

Local Guideline and Procedure



CONTINUOUS ELECTROCARDIOGRAPHIC (ECG) MONITORING IN PAEDIATRICS

Sites where Local Guideline and Procedure applies

John Hunter Children's Hospital

This Local Guideline and Procedure applies to:

Adults	No
Children up to 16 years	Yes
Neonates – less than 29 days	No

**Target audience
Description**

JHCH Medical & Nursing staff
Continuous ECG monitoring will be undertaken in accordance with the CPG to ensure patient and staff safety and minimise adverse outcomes.

National Standard

NS 1 & 8

[Go to Procedure](#)

Keywords	ECG, cardiac, JHCH,
Document registration number	JHCH 4.3
Replaces existing document?	No

Related Legislation, Australian Standard, NSW Ministry of Health Policy Directive or Guideline, National Safety and Quality Health Service Standard (NSQHSS) and/or other, HNE Health Document, Professional Guideline, Code of Practice or Ethics:

[NSW Health Policy PD2017_032. Clinical Procedural Policy pdf](#)
[NSW Health Policy IB2020_010 Consent to Medical and Health Care Treatment Manual .pdf](#)
[NSW Health Policy Directive PD 2017_013 Infection Prevention and Control Policy](#)

Local Guideline and Procedure note

This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s require mandatory compliance.
If staff believe that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patients health record.

Position responsible for and document authorised by

JHCH Clinical Quality and Patient Care Committee

Contact person
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Date authorised
This document contains advice on therapeutics

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 No

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JHCH would like to acknowledge this guideline was written by Sydney Children's Hospital Network, it is the property of SCHN. Adaption to the local facility has been made.

Note: Over time links in this document may cease working. Where this occurs please source the document in the PPG Directory at: <http://ppg.hne.health.nsw.gov.au/>

PURPOSE AND RISKS

ECG monitoring is a non-invasive method of monitoring a patient's heart rate and rhythm. This document outlines the procedure for ECG monitoring in paediatrics, and how to troubleshoot common issues with the ECG trace. Risks include patient allergy to the ECG monitoring pads and staff failure to identify abnormal rhythm

These risks are minimised by:

1. Patients checked each shift for signs of allergy, abnormal rhythms and appropriate escalation identified in this document.

Risk Category: Clinical Care & Patient Safety

GLOSSARY

Acronym or Term	Definition
ECG	Electrocardiographic monitoring
SPOC	Standard Paediatric Observation Chart

GUIDELINE

This Guideline does not replace the need for the application of clinical judgment in respect to each individual patient.

BACKGROUND

Abnormalities in respiratory rate, heart rate and ECG patterns are the most universally available signs for early recognition of major instability. Continuous ECG monitoring is used to detect rapid changes in a patient's heart rate and rhythm. Continuous ECG monitoring is used as a supplement to regular manually performed observations; it does not replace them.

Nurses who are unfamiliar with continuous ECG monitoring should seek guidance from an experienced colleague.

RATIONALE

To obtain a single ECG trace or display a continuous ECG reading so that cardiac arrhythmias can be identified and analysed.

INDICATIONS FOR CONTINUOUS ECG MONITORING

- Post-operative cardiac surgery patient – cessation of monitoring should be ordered in patient's notes by medical officer.
- Patient with known history of arrhythmias or at risk of arrhythmias e.g. accidental drug ingestion, drug toxicity, medication commencement, electrolyte imbalance.
- Patients with suspected malfunction of implanted pacemaker.
- Patients with other clinical conditions that require monitoring, as requested by a medical officer.
- High Dependency Unit patients

DEFINITIONS

Electrode:

The material containing conductive media that is applied to the patient's skin. Electrodes are placed onto the patient's skin to view the heart's electrical activity from different angles.

Cable:

The wire that attaches to the electrode and conducts current back to the cardiac monitor. One end of a monitoring cable is attached to the electrode, and the other end to the cardiac monitor.

