CLINICAL GUIDELINE
Arrhythmias and Cardiac Arrest on NICU: Treatment Algorithms

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

This document should be read in conjunction with this DISCLAIMER

The following algorithms are to be used for neonates on the NICU, not for resuscitation at birth when the NRP guidelines are appropriate.
See Resuscitation Algorithm for the Newborn

In the event of an arrhythmia or cardiac arrest on NICU consider:

- **ABC**
    - Ensure adequate FiO_2.
    - Consider intubation and ventilation.
    - Vascular access – antecubital cannula preferred (if difficult consider intraosseous).
    - Adequate technique of cardiac compressions/ mask ventilation.
    - If no intra-arterial BP monitoring, then cycle BP cuff every 2 minutes.
- **Underlying causes – identify and correct:**
    - Respiratory
        - Pneumothorax/ accidental extubation/ ETT blockage/ pulmonary haemorrhage.
    - Cardiovascular collapse
        - Blood loss/ sepsis/ cardiac tamponade (PICC/ UVC tip in heart and extravasated – stop infusion).
        - Underlying congenital cardiac abnormality.
    - Metabolic
        - Hypo/ hyperkalaemia, hypocalcaemia, hypoglycaemia.
    - Neurological
        - Intracranial haemorrhage, seizures.
- **Who to call** – see algorithm below.
- Other equipment required eg. Defibrillator. If required for use, see 'Cardioversion and Defibrillation Guideline'.

Who to call algorithm
Cardiac arrest algorithm for NICU
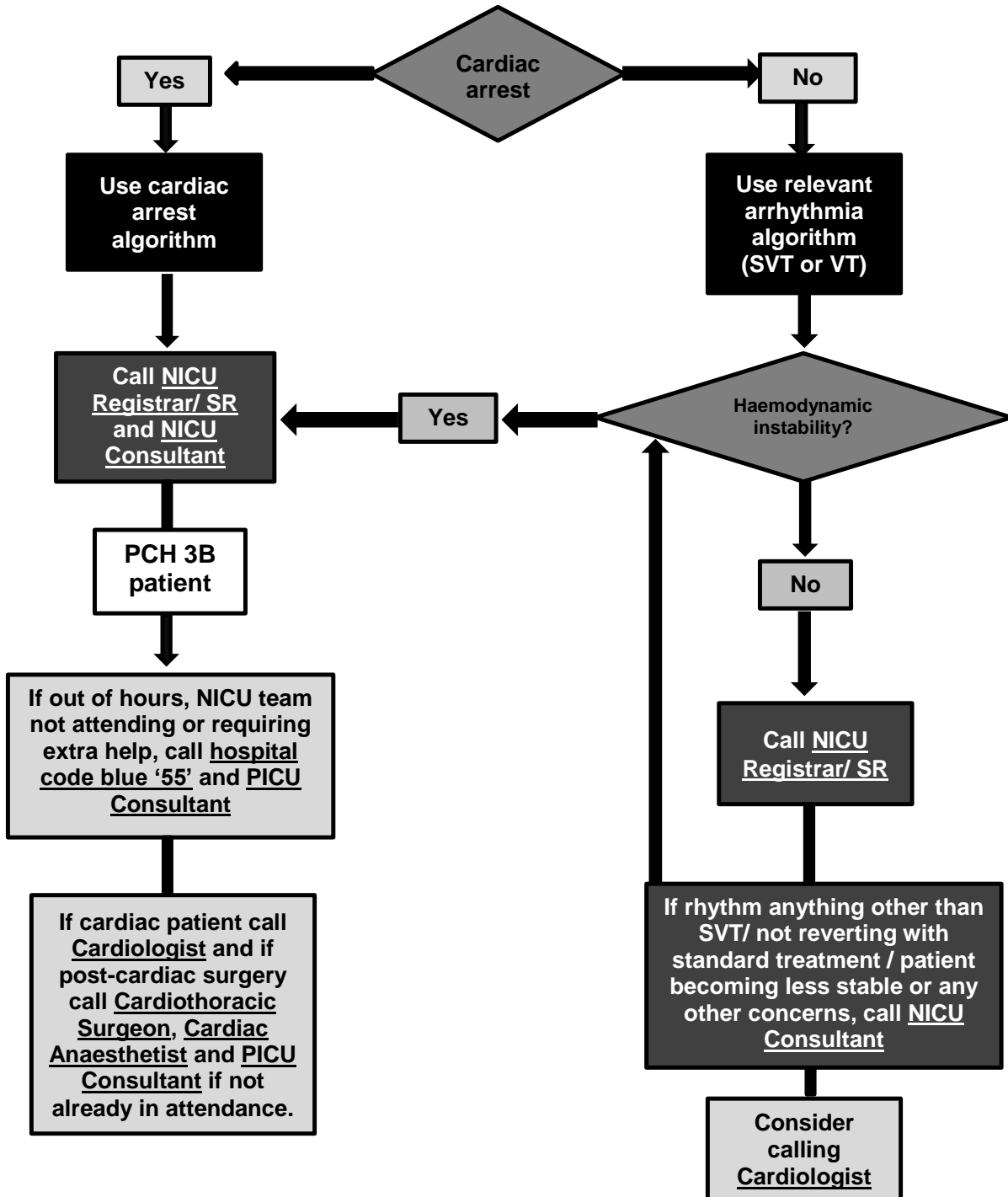SVT algorithm for NICU
VT algorithm for NICU

