

Adrenaline (epinephrine) use in Shock

Adrenaline (epinephrine) is a drug that is used as a life-saving pharmacological intervention for multiple patient presentation types in the Emergency Department (ED). This skill sheet will focus on its use in SHOCK. It is vital that the correct solution of adrenaline is selected and prepared to the right concentration. It is highly recommended that the [Children's Resuscitation Emergency Drug Dosage \(CREDD\)](#) is utilised in all emergencies. The instruction relating to the preparation and administration of adrenaline is provided in accordance with the "mothership-dose" method from the [CREDD](#). Prior to all episodes of medication administration, the routine safety checks should be completed.

ALERT –



In all situations where intravenous adrenaline (epinephrine) is being administered, the child must be in a high acuity area and on cardiac monitoring with the appropriate staffing for the patient condition.

If administering adrenaline through a peripheral line, ensure that regular IVC/IO site inspections are completed as adrenaline (epinephrine) can be vasoabrasive. It should ideally be delivered through a central point of vascular access.

For children in clinical shock, adrenaline (epinephrine) is usually administered one of two ways; as a PUSH-DOSE PRESSOR or as an INFUSION. To address an imminent risk of circulatory collapse, a push-dose pressor is used. It is given intravenously (IV) through a good sized vein to improve cardiac output. The most proximal vein that is appropriate is preferred. Where the IV route of adrenaline administration is indicated, it may also be administered INTRAOSSEOUSLY if required.

It is absolutely essential that the correct concentration is used. The concentration of push-dose pressor adrenaline (epinephrine) is 1:100 000, which equates to one-tenth of the concentration of adrenaline (epinephrine) that is used in cardiac arrest. Instructions in preparation are provided on page 2. For facilities that only have access to adrenaline (epinephrine) 1:1000, the adrenaline (epinephrine) must first be diluted to a concentration of 1:10 000 and further diluted to a concentration of 1:100 000 adrenaline (epinephrine). Facilities that do have access to the 1:10 000 "mini-jet" syringes, may use these to dilute to 1:100 000 adrenaline (epinephrine).



Adrenaline (epinephrine)

1:1000

= 1 mg in 1mL

= 1000mcg in 1mL



Adrenaline (epinephrine)

1:10 000

= 1 mg in 10mL

= 1000mcg in 10mL



Shock - Adrenaline (epinephrine) as PUSH DOSE PRESSOR

Adrenaline (epinephrine) is the usual first line drug for inotropic support for children and infants. It is used in the reversal of shock and to support cardiovascular function. The following instructions relate to preparing a "push-dose pressor".

1

GATHER EQUIPMENT



Adrenaline (epinephrine)
*needs reconstitution to
1:10 000 concentration (see
steps below)*



2 x 10mL 0.9%
Sodium Chloride



Drawing-up
needle



2 x 10mL syringe



3-way tap or
syringe connector



Syringe of the
appropriate size for
administration

2

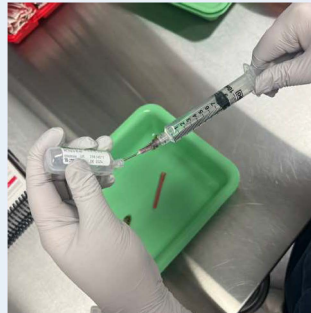
PREPARE

Draw up 1mL of the 1:1 000 vial of adrenaline (epinephrine) into a 10mL syringe. If using a 1:10 000 "mini-jet", you can skip step 2-4.



3

Draw up 9mL of 0.9% Saline into the same 10mL syringe, making a concentration of 1:10 000.



4

Label syringe according to national labelling guidelines.



5

In a new 10mL syringe, draw up 1mL from the 1:10 000 adrenaline (epinephrine) syringe just prepared. Use a syringe connector to connect the two syringes.



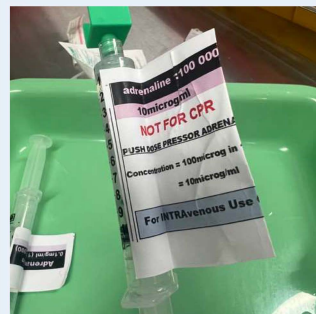
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Draw up 9mL of 0.9% Saline into the same 10mL syringe, making a concentration of 1:100 000.