Lead – has two meanings:

The actual tracing that is obtained and is dependent on the position of the electrode and the monitoring of the mode selected. Lead II is the most commonly used when ECG monitoring is required.

The wire that connects the patient to the ECG monitor.

PROCEDURE

This procedure requires mandatory compliance.

CLINICAL PROCEDURE SAFETY LEVEL

Every clinician involved in the procedure is responsible for ensuring the processes for clinical procedure safety are followed. The following level applies to this procedure (click on the link for more information):

Level 1 procedure

STAFF PREPARATION

It is mandatory for staff to follow relevant: "Five moments of hand hygiene", infection control, moving safely/safe manual handling, documentation practices and to use HAIDET for patient/carer communication: Hand hygiene Acknowledge, Introduce, Duration, Explanation, Thank you or closing comment.

EQUIPMENT

- ECG Monitor
- Cable/wires
- Disposable self-adhesive electrodes

PATIENT PREPARATION

PROCEDURE STEPS

1. Explain procedure to child and parent, using developmentally appropriate communication and language/techniques. It is important that the child is calm and relaxed for an accurate ECG reading.
2. Turn monitor on.
3. Ensure skin is clean and dry as this will provide optimal electrical contact and a clear signal. Choose sites with intact skin and over soft tissue, not over bony prominences or skin folds as these sites can produce ECG artifacts. If the patient has hair on the chest, the chest hair will need to be removed prior to applying the ECG electrodes to ensure optimal electrical contact.
4. Check that electrodes are still moist with conductive gel. If using the click-on ECG leads place them on to the electrodes first before applying them to the child. Change the electrodes every 24 hours as these can cause burns and pressure areas.
5. Apply right arm (RA) electrode (white) directly below the clavicle and near the right shoulder.
6. Apply left arm (LA) (black) electrode directly below the clavicle and near the left shoulder.

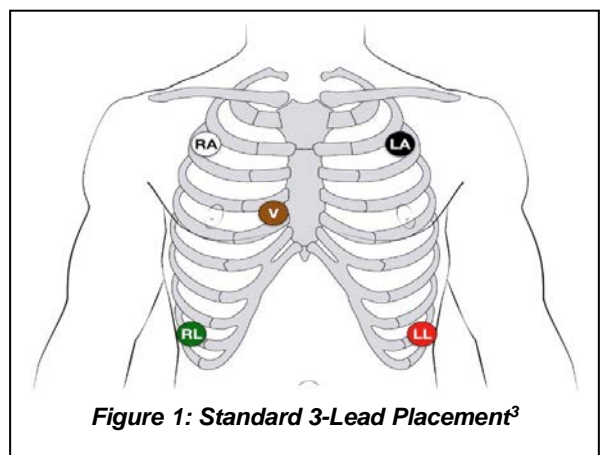
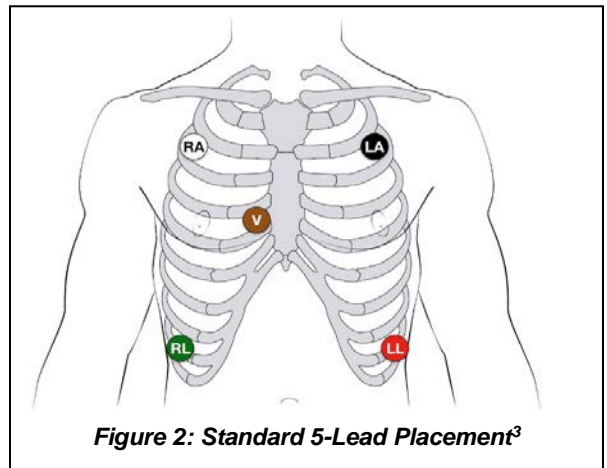


Figure 1: Standard 3-Lead Placement³

7. Apply left leg (LL) (red/green) electrode placed on the left side of the chest, lower edge of left rib cage.
8. The electrodes placed at these positions will produce ECG complexes for leads I, II, and III (See Figure 1). If further lead viewpoints are required, apply right leg (RL) electrode on the right side of the lower rib cage (opposite LL electrode). Then apply the chest lead in the V1 position (See Figure 2).
9. Connect leads to the ECG connection port. Where possible, connect correlating colours into the module. However, be aware that lead placements may not always be colour coded and positions should be checked.



