



## MONOGRAPH

### Noradrenaline (Norepinephrine)

Scope (Staff):	Medical, Pharmacy, Nursing, Anaesthetic Technicians
Scope (Area):	Critical Care, Theatre

#### Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this [DISCLAIMER](#)

## ! HIGH RISK MEDICINE !

#### QUICKLINKS

<a href="#">Dosage/Dosage Adjustments</a>	<a href="#">Administration</a>	<a href="#">Compatibility</a>	<a href="#">Monitoring</a>
---	--------------------------------	-------------------------------	----------------------------

#### DRUG CLASS

Noradrenaline (norepinephrine) is a sympathomimetic with potent agonistic action on alpha adrenoreceptors and modest agonistic action on beta adrenoreceptors. It acts as a vasoconstrictor with few cardiac effects.<sup>1</sup>

Noradrenaline (norepinephrine) has a rapid onset of action (less than 30 seconds) and duration of less than 10 minutes after discontinuation of the infusion.<sup>2</sup>

Noradrenaline (norepinephrine) is a [High Risk Medicine](#).

#### INDICATIONS AND RESTRICTIONS

- Restoration of blood pressure in certain acute hypotensive states<sup>3</sup>
- Adjunct in cardiac arrest – restore and maintain an adequate blood pressure after an effective heartbeat and ventilation have been established<sup>3</sup>

**CONTRAINDICATIONS**

**NOTE: Contraindications are relative as noradrenaline (norepinephrine) can be lifesaving.**

- Hypersensitivity to noradrenaline (norepinephrine) or any component of the formulation.
- Noradrenaline (norepinephrine) should not be used if the patient is hypovolaemic. This must be corrected before commencing noradrenaline (norepinephrine).<sup>3</sup>
- Avoid use if the patient has a mesenteric or peripheral vascular thrombosis, due to risk of extending ischaemia and site of infarct<sup>3</sup>

**PRECAUTIONS**

**NOTE: Precautions are relative as noradrenaline (norepinephrine) can be lifesaving.**

- Extravasation causes local necrosis due to vasoconstriction. Local injection of phentolamine may be required if extravasation occurs.

Dilute 10mg phentolamine up to 10 mL sodium chloride 0.9% and administer into extravasation site as soon as possible.<sup>3, 4</sup>

Topical glyceryl trinitrate can also be used<sup>4</sup> – contact Pharmacy for advice.

- General management of extravasation is described in Appendix 10 of the [Central Venous Access Devices \(CVAD\) and Midline Insertion and Management](#) Guideline.
- Use with caution in patients with hypertension, or hyperthyroidism<sup>1, 3</sup>
- Ventricular tachycardia or fibrillation may occur in patients with severe hypoxia or hypercapnia.<sup>3, 5</sup>
- Patients who are allergic to sodium metabisulphite.<sup>3</sup>

**FORMULATIONS**

Listed below are products available at PCH, other formulations may be available, check with pharmacy if required:

- Noradrenaline (norepinephrine) (4 mg/4 mL) ampoule.
- Noradrenaline pre-filled syringes (Baxter®): 500 micrograms in 30 mL, 3 mg in 50 mL.

Imprest location: [Formulary One](#)

**DOSAGE & DOSAGE ADJUSTMENTS**

**Neonates in NICU:** [Refer to Neonatal Medication Protocols](#)

The dose below is within the standard reference range however depending on the indication the dosage of noradrenaline (norepinephrine) may need to be adjusted depending on the patient's clinical needs and response.

**Continuous Intravenous / Intraosseous Infusion:** 0.02 – 0.1 microg/kg/minute initially, titrate to clinical response, usual maximum 1 – 2 microg/kg/minute.<sup>4, 6</sup>

**Renal impairment:** Dose adjustment not required<sup>4</sup>

**Hepatic impairment:** Dose adjustment not required<sup>4</sup>

**ADMINISTRATION**

- Noradrenaline (norepinephrine) must only be administered in critical care areas with continuous cardiac monitoring.
- Give via a **Central Venous Access Device (CVAD)**:

Patient's Weight	Concentration (In Glucose 5%)	Notes
<b>10 kg or less</b>	500 micrograms in 30 mL (17 microg/mL)	In a 3 kg patient, 0.1 microg/kg/min = 1 mL/hr
<b>Above 10 kg</b>	3 mg in 50 mL (60 microg/mL)	In a 20 kg patient, 0.1 microg/kg/min = 2 mL/hr