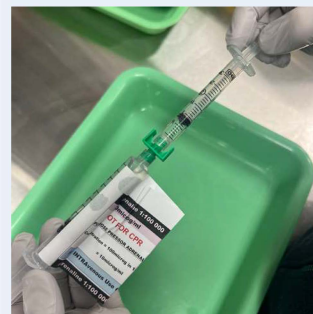
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Label syringe according to national labelling guidelines.



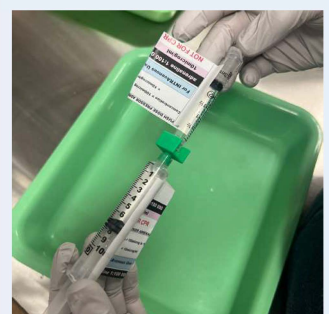
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Connect the prepared 1:100 000 adrenaline (epinephrine) concentration syringe to 3-way tap or syringe connector.

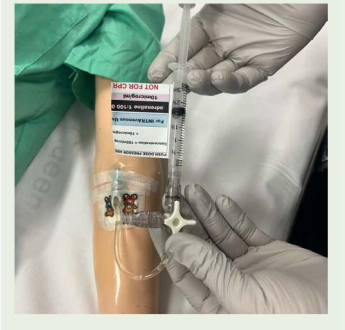


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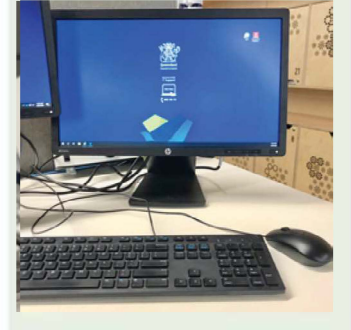
Connect administration syringe to other side of 3-way tap of syringe connector. Fill administration syringe with correct dose (1mcg/kg). Label syringe according to national labelling guidelines.



10 PROCEDURE
 Post medication safety checks and when directed by medical officer, administer dose into a cannula in a good vein, or via INTRAOSSEOUS route. Follow with Sodium Chloride 0.9% flush.



11
 Ensure that the administration is documented in the medical record.





ALERT

Children receiving adrenaline (epinephrine) as a push-dose pressor are critically unwell. It is essential that they are cared for in a high acuity area with the appropriate staffing and monitoring. Refer to your local hospital procedures to determine the parameters to safely care for these patients.

CREDD Tip:

20 kg

| Intubation – prepare ONE size tube above and below recommended size | | | |
|---|--------|----------|------------|
| ETT size – mm – CUFFED | 5 mm | NG tube | 10 – 12 Fr |
| ETT size – mm – UNCUFFED | 5.5 mm | ICC tube | 16 – 24 Fr |
| ETT at lips – cm | 15 cm | LMA | 3 |
| ETT at nose – cm | 18 cm | IDC | 10 – 12 Fr |

| ANAPHYLAXIS | | |
|--|--------|--------------|
| IM Adrenaline (Epinephrine) 1:1000 (1 mg/mL) | | |
| Dose | Volume | Autoinjector |
| 200 microg | 0.2 mL | 150 microg |