10. Set the monitor to appropriate ECG lead either I, II, III. Lead II is the preferred lead, as it most closely resembles the normal pathway of current of flow in the heart and therefore displays an upright complex with an optimal signal
11. Set alarm parameters in accordance with Between the Flags (SPOC) parameters or individual patient's altered calling criteria if applicable. Alarms must always be active i.e. never turned off. Alarms must be responded to promptly.
12. Observations should be performed as per Between the Flags requirements at a minimum. Frequency should be increased as clinically indicated and/or as specified by a medical officer. All cardiac patients require at least fourth hourly oxygen saturation measurement as per Between the Flags. Continuous oxygen saturation monitoring should be implemented as clinically indicated and/or as directed by treating team. Patients in whom haemodynamics may be compromised require 4th hourly blood pressure measurement at a minimum.
13. Regularly monitor the patient's skin for signs of allergic reactions, burns or pressure areas from electrodes.
14. Cessation of cardiac monitoring should be at the discretion of the treating medical officer and should be documented in the patient's notes.
15. The rhythm should be assessed for the presence of P waves, QRS complex, T wave, regularity and rate (see Figure. 3).
16. If there is concern regarding an abnormal rhythm this should be printed, patient assessment performed, and review escalated as required.
17. All patients should have a baseline rhythm strip printed each shift if any abnormal rhythm identified. Any abnormal strips should also be included in the patient record. Sticky tape all sides of the rhythm strip to the patients progress notes, ensuring that date, time and lead are visible

COMMON ARYTHMIAS:

SINUS TACHYCARDIA:



SINUS BRADYCARDIA

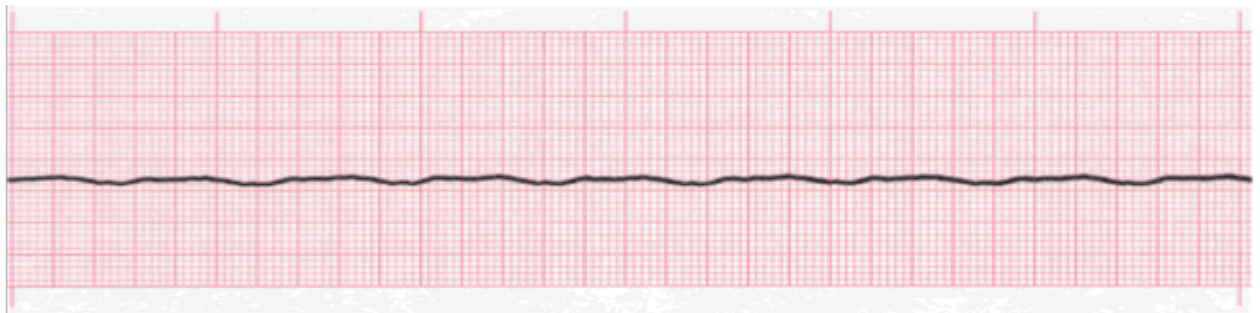


LIFE THREATENING ARYTHMIAS – CALL RAPID RESPONSE 2222 AND COMMENCE CPR

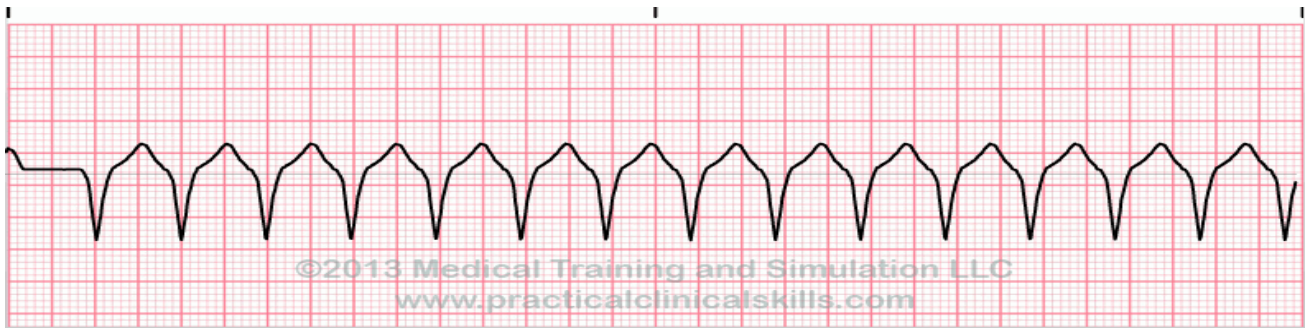
PULSELESS ELECTRICAL ACTIVITY (will have no pulse)



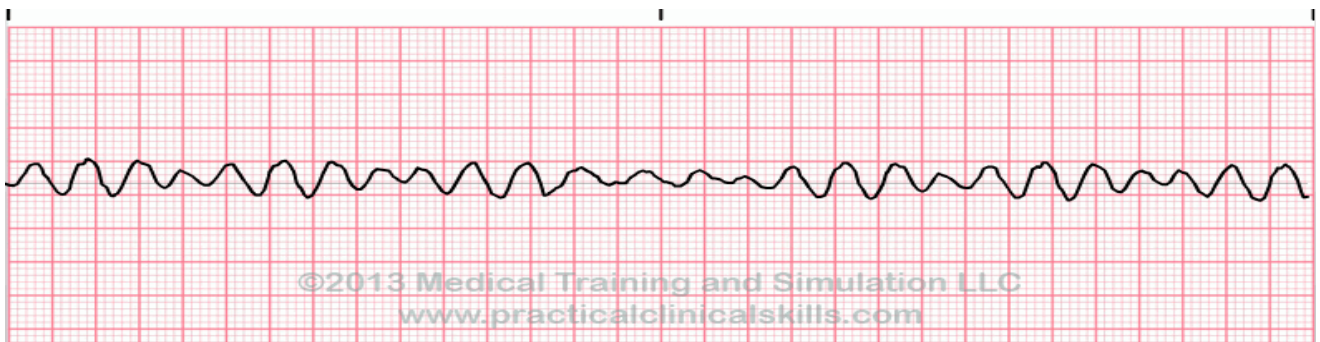
ASYSTOLE



VENTRICULAR TACHYCARDIA

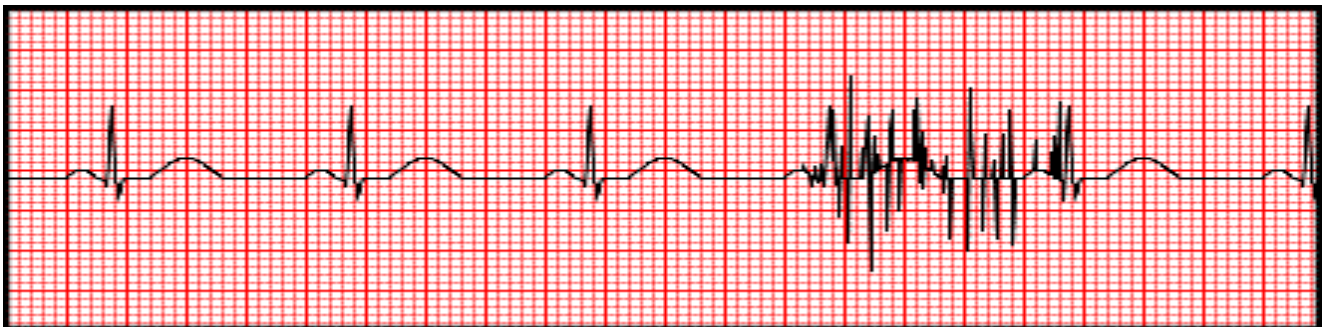


VENTRICULAR FIBRILLATION



TROUBLESHOOTING PROBLEMS

ARTIFACTS



Distortion of an ECG trace by electrical activity that is non-cardiac in origin is called artifacts or waveform interference. The ECG trace appears bumpy or tremulous.