- Low strength standard concentration infusion (6 mg in 1000 mL) may be used in the following circumstances:
  - For administration via **Peripheral Intravenous Catheter (PIVC)** in an emergency.
  - For older/overweight children, patients requiring very low dose at consultant's discretion or patients with unstable blood pressure.
  - 1 mL/kg/hour of this dilution = 0.1 micrograms/kg/minute.
  - Must be administered using Infusomat® Space Line Safe Set "UV-protect" (giving set without additional in-line additive port).**
- If noradrenaline (norepinephrine) is given via PIVC or intraosseous infusion, the site of administration should be monitored regularly for signs of extravasation. Central access should be obtained as soon as practicable.<sup>2, 3</sup>
- Do NOT give intramuscularly **or** subcutaneously as extravasation causes tissue necrosis.<sup>7</sup>
- Do not stop infusion abruptly, gradual dose reduction is recommended<sup>6, 7</sup>

**COMPATIBILITY (LIST IS NOT EXHAUSTIVE)****Compatible fluids:<sup>7</sup>**

Glucose 5% (preferred), glucose in sodium chloride solutions, sodium chloride 0.9%, Hartmann's.

**Compatible at Y-site:<sup>7</sup>**

**NOTE: Although the following drugs are compatible via Y-site, their co-administration may affect the infusion rate of noradrenaline (norepinephrine). Therefore, it is recommended that noradrenaline (norepinephrine) be administered separately via a dedicated intravenous line.**

Amikacin, amiodarone, atracurium, calcium chloride, calcium gluconate, caspofungin, cefazolin, cefotaxime, cefoxitin, ceftaroline fosamil, ceftazidime, ceftriaxone, clindamycin, dexmedetomidine, dobutamine, dopamine, esmolol, fentanyl, fluconazole, gentamicin, glyceryl trinitrate, haloperidol lactate (in glucose), heparin sodium, hydrocortisone sodium succinate, insulin (Novorapid®),

labetalol, magnesium sulfate, meropenem, metoclopramide, micafungin, midazolam, milrinone, morphine sulfate, mycophenolate mofetil, phenylephrine, posaconazole, potassium chloride, remifentanyl, sodium nitroprusside, suxamethonium, tobramycin, vancomycin, verapamil.

*Only commonly used drugs are listed below. This is not a complete list of incompatible drugs.*

[Compatibilities of IV drugs](#) must be checked when two or more drugs are given concurrently.

#### **INCOMPATIBLE drugs:<sup>7</sup>**

Aminophylline, azathioprine, benzylpenicillin, folic acid, foscarnet, ganciclovir, insulin (Actrapid®), iron salts, phenobarbital, sodium bicarbonate, thiopental sodium.

#### **MONITORING**

Continuous ECG, blood pressure, heart rate, urine output, peripheral perfusion, infusion site for signs of extravasation or blanching of the vein.<sup>4</sup>

#### **ADVERSE EFFECTS**

Prolonged use of high doses can result in volume depletion, if not corrected when noradrenaline is discontinued it can lead to myocardial ischaemia, infarction, renal impairment, and peripheral tissue ischaemia which can lead to gangrene. Plasma volume should be constantly monitored and depletion corrected with appropriate fluid and electrolyte replacement therapy<sup>3</sup>

#### **Common:<sup>1, 3</sup>**

Anxiety, restlessness, confusion, palpitations, headache, dyspnoea.

#### **Rare:<sup>1</sup>**

Hypertension, bradycardia, vomiting, retrosternal pain

#### **STORAGE**

Ampoules should be stored below 25°C. Protect from light.<sup>3</sup>

Baxter syringes should be stored between 2-8°C. Protect from light.

#### **INTERACTIONS**

This medication may interact with other medications; consult PCH approved references (e.g. [Clinical Pharmacology](#)), a clinical pharmacist or PCH Medicines Information Service on extension 63546 for more information.

*\*\*Please note: The information contained in this guideline is to assist with the preparation and administration of **noradrenaline (norepinephrine)**. Any variations to the doses recommended should be clarified with the prescriber prior to administration\*\**

#### **Related CAHS internal policies, procedures and guidelines**

[Central Venous Access Devices \(CVAD\) and Midline Insertion and Management](#)




[High Risk Medicine](#).

