
- 19) Australasian Neonatal Medicines Formulary Consensus Group. Amikacin 2021. Available from: <https://www.anmfonline.org/wp-content/uploads/2021/06/amikacin-18022021-2.0.pdf> [Accessed 8 Dec 2023].
- 20) New Zealand Hospital Pharmacists' Association (Inc.). *Notes on Injectable Drugs*. Amikacin 2020.
- 21) UK Cystic Fibrosis Trust Antibiotic Working Group. Antibiotic Treatment for cystic fibrosis. 3rd edition 2009. Available from: <https://www.cysticfibrosis.org.uk/sites/default/files/2020-11/Anitbiotic%20Treatment.pdf> [Accessed 1 Dec 2023].
- 22) Phelps SJ, Hageman TM, Lee KR, *et al*. Tobramycin Sulfate. In: Pediatric injectable drugs: the teddy bear book. Bethesda: American Society of Health-System Pharmacists; 2018. p 830–3.
- 23) Perth Children's Hospital. Children's Antimicrobial Management Programme (ChAMP). Tobramycin (intravenous) Monograph – Paediatric, 2022. Available from: <https://pch.health.wa.gov.au/~media/Files/Hospitals/PCH/General-documents/Health-professionals/ChAMP-Monographs/Tobramycin.pdf> [Accessed 6 Dec 2023].

Medicines Update

- 24) Australasian Neonatal Medicines Formulary Consensus Group. Tobramycin 2020. Available from: <https://www.anmfonline.org/wp-content/uploads/2021/06/tobramycin-29102020-1.0.pdf> [Accessed 8 Dec 2023].
- 25) New Zealand Hospital Pharmacists' Association (Inc.). *Notes on Injectable Drugs*. Tobramycin 2020.
- 26) Oxford University Hospitals NHS Trust. Gentamicin Injection - Monograph Neonatal 2014. Available from: accessed via NPPG discussion forum.
- 27) Australasian Neonatal Medicines Formulary Consensus Group. Gentamicin 2021. Available from: <https://www.anmfonline.org/wp-content/uploads/2021/06/gentamicin-18022021-3.0.pdf> [Accessed 8 Dec 2023].