Post-resuscitation care:

- Re-evaluate ABCDE.
- Re-evaluate oxygenation and ventilation.
- Identify and treat precipitating causes.
- Consider 12-lead ECG.
- Temperature management – if full cardiac arrest, discussion re: cooling.
- Make sure all relevant personnel and teams aware.
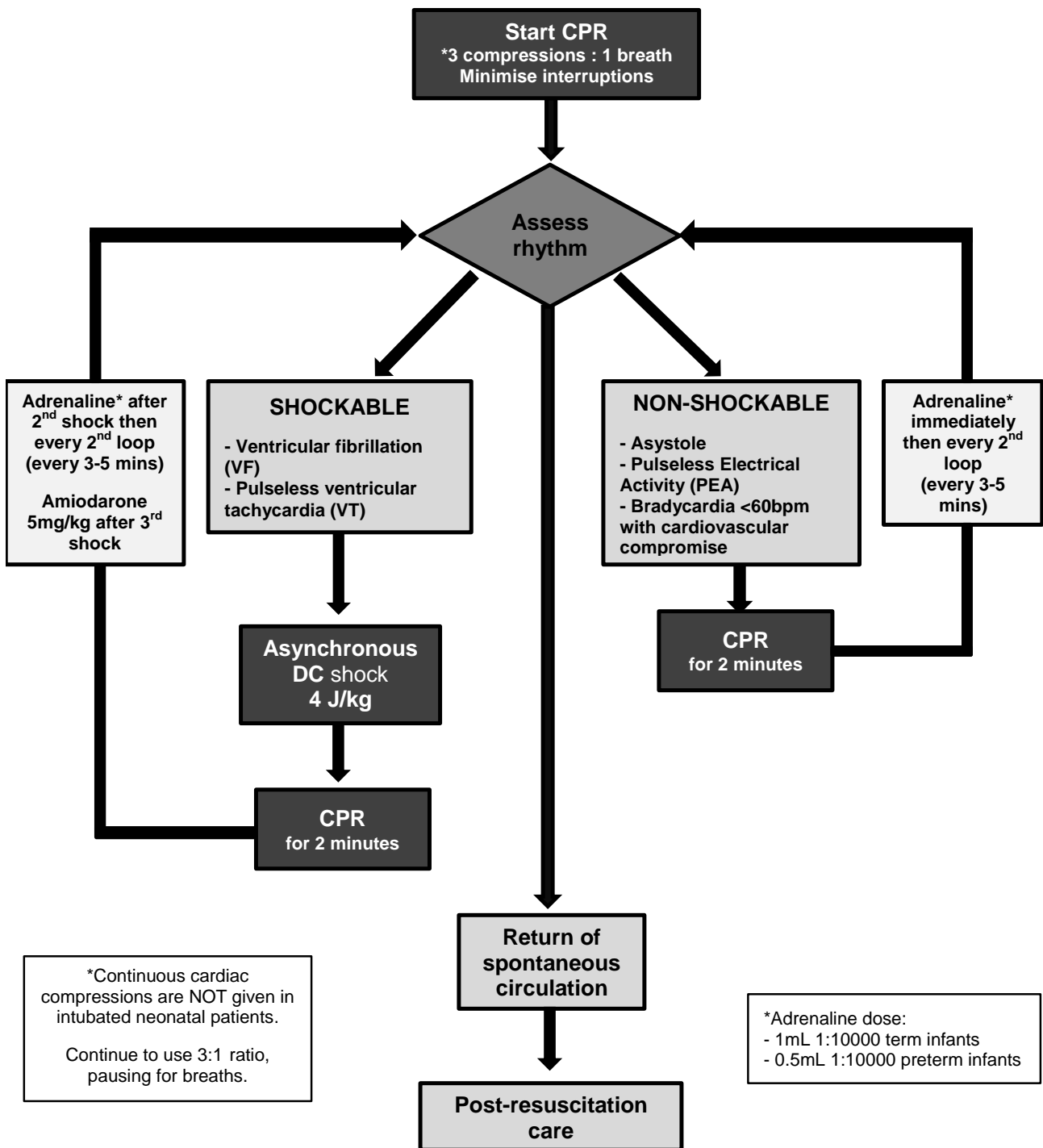- Are the parents aware?

