

South Australian Neonatal Medication Guidelines

Adrenaline (epinephrine) (undiluted)

1 mg/mL injection (1 in 1000)

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Note:

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

This is a High Risk Medication 

An overdose can be rapidly fatal.

There are two strengths of adrenaline (epinephrine) available. This guideline uses the undiluted 1 mg/mL form and requires diluting prior to intravenous infusion.

For information on adrenaline (epinephrine) for resuscitation, see adrenaline (epinephrine) (diluted) 0.1 mg/mL for resuscitation

Synonyms

Epinephrine

Dose and Indications

Circulatory Support

Intravenous infusion

0.05 to 1 microgram/kg/minute; commence at low dose and titrate based on clinical response

Infusion through a central line is preferable.

Reactive Oedema Post-Extubation

Inhaled via nebuliser

0.5 mL/kg of adrenaline (epinephrine) 1 mg/mL (1 in 1000)

If there is an initial response but subsequent worsening, repeat same dose. If there is no response to the first dose and airway obstruction is severe, re-intubate.

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Preparation and Administration

Store adrenaline (epinephrine) 1 mg/mL (1 in 1000) vials protected from light. It is not necessary to protect from light during administration.

Inhaled

Adrenaline (epinephrine) 1 mg/mL (1 in 1000) may be administered undiluted via nebuliser. For doses resulting in a volume less than 4 mL, make up to a total volume of 4 mL with sodium chloride 0.9%.

Administer the final volume via nebuliser over 15 minutes.

There will always be dead space that is not available for nebulisation – it is not possible to nebulise to dryness.

Intravenous Infusion

It is preferable to run adrenaline (epinephrine) continuous infusion via a dedicated line.

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Adrenaline (epinephrine) Concentration Selection Tables can be found on the following pages of this guideline to assist prescribers to gauge which strength is best for the patient.

Dilute the appropriate volume of the adrenaline (epinephrine) 1 mg/mL (1 in 1000) solution using compatible fluid; and administer by continuous infusion. Diluted preparation is stable for 24 hours at room temperature.

The three standard concentrations to select from are:

Adrenaline (epinephrine) 20 microgram/mL (equivalent to 0.02 mg/mL)

Adrenaline (epinephrine) 60 microgram/mL (equivalent to 0.06 mg/mL)

Adrenaline (epinephrine) 180 microgram/mL (equivalent to 0.18 mg/mL)

Formulae

To calculate infusion rate (mL/hr):

$$\text{Rate (mL/hr)} = \frac{60 \times \text{dose (microgram/kg/min)} \times \text{weight(kg)}}{\text{Strength (microgram/mL)}}$$

To calculate the dose (micrograms/kg/min):

$$\text{Dose (microgram/kg/min)} = \frac{\text{Rate(mL/hr)} \times \text{Strength (microgram/mL)}}{(60 \times \text{weight (kg)})}$$



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Adrenaline (epinephrine) Concentration Selection Table

Adrenaline (epinephrine) 20 microgram/mL

To make 25 mL syringe:

Dilute 0.5 mL adrenaline (epinephrine) (1 mg/mL) with 24.5 mL of compatible fluid (total of 25 mL). This makes a 20 microgram/mL solution (0.02 mg/mL).

To make 50 mL syringe:

Dilute 1 mL adrenaline (epinephrine) (1 mg/mL) with 49 mL of compatible fluid (total of 50 mL). This makes a 20 microgram/mL solution (0.02 mg/mL).

Generally used for neonates weighing less than 1 kg

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate microgram/kg/minute					Weight (kg)
0.5	0.13	0.27	0.40	0.53	0.67	0.5
1	0.07	0.13	0.20	0.27	0.33	1
1.5	0.04	0.09	0.13	0.18	0.22	1.5
2	0.03	0.07	0.1	0.13	0.17	2
2.5	0.03	0.05	0.08	0.11	0.13	2.5
3	0.02	0.04	0.07	0.09	0.11	3
3.5	0.02	0.04	0.06	0.08	0.1	3.5

Discard remaining solution.

Adrenaline (epinephrine) 60 microgram/mL

To make 25 mL syringe:

Dilute 1.5 mL adrenaline (epinephrine) (1 mg/mL) with 23.5 mL of compatible fluid (total of 25 mL). This makes a 60 microgram/mL solution (0.06 mg/mL).

To make 50 mL syringe:

Dilute 3 mL adrenaline (epinephrine) (1 mg/mL) with 47 mL of compatible fluid (total of 50 mL). This makes a 60 microgram/mL solution (0.06 mg/mL).

Generally used for neonates weighing 1 kg to 3 kg

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate microgram/kg/minute					Weight (kg)
1	0.2	0.4	0.6	0.8	1	1
1.5	0.13	0.27	0.4	0.53	0.67	1.5
2	0.1	0.20	0.3	0.4	0.5	2
2.5	0.08	0.16	0.24	0.32	0.4	2.5
3	0.07	0.13	0.2	0.27	0.33	3
3.5	0.06	0.11	0.17	0.23	0.29	3.5
4	0.05	0.1	0.15	0.2	0.25	4

Discard remaining solution.

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Adrenaline (epinephrine) 180 microgram/mL

To make 25 mL syringe:

Dilute 4.5 mL adrenaline (epinephrine) (1 mg/mL) with 20.5 mL of compatible fluid (total of 25 mL). This makes a 180 microgram/mL solution (0.18 mg/mL).

To make 50 mL syringe:

Dilute 9 mL adrenaline (epinephrine) (1 mg/mL) with 41 mL of compatible fluid (total of 50 mL). This makes a 180 microgram/mL solution (0.18 mg/mL).

Generally for neonates weighing greater than 3 kg

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate microgram/kg/min					Weight (kg)
2	0.3	0.6	0.9	1.2	1.5	2
2.5	0.24	0.48	0.72	0.96	1.2	2.5
3	0.2	0.40	0.6	0.8	1	3
3.5	0.17	0.34	0.51	0.69	0.86	3.5
4	0.15	0.3	0.45	0.6	0.75	4
4.5	0.13	0.27	0.4	0.53	0.67	4.5
5	0.12	0.24	0.36	0.48	0.6	5

Discard remaining solution.

Compatible Fluids

Glucose 5%, glucose 10%, sodium chloride 0.9%, glucose / sodium chloride combinations

Adverse Effects

Common

Tachycardia, tremor, sweating, hyperglycaemia

Infrequent

Peripheral ischaemia and necrosis at infusion site, excessive increase in blood pressure, ventricular arrhythmias, cerebral haemorrhage, renal vascular ischaemia, pulmonary oedema and hypokalaemia. These are mostly related to overdose or rapid IV administration.

Rare

Allergic reaction (sodium metabisulfite in preparations)



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Monitoring

When administering by the intravenous route:

- > ECG monitoring and continuous medical supervision advised
- > Continuous heart rate
- > Intra-arterial blood pressure
- > Observe intravenous site for signs of extravasation

Practice Points

- > Caution - there are two strengths of adrenaline (epinephrine) available.
- > Adrenaline (epinephrine) administered for stridor indicates a critical airway and should be administered in a safe environment where intubation can be facilitated where required.
- > Provide adequate hydration and correct underlying hypovolaemia.
- > Correct acidosis prior to administration to enhance effectiveness.

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Document Ownership & History

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