[Intraosseous Access](#)

## References

1. Australian Medicines Handbook Adelaide, South Australia: AUSTRALIAN MEDICINES HANDBOOK; 2024. Available from: <https://amhonline-amh-net-au.pklibresources.health.wa.gov.au/chapters/cardiovascular-drugs/drugs-heart-failure/sympathomimetics-cardiovascular/noradrenaline?menu=hints>.
2. Clinical Pharmacology: Elsevier Inc; 2024. Available from: <https://www-clinicalkey-com.pklibresources.health.wa.gov.au/pharmacology/monograph/443?type=1>.
3. MIMS Online St Leonards, N.S.W: MIMS Australia Pty Ltd; 2024. Available from: [https://www-mimsonline-com-au.pklibresources.health.wa.gov.au/Search/FullPI.aspx?ModuleName=Product%20Info&searchKeyword=noradrenaline&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=2500001\\_2#AdverseEffects2154](https://www-mimsonline-com-au.pklibresources.health.wa.gov.au/Search/FullPI.aspx?ModuleName=Product%20Info&searchKeyword=noradrenaline&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=2500001_2#AdverseEffects2154).
4. UpToDate Waltham, MA: Lexicomp; 2024. Available from: [https://www-uptodate-com.pklibresources.health.wa.gov.au/contents/norepinephrine-noradrenaline-drug-information?sectionName=Pediatric&topicId=9709&search=noradrenaline&usage\\_type=panel&anchor=F202422&source=panel\\_search\\_result&selectedTitle=1%7E148&showDrugLabel=true&kp\\_tab=drug\\_general&display\\_rank=1#F202422](https://www-uptodate-com.pklibresources.health.wa.gov.au/contents/norepinephrine-noradrenaline-drug-information?sectionName=Pediatric&topicId=9709&search=noradrenaline&usage_type=panel&anchor=F202422&source=panel_search_result&selectedTitle=1%7E148&showDrugLabel=true&kp_tab=drug_general&display_rank=1#F202422).
5. Martindale: The Complete Drug Reference [Internet]. 2024 [cited 25/03/24]. Available from: <https://www-medicinescomplete-com.pklibresources.health.wa.gov.au/#/content/martindale/9506-x?hspl=noradrenaline>.
6. AMH Children's Dosing Companion Adelaide: Australian Medicines Handbook Pty Ltd; 2024. Available from: <https://childrens-amh-net-au.pklibresources.health.wa.gov.au/monographs/noradrenaline?menu=hints>.
7. Society of Hospital Pharmacists of Australia. Australian Injectable Drugs Handbook: Health Communication Network; 2024. Available from: [https://aidh-hcn-com-au.pklibresources.health.wa.gov.au/browse/n/noradrenaline\\_\(norepinephrine\)](https://aidh-hcn-com-au.pklibresources.health.wa.gov.au/browse/n/noradrenaline_(norepinephrine)).

This document can be made available in alternative formats on request for a person with a disability.

<b>File Path:</b>	C:\Users\he68277\AppData\Roaming\Kapish\TRIM Explorer\HI\FC\11511\2423760\2491354\3271597\PCH.MED. Noradrenaline_DTC ENDORSED (CD_24_224178).docx		
<b>Document Owner:</b>	Chief Pharmacist		
<b>Reviewer / Team:</b>	Pharmacist, PCC CNS, anaesthetics consultant, PCC consultant, ED consultant, ED SDN		
<b>Date First Issued:</b>	Sep 2014	<b>Last Reviewed:</b>	Jun 2024
<b>Amendment Dates:</b>	May 2021, Jun 2022	<b>Next Review Date:</b>	Jun 2027
<b>Approved by:</b>	Medication Safety Committee	<b>Date:</b>	Jun 2024
<b>Endorsed by:</b>	Drugs and Therapeutics Committee	<b>Date:</b>	Jul 2024
<b>Standards Applicable:</b>	NSQHS Standards:   NSMHS: N/A Child Safe Standards: N/A		
<b>Printed or personally saved electronic copies of this document are considered uncontrolled</b>			
 <div> <b>Healthy kids, healthy communities</b>            Compassion Excellence Collaboration Accountability Equity Respect            Neonatology   Community Health   Mental Health   Perth Children's Hospital         </div>			