

ELECTROCARDIOGRAPHIC (ECG) MONITORING - CHW PROCEDURE[®]

DOCUMENT SUMMARY/KEY POINTS

- Standard placement of the three electrodes for continuous ECG monitoring are right arm (RA), left arm (LA) and left leg (LL):
 - Apply RA electrode (white) directly below the clavicle and near the right shoulder.
 - Apply LA (black) electrode directly below the clavicle and near the left shoulder.
 - Apply LL (red/green) electrode on left iliac fossa (left lower abdomen).
- Lead II is the preferred monitoring lead of choice for continuous ECG monitoring.
- If an arrhythmia is detected the child should be reviewed by a medical officer.
- Staff must respond to alarms promptly and ensure settings are within normal parameters for age group as per the **CHW Between the Flags- Clinical Emergency Response System Practice Guideline**:
<http://chw.schn.health.nsw.gov.au/o/documents/policies/procedures/2012-8013.pdf>

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
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This Policy/Procedure may be varied, withdrawn or replaced at any time. Compliance with this Policy/Procedure is mandatory.

CHANGE SUMMARY

- Due for mandatory review – minor changes made throughout.

READ ACKNOWLEDGEMENT

- Clinical staff who use an ECG monitor are to read and acknowledge they understand the contents of this document.

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1 Introduction

1.1 Rationale

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

1.2 Definitions

- **Electrode:**
 - The material containing conductive media that is applied to the patient's skin. Electrodes are placed at different parts of the patient's skin to view the heart's electrical activity from different angles¹.
- **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 monitor¹.
- **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 selected¹. Lead II is the most commonly used when ECG monitoring is required².
 - The wire that connects the patient to the ECG monitor¹.

1.3 Equipment

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

2 Procedure

1. Explain procedure to child and parent, using developmentally appropriate communication language/techniques². 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 signal². Choose sites with intact skin and over soft tissue, not over bony prominences or skin folds as these sites can produce ECG artefacts (see 4.1)².

4. Check that electrodes are still moist with conductive gel³. If using the click-on ECG leads place them on to the electrodes first before applying them to the child². Change the electrodes preferably every 24 hours or when necessary².
5. Apply right arm (RA) electrode (white) directly below the clavicle and near the right shoulder².
6. Apply left arm (LA) (black) electrode directly below the clavicle and near the left shoulder².
7. Apply left leg (LL) (red/green) electrode on left iliac fossa (left lower abdomen)².

The electrodes placed at these positions will produce ECG complexes for leads I, II, and III² (see [Figure 1](#)).

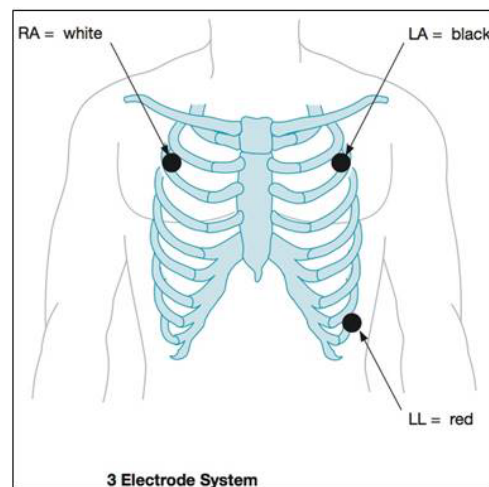


Figure 1: Standard 3-Lead Placement³

8. If further lead viewpoints are required, apply right leg (RL) electrode on right iliac fossa (right lower abdomen)². Then apply the chest lead in the V1 position² (See [Figure 2](#))