Artifacts troubleshooting guide:

Causes	Actions
Patient movement	Use developmentally appropriate distraction technique
Muscle tremor	Reposition electrodes
Poor electrode contact	Replace electrodes to ensure adequate conduction.
Dry electrodes	Replace electrodes to ensure adequate conduction.
Fractured wires	Replace ECG cable if faulty.
Nearby sources of electrical equipment	Turn off any nearby electrical equipment.

A WANDERING BASELINE

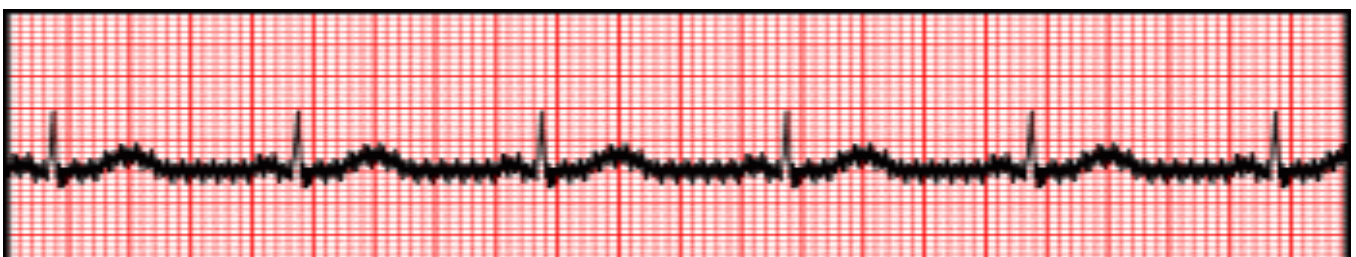


This is when the baseline is wandering up and down over the strip.

Wandering baseline troubleshooting guide

Causes	Actions
Chest movement during respirations	Reposition electrodes away from the lower ribs or over bone
Restless patient	Utilise developmentally appropriate distraction techniques. Encourage patient to relax
Poor electrode placement	Ensure electrodes are in correct position Reapply electrodes
Poor electrode contact	Ensure electrodes are in correct position and still moist Reapply electrodes

A THICK BASELINE



This is when the baseline is thick, “fuzzy” and unreadable.

Troubleshooting guide:

Causes	Actions
Electrical interference from other equipment for example mobile phones	Turn off any nearby unnecessary electrical equipment
Electrical power leakage	Check that electrode plugs have not become loose
Electrode malfunction	Replace electrodes
When using Philips monitor – “monitor view” could be selected	Adjust ECG trace size When using Philips monitor – set trace to “filter view”

It is important to note that accurately recognising artifacts can be complex and may require the assistance of experienced clinicians. Do not hesitate to seek assistance should there be concerns regarding presence of artifacts.

IMPLEMENTATION, MONITORING COMPLIANCE AND AUDIT

The document will be communicated with all key stakeholders and clinical staff within JHCH; and made available through the Policy, Procedure and Guideline directory on the HNELHD intranet site.

- Staff will be provided support by clinical educator and/or CNC re caring for patient enquiring continuous ECG.
- Added to relevant meeting agendas (ED Exec, SS, Nurses meeting, Clerical, Bed meeting)
- Document disseminated via hard copy and email to all clinical staff
- The document will be monitored for effectiveness and compliance
- IIMS will be monitored for any ECG related patient issues and investigated
- Staff rounding and feedback

REFERENCES

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FEEDBACK

Any feedback on this document should be sent to the Contact Officer listed on the front page.

APPROVAL

CPGAG February 2020

CQ&PCC 19 May 2020