Waikato District Health Board	Type: Drug Guideline	Document reference: 2911	Manual Classification: Waikato DHB Drug Guidelines
Title: **Doxapram for neonates**			Effective date: **25 January 2022**
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BRIEF ADMINISTRATION GUIDE

For detailed information refer to the Canterbury DHB Neonatal services guideline **doxapram**

Critical Note: there are minor variations between the Canterbury guideline and Waikato DHB best practice within this drug guideline – see yellow shaded text

Indications: Apnoea of prematurity unresponsive to caffeine (or aminophylline)

Route: Intravenous or Oral

- Supplied as doxapram 100 mg/5 mL (20 mg/mL) vial (contains benzyl alcohol) Doxapram injection is an unregistered medicine available under section 29 of the Medicines Act. Names of the patient and prescriber must be sent to Pharmacy when ordering
  - pH of doxapram is 3.5 to 5

Dose:

Continuous IV Infusion

- Start with a 2.5mg/kg loading dose, administered over 30 minutes.
- Follow loading dose with a maintenance infusion of 0.5 mg/kg/hr, then increase dose as needed to control apnoea up to a maximum rate of 1.5 mg/kg/hr.

Oral

6mg/kg every 6 hours OR if converting from IV therapy then halve the total daily IV dose found to be effective and administer this dose every 6 hours

Weaning: Continue treatment until stable or for a maximum of 48 hours, then titrate to the lowest dose at which apnoea is controlled

Preparation and administration

Compatible fluids: glucose 5%, glucose 10%, sodium chloride 0.9%

Continuous Intravenous Infusion

- Select the concentration of doxapram required based on the weight of the infant and in the context of any fluid restrictions (refer to appendix for assistance) and dilute the appropriate volume of doxapram injection using compatible fluid in accordance with the table below:
  Note: The **recommended concentration is 1 - 2 mg/ml**, however higher concentrations have been used in fluid restricted infants via a central line only.

Final Doxapram Concentration	2 mg/mL	5 mg/mL
Volume of doxapram (100 mg / 5 mL)	5 mL	7.5 mL
Volume of compatible fluid	45 mL	22.5 mL
Total volume	50 mL	30 mL

$$\text{Rate (mL/hr)} = \frac{\text{Dose (mg/kg/hr) x Weight (kg)}}{\text{Concentration (mg/mL)}}$$

- Administer at the prescribed rate by continuous infusion; preferably via a central line to prevent the possibility of extravasation

Oral

- The injection solution may be given orally undiluted. Can be diluted with glucose 5% if required.

Monitoring

- Monitor blood pressure and heart rate prior to administration, every 4 hours during the infusion and as required
- Monitor capillary or arterial blood gases periodically during treatment
- Observe IV site for signs of extravasation

Storage and Stability

- Store vials at or below 25°C. Do not refrigerate.
- Discard unused portion of the vial immediately after use if dose is administered IV. If being used orally the solution can be drawn up into a syringe and discarded after 24 hours.
- Diluted solutions should be used within 24 hours

Competency for Administration

This procedure is carried out by, or under, the direct supervision of a registered nurse/registered midwife who holds current Waikato DHB Generic Medicine Management and IV certification plus Guardrails competency as well as Neonatal specific competency NCV/NAC (if administering via CVAD).

Guardrails Information

Doxapram is Guardrail profiled on the CC syringe driver for NICU. The following entries and limits will be in place from early 2022:

Guardrails Drug Name	Doxapram (load)*	Doxapram (maint)
Concentration (mg/ml)		
Minimum	1	1
Maximum	5	5
Dose rate (mg/kg/hour)		
Default	5	0.5
Soft minimum	4.9	0.3
Soft maximum	5.1	1.5
Hard max	5.1	1.6

References

- New Zealand Formulary for Children (NZFC). Respiratory Stimulants. Accessed 27th July 2021. Available from: https://www.nzfchildren.org.nz/nzf_1906
- Lexicomp. Doxapram: Pediatric drug information monograph. Uptodate. Accessed 27th July 2021. Available from: https://www.uptodate.com.
- Phelps SJ, Hagemann TM, Lee KR, Thompson AJ. The Teddy Bear Book: Pediatric Injectable Drugs. 11th edition. American Society of Health-System Pharmacists; 2018.
- Ainsworth S. Neonatal Formulary: Drug Use in Pregnancy and the First Year of Life, 8th ed, 2020. Accessed online via https://oxfordmedicine.com/view/10.1093/med/9780198840787.001.0001/med-9780198840787-chapter-17
- Auckland DHB Newborn Services. Doxapram Drug Protocol. November 2011. Available from: https://starship.org.nz/guidelines/doxapram/
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- Sheffield Neonatal Formulary 8th ed, 2008.
- MercuryPharm Ltd. Doxapram hydrochloride solution for injection Data Sheet. 02 November 2016. Available from: https://www.medicines.org.uk/emc/product/6598

- New Zealand Hospital Pharmacists Assoc. Inc. Notes on Injectable Drugs 8th ed, 2020.
- Waikato DHB. Dr Phil Weston, NICU Consultant.

Note: **Printed copies are only valid on the day of printing – they are not controlled and may not be the current version in use. Please refer to the online version.**

Appendix

Infusion tables

Table 1: Infusion rates when using doxapram concentration **2 mg/mL (preferred concentration)**

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate mg/kg/hour**									
0.5	0.4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4
1	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
1.5	0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3
2	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
2.5	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8
3	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
3.5	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
4	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
4.5	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
5	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4

Table 2: Infusion rates when using doxapram concentration **5 mg/mL**

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate mg/kg/hour**									
1	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
1.5	0.3	0.7	1	1.3	1.7	2	2.3	2.7	3	3.3
2	0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3	2.5
2.5	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
3	0.2	0.3	0.5	0.7	0.8	1	1.2	1.3	1.5	1.7
3.5	0.1	0.3	0.4	0.6	0.7	0.9	1	1.1	1.3	1.4
4	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1	1.1	1.3
4.5	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1	1.1
5	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1