



# Clinical Practice Procedures: Cardiac/12-Lead ECG acquisition

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| <b>Policy code</b>          | CPP_CA_12L_0722   |
| <b>Date</b>                 | July, 2022  |
| <b>Purpose</b>              | To ensure a consistent procedural approach to 12-lead ECG acquisition.                              |
| <b>Scope</b>                | Applies to Queensland Ambulance Service (QAS) clinical staff.                                       |
| <b>Health care setting</b>  | Pre-hospital assessment and treatment.  |
| <b>Population</b>           | Applies to all ages unless stated otherwise.  |
| <b>Source of funding</b>    | Internal – 100%   |
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# 12-Lead ECG acquisition

July, 2022

The **12-Lead electrocardiogram (ECG)** is a graphical representation of the electrical activity within the heart. It provides information on the pacemaker origin, rate, axis and conduction pathways of the myocardium. Further interpretation of the 12-Lead ECG can indicate AMI, ischaemic changes, electrolyte imbalances, conduction defects, drug toxicity, dysrhythmias and some structural changes.

Timely acquisition of a 12-Lead ECG is warranted for all patients suffering signs/symptoms suggestive of AMI (e.g. chest pain/tightness). Additionally, clinicians should have a low threshold for obtaining 12-Lead ECGs in the following circumstances:

- ALOC
- Overdose
- Envenomation
- Electrolyte disorders
- Syncope
- Patients presenting with grossly altered vital signs

## Indications

- Any patient requiring detailed ECG analysis:
  - suspected ACS
  - cardiac dysrhythmias
  - conduction disturbances
  - electrolyte imbalances
  - drug toxicity

## Contraindications

- Nil in this setting

## Complications

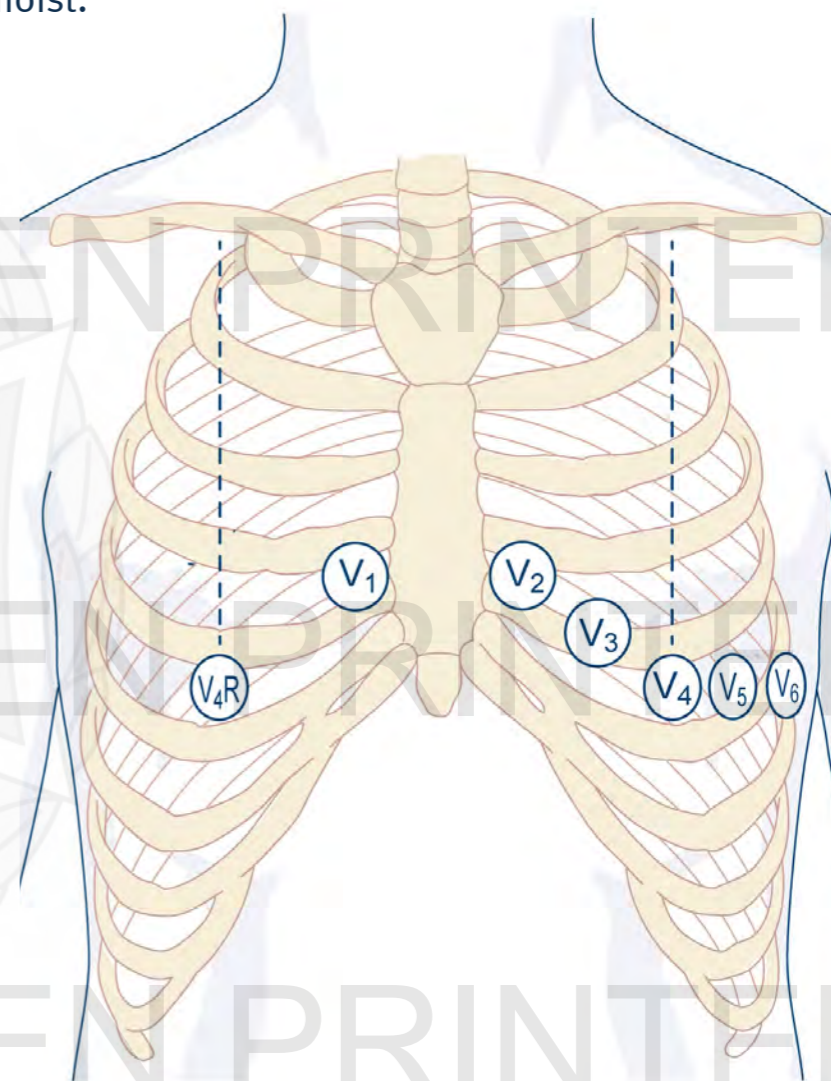
- Nil in this setting

## Procedure – 12 Lead ECG acquisition

1. Explain to the patient what is required, ensure privacy and obtain consent to place electrodes.
2. If required, remove excessive hair to ensure electrodes have full contact with the patient's skin.
3. Clean and dry the skin.
4. Position the patient preferably supine or semi-recumbent, (without arms or legs crossed).
5. Attach electrodes to the connector on each lead, ensuring electrodes are in date and gel is moist.
6. Accurately position the electrodes on the patient. (refer to *CPP: Cardiac monitoring*)
7. Accurately position the chest electrodes on the patient.