*Use autoinjector only if adrenaline 1:1000 not available

| Resuscitation | Vial concentration | Recommended dose/kg | Preparation: Dilution – Sodium Chloride 0.9% | Final concentration | Dose | Final volume to administer | Administration |
|--|--------------------|---------------------|--|---------------------|------------|----------------------------|---|
| Adrenaline (Epinephrine) 1:10 000 (1 mg/10 mL) | 100 microg/mL | 10 microg/kg | Undiluted | 100 microg/mL | 200 microg | 2 mL | Push |
| DC shock – VF/ pulseless VT | | 4 Joule/kg | Round up energy level to next highest setting on defibrillator | | 80 Joule | | Use paediatric or adult pads |
| AmiodARone (150 mg/3 mL) | 50 mg/mL | 5 mg/kg | Dilute 3 mL (150 mg) to 15 mL in glucose 5% | 10 mg/mL | 100 mg | 10 mL | Push over 5 mins |
| Fluid Bolus | | 10 mL/kg | Sodium Chloride 0.9% | | 200 mL | | Push |
| Fluid Bolus | | 20 mL/kg | Sodium Chloride 0.9% | | 400 mL | | Push |
| Glucose 10% | 100 mg/mL | 2 mL/kg | Glucose 10% | 100 mg/mL | 40 mL | | Push |
| Adenosine (6 mg/2 mL) – 1st dose | 3 mg/mL | 0.1 mg/kg | Undiluted | 3 mg/mL | 2 mg | 0.67 mL | Push via proximal vein or CVL – Follow immediately by a 10 – 20 mL fast flush |
| Adenosine (6 mg/2 mL) – 2nd dose | 3 mg/mL | 0.2 mg/kg | | | 4 mg | 1.3 mL | |
| Adenosine (6 mg/2 mL) – 3rd dose | 3 mg/mL | 0.3 mg/kg | | | 6 mg | 2 mL | |
| Synchronised Cardioversion | | 1 Joule/kg | Round up energy level to next highest setting on defibrillator | | 20 Joule | | Use paediatric or adult pads |
| Atropine (600 microg/mL) | 600 microg/mL | 20 microg/kg | Dilute 1 mL (600 microg) to 10 mL | 100 microg/mL | 400 microg | 4 mL | Push |
| Adrenaline (Epinephrine) 1:10 000 (1 mg/10 mL) | 100 microg/mL | 1 microg/kg | Dilute 1 mL (100 microg) to 10 mL | 10 microg/mL | 20 microg | 2 mL | Push |
| Metaraminol (Syringe 5 mg/10 mL) | 5 mg/10 mL | 0.1 mg/kg | Dilute 1 mL (5 mg) to 10 mL | 1 mg/mL | 2 mg | 2 mL | Push |
| Induction agents | Vial concentration | Recommended dose/kg | Dilution – Sodium Chloride 0.9% | Final concentration | Dose | Final volume | Administration |
| Fentanyl (100 microg/2 mL) | 50 microg/mL | 2 – 5 microg/kg | Dilute 2 mL (100 microg) to 10 mL | 10 microg/mL | 40 microg | 4 mL | Push over 1 – 3 mins |
| Ketamine (200 mg/2 mL) | 100 mg/mL | 1 – 2 mg/kg | Dilute 2 mL (200 mg) to 20 mL | 10 mg/mL | 20 mg | 2 mL | Push over 60 secs |
| Propofol (200 mg/20 mL) | 10 mg/mL | 2 – 3 mg/kg | Undiluted | 10 mg/mL | 40 mg | 4 mL | Push over 30 secs |
| Midazolam | Various strengths | 0.1 – 0.2 mg/kg | Dilute to 1 mg/mL regardless of ampoule strength | 1 mg/mL | 2 mg | 2 mL | Push over 30 secs |
| Paralytic agents | Vial concentration | Recommended dose/kg | Dilution – Sodium Chloride 0.9% | Final concentration | Dose | Final volume | Administration |
| Rocuronium (50 mg/5 mL) | 10 mg/mL | 1.2 mg/kg | Undiluted | 10 mg/mL | 24 mg | 2.4 mL | Push |
| Suxamethonium (100 mg/2 mL) | 50 mg/mL | 2 mg/kg | Dilute 2 mL (100 mg) to 10 mL | 10 mg/mL | 40 mg | 4 mL | Push |
| Vecuronium (10 mg) | 10 mg | 0.1 mg/kg | Reconstitute vial with 10 mL WFI | 1 mg/mL | 2 mg | 2 mL | Push |

In the [CREDD](#), push-dose pressors are found at the bottom of the RESUSCITATION section. This is on the first page specific to a particular weight. In this example, the instructions pertain to a child with an ideal body weight (IBW) of 20kg.



