Waikato District Health Board	Type: Drug Guideline	Document reference: 0570	Manual Classification: Waikato DHB Drug Guidelines
Title: **Sodium bicarbonate for neonates**			Effective date: **26 January 2022**
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BRIEF ADMINISTRATION GUIDE

For detailed information refer to The Australasian Neonatal Medicines Formulary **sodium bicarbonate** guideline

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

Indications:
- Prolonged resuscitation ≥ 15 minutes
- Metabolic acidosis (persistent pH less than 7 or persistent base excess less than -12)
- Renal tubular acidosis
- Persistent pulmonary hypertension

Route: Intravenous, Umbilical Arterial Catheter (UAC), Oral

- Supplied as sodium bicarbonate 8.4% (84 mg/ml or 1 mmol/mL) injection
  pH of sodium bicarbonate 7-8.5

Dose:

Prolonged resuscitation
Initially 1 mmol/kg, followed by 0.5 mmol/kg/dose at 10 minute intervals, guided by arterial blood gases

Correction of acidosis
Dose determined by base deficit, usually 1 – 2 mmol/kg/dose

To calculate dosage based on base deficit:
Full correction dose (mmol) = 0.3 x weight (kg) x base deficit (mmol/L)

Administer half of the calculated dose and then assess the need for the remainder. Subsequent doses should be individualised based on response and severity of acidosis

Persistent Pulmonary Hypertension
0.25 – 0.5 mmol/kg/hour continuous IV infusion, titrated according to response and adverse effects

Preparation and administration

Compatible fluids: glucose 5%, glucose 10%, sodium chloride 0.9%, glucose in sodium chloride solutions, water for injection
Note: sodium chloride increases the sodium concentration therefore is the least preferred diluent

To prepare a sodium bicarbonate **0.5 mmol/mL** solution dilute the sodium bicarbonate 8.4% with an equal volume of water for injection. Further dilution down to 0.1 mmol/mL can be performed if required.

Direct IV Injection / UAC
- Administer prescribed dose by slow IV injection in emergency situations only.

Intermittent IV Infusion
- Administer dose by IV infusion over 30 to 60 minutes, with a maximum rate of 1 mmol/kg/hr

Continuous IV infusion
- Administer by continuous IV infusion at the prescribed rate using a Guardrails profiled syringe driver

Note: Flush cannula and IV line following administration to avoid inactivation and precipitation with other medications.

Oral

- The injection solution may be given orally. To minimise gastric irritation, administer after feeds or dilute sodium bicarbonate 8.4% injection with an equal volume of water for injection.

Monitoring

- Monitor arterial blood gases, acid base status, pH and serum electrolytes including calcium at baseline and periodically throughout treatment
- Monitor blood pressure, heart rate, respiratory rate and temperature periodically during treatment.
- Ensure adequate ventilation and response to resuscitation
- Monitor injection site for irritation, extravasation

Storage and Stability

- Discard any unused portion of the injection solution
- Diluted solution may be refrigerated (between 2 - 8°C) and 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

Sodium bicarbonate is Guardrail profiled on the CC pump for NICU. Following are the guardrail limits:

Guardrails Drug Name	Sodium bicarb (int)*	Sodium bicarb (cont)
Pump	**CC**	**CC**
Concentration (mmol/ml)		
Standard	0.5	0.5
Minimum	0.1	0.1
Maximum	0.5	0.5
Dose rate (mmol/kg/hr)		
Default	1	0.25
Soft minimum	0.5	0.1
Soft maximum	1	0.5
Hard max	2	1

References

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- Phelps SJ, Hagemann TM, Lee KR, Thompson AJ. The Teddy Bear Book: Pediatric Injectable Drugs. 11th edition. Sodium Bicarbonate. American Society of Health-System Pharmacists; 2018.
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- AFT Pharmaceuticals Ltd. Sodium bicarbonate Data Sheet. 16 October 2013. Available from: http://www.medsafe.govt.nz/profs/Datasheet/s/SodiumBicarbonateinjAFT.pdf

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

Table 1: Infusion rates when using sodium bicarbonate concentration **0.5mmol/mL**

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5
Weight (kg)	**Approximate mmol/kg/hr**														
0.5	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5
1	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75
1.5	0.03	0.07	0.1	0.13	0.17	0.2	0.23	0.27	0.3	0.33	0.37	0.4	0.43	0.47	0.5
2	0.03	0.05	0.08	0.1	0.13	0.15	0.18	0.2	0.23	0.25	0.28	0.3	0.33	0.35	0.38
2.5	0.02	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18	0.2	0.22	0.24	0.26	0.28	0.3
3	0.02	0.03	0.05	0.07	0.08	0.1	0.12	0.13	0.15	0.17	0.18	0.2	0.22	0.23	0.25
3.5	0.01	0.03	0.04	0.06	0.07	0.09	0.1	0.11	0.13	0.14	0.16	0.17	0.19	0.2	0.21
4	0.01	0.03	0.04	0.05	0.06	0.08	0.09	0.1	0.11	0.13	0.14	0.15	0.16	0.18	0.19
4.5	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.16	0.17
5	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15