### Placement of ECG Chest Electrodes

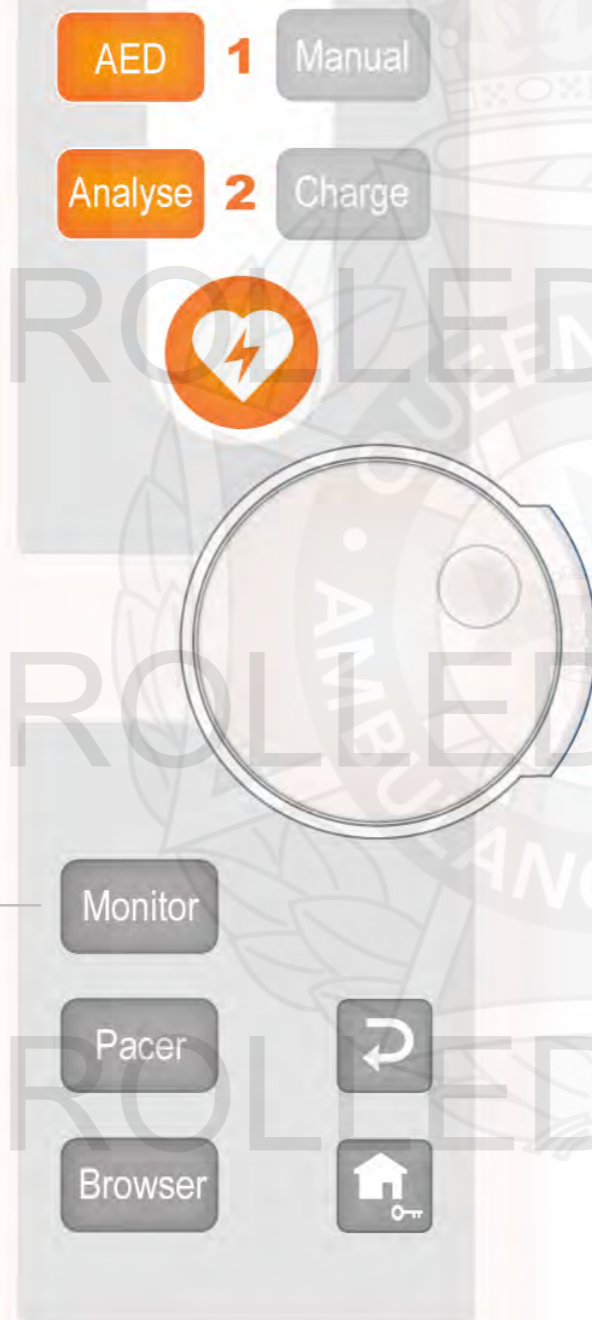
| Placement order | Chest lead      | Anatomical position                                      |
|-----------------|-----------------|--|
| 1st             | V <sub>1</sub>  | 4th Intercostal space, right of the sternum              |
| 2nd             | V <sub>2</sub>  | 4th Intercostal space, left of the sternum               |
| 3rd             | V <sub>4</sub>  | 5th Intercostal space, on left midclavicular line        |
| 4th             | V <sub>6</sub>  | On the left mid-axillary line, level with V <sub>4</sub> |
| 5th             | V <sub>3</sub>  | Midway between V <sub>2</sub> and V <sub>4</sub>         |
| 6th             | V <sub>5</sub>  | Midway between V <sub>4</sub> and V <sub>6</sub>         |
| Optional*       | V <sub>4R</sub> | 5th Intercostal space, on the right midclavicular line   |