Shock - Adrenaline (epinephrine) as INFUSION

Where there is an ongoing need for inotropic support, an adrenaline (epinephrine) infusion may be requested. See [CREDD](#) Infusions page.

1 GATHER EQUIPMENT



Adrenaline (epinephrine)



49mL 0.9% Sodium Chloride or 5% Glucose



50mL syringe



Smart site device



Low-volume IV extension



Infusion pump

2 PREPARE

In a 50mL syringe, draw up 49mL of Sodium Chloride 0.9% or 5% Glucose.



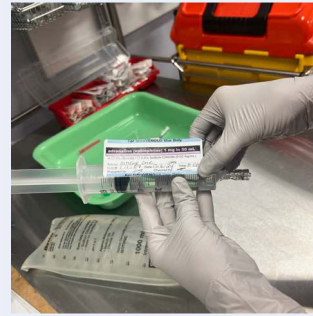
3

Draw up 1mL of adrenaline (epinephrine) 1:1000 and add to syringe with the 49mL from step 1. This will give a total volume of 50mL.



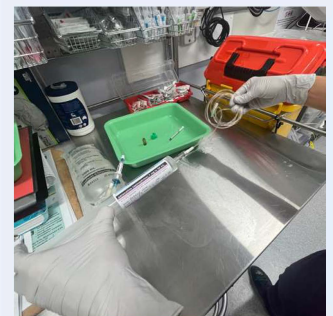
4


Label syringe according to national labelling guidelines.



5

Attach smart site device to syringe. Attach IV extension line to smart site device. Prime the line.






ALERT

The 'dead-space' in an IVC extension will cause a considerable delay in the patient receiving the adrenaline (epinephrine). Consider priming a new smart site and extension line prior to attaching to the patient, swapping the pre-existing smart site and extension for the newly primed one.

6

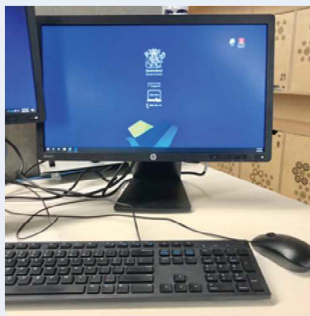
Load syringe into the infusion pump used in your HHS. Program infusion pump as per the medical order.


For more information on expected ranges, refer to the [CREDD](#).



7

Document the rate and time of commencement of the infusion.





ALERT

Where INTRAVENOUS adrenaline (epinephrine) is administered, continuous invasive blood pressure (BP) monitoring is strongly advised. This allows for immediate feedback on BP and accurate and safe titration of adrenaline administration rates.



For further information:

[State-wide Guideline: Allergy and anaphylaxis - Emergency management in children](#)

[State-wide Guideline: Sepsis](#)

Videos

[CREDD Education: Adrenaline: Push Dose Pressor Preparation](#)

[CREDD Education: IV Adrenaline Infusion](#)

References:

Children's Health Queensland Hospital and Health Service. (2021, June). Children's Resuscitation Emergency Drug Dosage (CREDD) 2nd Edition. Retrieved from <https://www.childrens.health.qld.gov.au/qpec-paediatric-resuscitation-tools/#tab-6ff1bb73468033104a2>

Children's Health Queensland Hospital and Health Service. (2021, February 26). Allergy and Anaphylaxis - Emergency management in children. Retrieved from <https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/guidelines/CHO-GDL-60011-allergy-anaphylaxis.pdf>

Children's Health Queensland Hospital and Health Service. (2023, February 21). Sepsis - Recognition and emergency management in children. Retrieved from <https://www.childrens.health.qld.gov.au/guideline-sepsis-recognition-and-emergency-management-in-children/>

This Queensland Paediatric Emergency Skill Sheet was developed by the Emergency Care of Children working group.

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- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management.

- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary.
- Ensuring informed consent is obtained prior to delivering care.
- Meeting all legislative requirements and professional standards.
- Applying standard precautions, and additional precautions as necessary, when delivering care.
- Documenting all care in accordance with mandatory and local requirements.

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