Who to call in the event of an arrhythmia or cardiac arrest:

```
                        ┌─────────────┐
         Yes ◄──────────┤   Cardiac   ├──────────► No
          │             │   arrest    │            │
          ▼             └─────────────┘            ▼
   ┌──────────────┐                        ┌──────────────┐
   │ Use cardiac  │                        │ Use relevant │
   │ arrest       │                        │ arrhythmia   │
   │ algorithm    │                        │ algorithm    │
   └──────┬───────┘                        │ (SVT or VT)  │
          │                                └──────┬───────┘
          ▼                                       ▼
   ┌──────────────┐                        ┌──────────────┐
   │ Call NICU    │                        │ Haemodynamic │
   │ Registrar/SR │◄──── Yes ◄─────────────┤ instability? │
   │ and NICU     │                        └──────────────┘
   │ Consultant   │                               │
   └──────┬───────┘                               ▼ No
          ▼                                 ┌──────────────┐
   ┌──────────────┐                         │ Call NICU    │
   │ PCH 3B       │                         │ Registrar/SR │
   │ patient      │                         └──────┬───────┘
   └──────┬───────┘                                ▼
          ▼
```

Cardiac arrest (decision)

Yes → **Use cardiac arrest algorithm** → **Call NICU Registrar/ SR and NICU Consultant** → **PCH 3B patient** →

If out of hours, NICU team not attending or requiring extra help, call hospital code blue '55' and PICU Consultant

→ **If cardiac patient call Cardiologist and if post-cardiac surgery call Cardiothoracic Surgeon, Cardiac Anaesthetist and PICU Consultant if not already in attendance.**

No → **Use relevant arrhythmia algorithm (SVT or VT)** → **Haemodynamic instability?**

Yes → **Call NICU Registrar/ SR and NICU Consultant**

No → **Call NICU Registrar/ SR** → **If rhythm anything other than SVT/ not reverting with standard treatment / patient becoming less stable or any other concerns, call NICU Consultant** → **Consider calling Cardiologist**