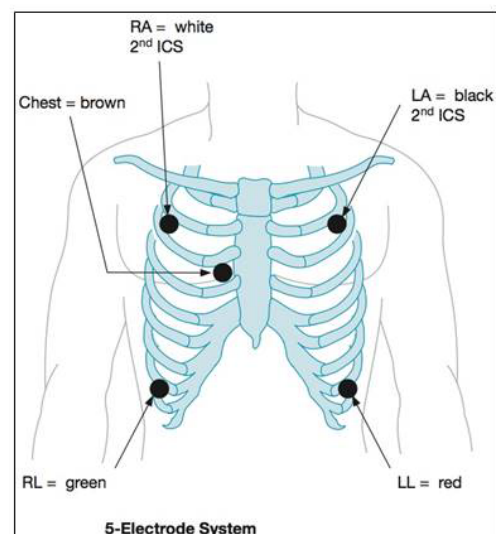


Figure 2: Standard 5-lead placement⁴

9. Connect leads to the ECG connection port. Where possible, connect correlating colours into the module². 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 (see [Figure 3](#))¹.
11. Set alarm parameters appropriately for the individual patient's age and altered criteria if applicable and alarms must always be active i.e. never turned off. Alarms must be responded to promptly.

Note: Ensure settings are within normal parameters for age group as per the CHW **Between the Flags- Clinical Emergency Response System Practice Guideline:** <http://chw.schn.health.nsw.gov.au/o/documents/policies/procedures/2012-8013.pdf>

12. Regularly monitor the patient's skin for signs of allergic reactions to electrodes⁵.

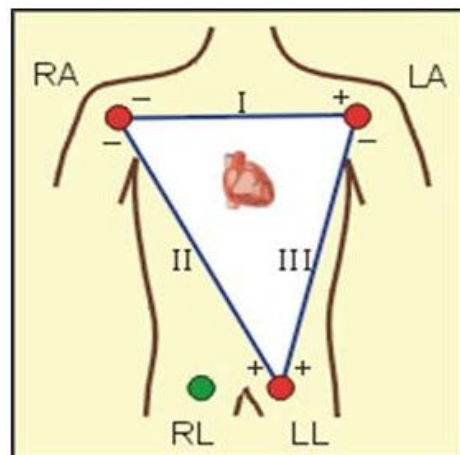


Figure 3: Einthovens triangle⁴

13. The rhythm should be assessed for the presence of P waves, QRS complex, T wave, regularity and rate (see [Figure. 4](#)).
14. Print rhythm strip and include in patient progress notes

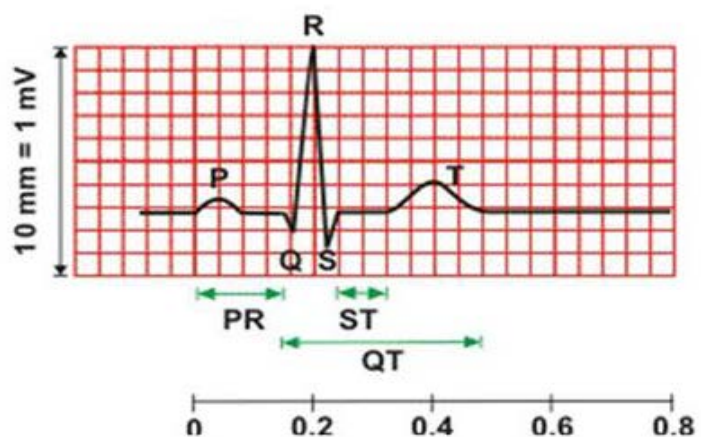


Figure 4: ECG Complex in Lead II⁴

3 Troubleshooting Problems

3.1 Artefacts

Distortion of an ECG trace by electrical activity that is non-cardiac in origin is called artefact⁴. The ECG trace appears bumpy or tremulous. Trouble shooting guide^{1,2,5,6}:

Causes	Actions
Patient movement	Use developmentally appropriate distraction technique to keep the patient still
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.

3.2 A wandering baseline

This is when the baseline is wandering up and down over the strip⁵.

Troubleshooting guide^{1,2,5}:

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 Reapply electrodes

3.3 A thick baseline

This is when the baseline is thick and unreadable. Troubleshooting guide⁵:

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
Philips monitor – Monitor view may be selected	Adjust ECG trace size Philips monitor – set trace to filter view

4 References

1. Jevon P. ECGs for nurses. Australia: Blackwell Publishing; 2009.
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6. Aehlert B. ECGs made easy. 5th ed. Canada: Mosby Elsevier; 2013.

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