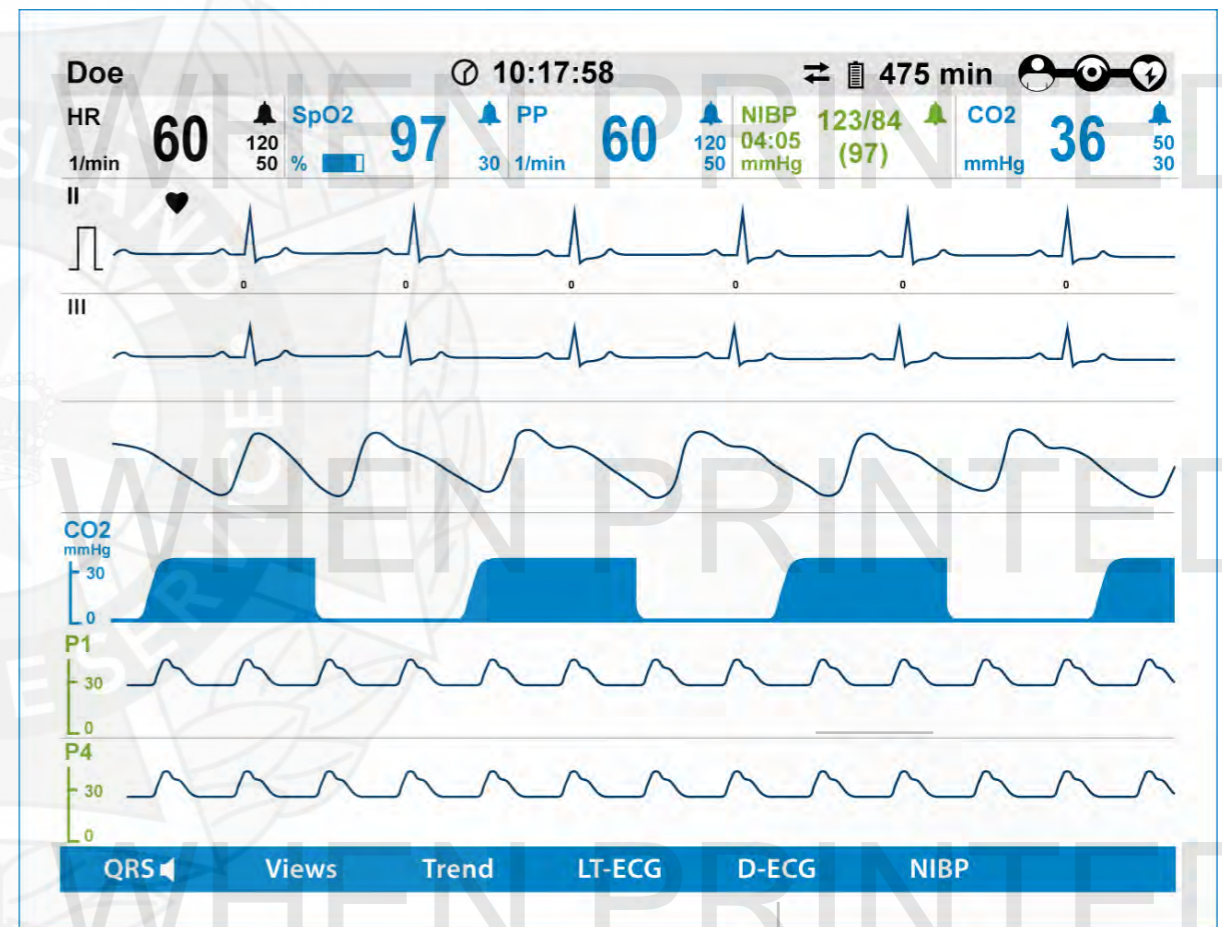
\* For evaluation of right ventricular involvement with inferior STEMI. Consider acquiring a 12-Lead ECG with V<sub>4</sub> repositioned to V<sub>4R</sub>. If V<sub>4R</sub> is acquired, the 12-Lead ECG must be annotated to indicate that V<sub>4</sub> is now representing V<sub>4R</sub>. Furthermore when V<sub>4R</sub> is acquired, the defibrillators interpretive statement must not be relied upon.<sup>[1]</sup>

**corpuls<sup>3</sup>:** For comprehensive instructions refer to the corpuls<sup>3</sup> operating instructions

1. Ensure the corpuls<sup>3</sup> is on.
2. Press the **Monitor** Key.
3. Press the **D-ECG** soft-key.
4. Encourage the patient to remain as still as possible.
5. Ensure that all leads are displayed and that the signal quality is appropriate. If the signal quality is poor, confirm correct electrode positioning and contact.



7. When the message 'Ready for D-ECG' is displayed, press the **Start** soft-key. The 12-Lead ECG recorded up to this moment is discontinued and saved.
8. When requested, enter the patient's gender and age, confirm the details by pressing the **OK** soft-key.
9. Press the **Print** soft-key.




6. Confirm that the diagnostic frequency of 0.05–150 Hz is displayed (this is the preferred corpuls<sup>3</sup> setting).

D-ECG soft key locator

## Procedure – 12 Lead ECG acquisition

**ZOLL® X Series®:** *For comprehensive instructions refer to the ZOLL® X Series® operating instructions.*

1. Ensure the Propaq® is on.
2. Encourage the patient to remain as still as possible.
3. Press the **12-Lead** key  to enter the 12-Lead mode.

4. Ensure that all leads are displayed and that the signal quality is appropriate. If the signal quality is poor, confirm correct electrode positioning and contact.
5. To begin 12-Lead interpretive analysis press the **Acquire** key.
6. Press **Print** to print the displayed 12-Lead ECG.

12-Lead  
Acquire key



12-Lead mode

### Additional information

- 12-lead ECG electrodes should remain in position to facilitate serial 12-Lead ECGs.
- Electrodes must be placed in their anatomically designated positions in order for an ECG to be of diagnostic quality.
- Clinicians should ensure the 12-Lead ECG is of diagnostic quality (size, frequency and paper speed) before analysing and interpreting.
- Copies of the patient's 12-Lead ECG(s) (annotated with the patient's name, date of birth and brief description of symptoms if appropriate) **MUST** be provided with the eARF to the receiving health care facility.