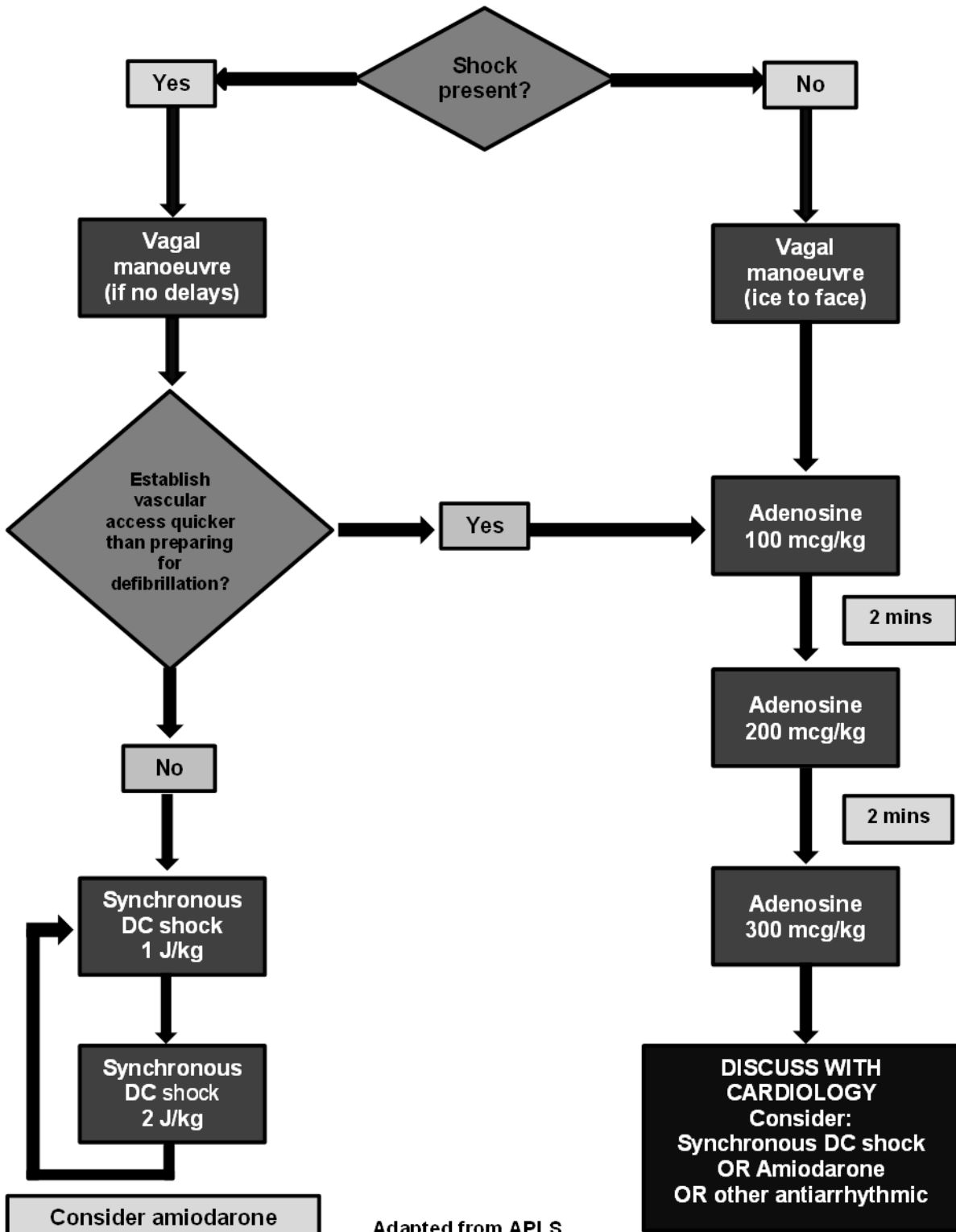**Guideline as to who should lead an arrest on NICU 3B PCH:**

- In general, the most experienced person in attendance.
- The resuscitation lead should be made clear to all staff at the resus.
- If the lead is handed over at any time during the resus, this should be made clear to all staff at the resus.
- Before a consultant arrives, the NICU registrar/ SR should be the lead.
- If a PICU registrar arrives, the resus should continue to be led by the NICU registrar/ SR unless the NICU registrar/ SR is required to be hands on eg. Intubate/ get vascular access.
- Once the NICU consultant arrives, they should usually take over leadership, unless discussed that the trainee will continue to lead with supervision.
- If the PICU consultant has arrived before the NICU consultant and has taken over as leader, when the NICU consultant arrives there will be a discussion between both consultants as to whether the PICU consultant continues or whether the NICU consultant takes over.

