South Australian Neonatal Medication Guidelines

adrenaline (undiluted)

1mg/mL injection (1 in 1000)

This is a High Risk Medication ⚠

An overdose can be rapidly fatal.

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

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SA Health

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Endorsed by: South Australian Maternal & Neonatal Clinical Network
Contact: South Australian Neonatal Medication Guidelines Workgroup at:
NeoMed@health.sa.gov.au

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

Synonyms

Epinephrine

Dose and Indications

Circulatory Support

Intravenous infusion

0.05 to 1micrograms/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

Gestational Age (Weeks)	Dose (mL of 1mg/mL strength)
< 36	2mL of adrenaline 1mg/mL diluted with 2mL of 0.9% sodium chloride, regardless of weight
≥36	4mL of adrenaline 1mg/mL, regardless of weight.

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 reintubate.

Preparation and Administration

Inhaled

Adrenaline may be administered undiluted via nebuliser. If small volumes of adrenaline 1mg/mL (1 in 1000) are required, dilute to 2mL with sodium chloride 0.9% prior to administration.

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Intravenous Infusion

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Adrenaline 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 1mg/mL adrenaline 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 20microgram/mL (equivalent to 0.02mg/mL)
- Adrenaline 60micrograms/mL (equivalent to 0.06mg/mL)
- Adrenaline 160micrograms/mL (equivalent to 0.16mg/mL)

Formulae

To calculate infusion rate (mL/hr):

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

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

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

Compatible Fluids

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

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Adrenaline Concentration Selection Table for 25mL syringes

Adrenaline 20microgram/mL

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

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 60microgram/mL

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

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	0.1	0.3	0.4	0.5	0.7	1.5
2	0.1	0.2	0.3	0.4	0.5	2
2.5	0.1	0.2	0.2	0.3	0.4	2.5
3	0.1	0.1	0.2	0.3	0.3	3
3.5	0.1	0.1	0.2	0.2	0.3	3.5
4	0.1	0.1	0.2	0.2	0.3	4

Discard remaining solution

Adrenaline 180microgram/mL

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

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate micrograms/kg/min					Weight (kg)
2	0.3	0.6	0.9	1.2	1.5	2
2.5	0.2	0.5	0.7	1	1.2	2.5
3	0.2	0.4	0.6	0.8	1	3
3.5	0.2	0.3	0.5	0.7	0.9	3.5
4	0.2	0.3	0.5	0.6	0.8	4
4.5	0.1	0.3	0.4	0.5	0.7	4.5
5	0.1	0.2	0.4	0.5	0.6	5

Discard remaining solution

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Adrenaline Concentration Selection Table for 50mL syringes

Adrenaline 20microgram/mL

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

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 60microgram/mL

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

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	0.1	0.3	0.4	0.5	0.7	1.5
2	0.1	0.2	0.3	0.4	0.5	2
2.5	0.1	0.2	0.2	0.3	0.4	2.5
3	0.1	0.1	0.2	0.3	0.3	3
3.5	0.1	0.1	0.2	0.2	0.3	3.5
4	0.1	0.1	0.2	0.2	0.3	4

Discard remaining solution

Adrenaline 180microgram/mL

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

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate micrograms/kg/min					Weight (kg)
2	0.3	0.6	0.9	1.2	1.5	2
2.5	0.2	0.5	0.7	1	1.2	2.5
3	0.2	0.4	0.6	0.8	1	3
3.5	0.2	0.3	0.5	0.7	0.9	3.5
4	0.2	0.3	0.5	0.6	0.8	4
4.5	0.1	0.3	0.4	0.5	0.7	4.5
5	0.1	0.2	0.4	0.5	0.6	5

Discard remaining solution

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Adverse Effects

Common

Tachycardia, tremor, sweating and hyperglycaemia.

Infrequent

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

Rare

Allergic reaction (sodium metabisulfite in preparations).

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 available
- Adrenaline may be of value in obvious stridor
- Adrenaline is not a substitute for intubation, if intubation indicated
- Provide adequate hydration and correct underlying hypovolaemia
- Correct acidosis prior to administration to enhance effectiveness
- Adrenaline is sensitive to light and air. Protection from light is recommended.

Version control and change history

PDS reference: OCE use only

Version	Date from	Date to	Amendment
1.0	November 2012	current	Original version

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