Cardiac arrest algorithm for NICU:

Start CPR
*3 compressions : 1 breath
Minimise interruptions

↓

Assess rhythm

Adrenaline* after 2nd shock then every 2nd loop (every 3-5 mins)

Amiodarone 5mg/kg after 3rd shock

SHOCKABLE
- Ventricular fibrillation (VF)
- Pulseless ventricular tachycardia (VT)

↓

Asynchronous DC shock 4 J/kg

↓

CPR for 2 minutes

NON-SHOCKABLE
- Asystole
- Pulseless Electrical Activity (PEA)
- Bradycardia <60bpm with cardiovascular compromise

↓

CPR for 2 minutes

Adrenaline* immediately then every 2nd loop (every 3-5 mins)

Return of spontaneous circulation

↓

Post-resuscitation care

*Continuous cardiac compressions are NOT given in intubated neonatal patients.

Continue to use 3:1 ratio, pausing for breaths.

*Adrenaline dose:
- 1mL 1:10000 term infants
- 0.5mL 1:10000 preterm infants

Adapted from ANZCOR 2016

SVT algorithm for NICU:

```
                        ┌─────────────┐
                        │    Shock    │
        Yes ◄───────────│   present?  │───────────► No
         │              └─────────────┘              │
         ▼                                           ▼
  ┌──────────────┐                          ┌──────────────┐
  │    Vagal     │                          │    Vagal     │
  │  manoeuvre   │                          │  manoeuvre   │
  │ (if no delays)│                         │ (ice to face)│
  └──────────────┘                          └──────────────┘
         │                                           │
         ▼                                           ▼
  ┌──────────────┐                          ┌──────────────┐
  │   Establish  │                          │  Adenosine   │
  │   vascular   │──── Yes ────────────────►│  100 mcg/kg  │
  │ access quicker│                         └──────────────┘
  │ than preparing│                                 │  2 mins
  │      for      │                                ▼
  │ defibrillation?│                        ┌──────────────┐
  └──────────────┘                          │  Adenosine   │
         │ No                               │  200 mcg/kg  │
         ▼                                  └──────────────┘
  ┌──────────────┐                                 │  2 mins
  │ Synchronous  │◄─┐                              ▼
  │   DC shock   │  │                       ┌──────────────┐
  │    1 J/kg    │  │                       │  Adenosine   │
  └──────────────┘  │                       │  300 mcg/kg  │
         │          │                       └──────────────┘
         ▼          │                              │
  ┌──────────────┐  │                              ▼
  │ Synchronous  │  │               ┌────────────────────────────┐
  │   DC shock   │──┘               │     DISCUSS WITH           │
  │    2 J/kg    │                  │     CARDIOLOGY             │
  └──────────────┘                  │     Consider:              │
         │                          │ Synchronous DC shock       │
         ▼                          │ OR Amiodarone              │
  ┌──────────────┐                  │ OR other antiarrhythmic    │
  │ Consider amiodarone │           └────────────────────────────┘
  └──────────────┘
```

Adapted from APLS
Australia 2017

VT algorithm for NICU:

Pulse present?

No → **Cardiac arrest protocol**

Yes ↓

Shock present?

No ↓

CONSULT CARDIOLOGY URGENTLY

Amiodarone 5 mg/kg over 30 mins

↓

Consider Synchronous* DC shock

Yes ↓

Synchronous* DC shock 1 J/kg

↓

Synchronous* DC shock 2 J/kg

↓

Amiodarone 5mg/kg once

*IF SYNCHRONOUS SHOCK FAILS TO CAPTURE OR DISCHARGE, USE AN ASYNCHRONOUS SHOCK
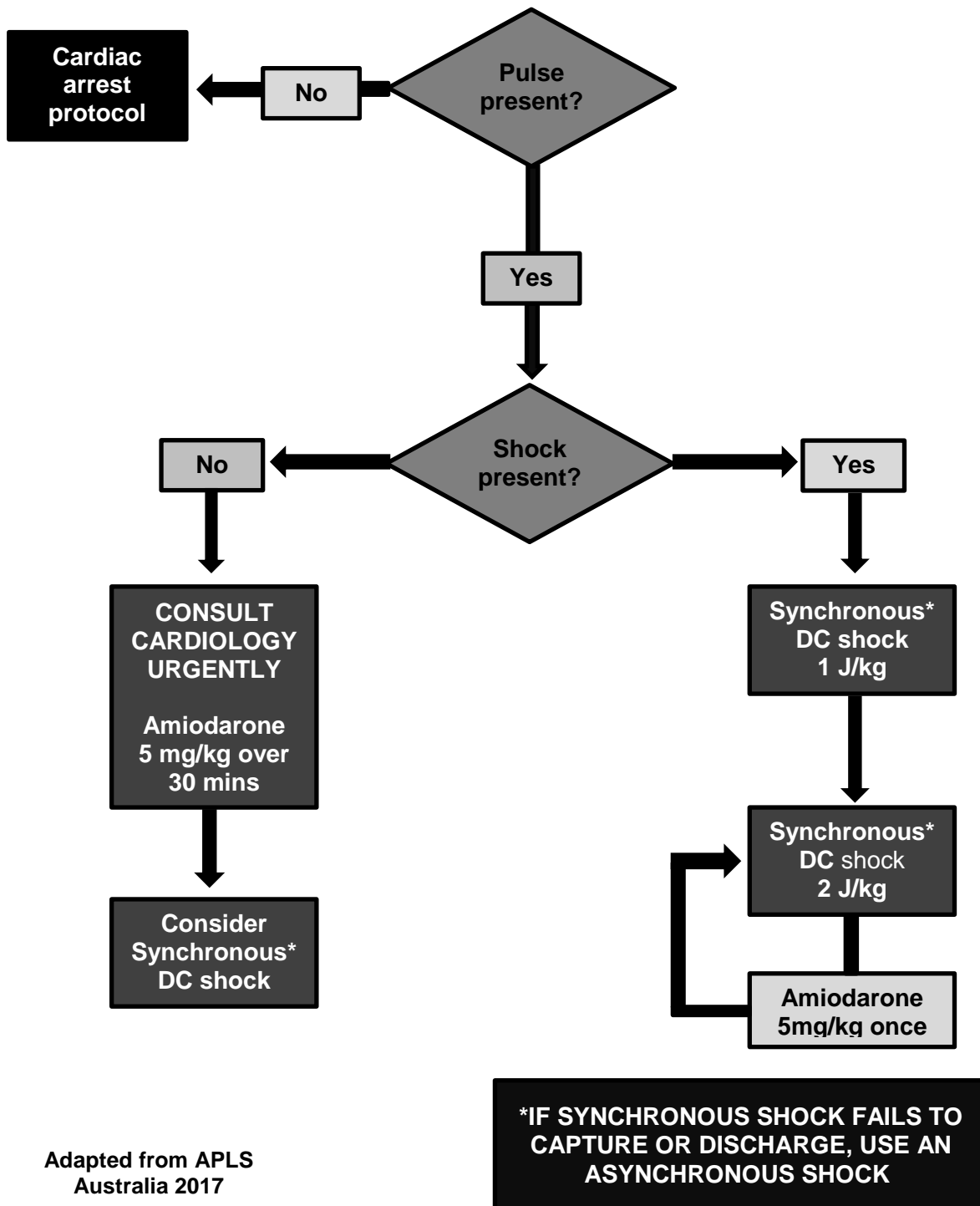
Adapted from APLS Australia 2017

Related CAHS internal policies, procedures and guidelines
Neonatology Guideline   • Cardioversion and Defibrillation   • Recognising and Responding to Clinical Deterioration   • Resuscitation Algorithm for the Newborn

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

File Path:			
Document Owner:	Neonatology		
Reviewer / Team:	Neonatal Coordinating Group		
Date First Issued:	February 2019	Last Reviewed:	29th January 2019
Amendment Dates:		Next Review Date:	29th January 2019
Approved by:	Neonatal Coordinating Group	Date:	26th February 2019
Endorsed by:	Neonatal Coordinating Group	Date:	26th February 2019
Standards Applicable:	NSQHS Standards:		
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