



Clinical Practice Procedures: Cardiac/12-Lead ECG acquisition

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Date	December, 2024
Purpose	To ensure a consistent procedural approach to 12-lead ECG acquisition.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless stated otherwise.
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12-Lead ECG acquisition

December, 2024

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

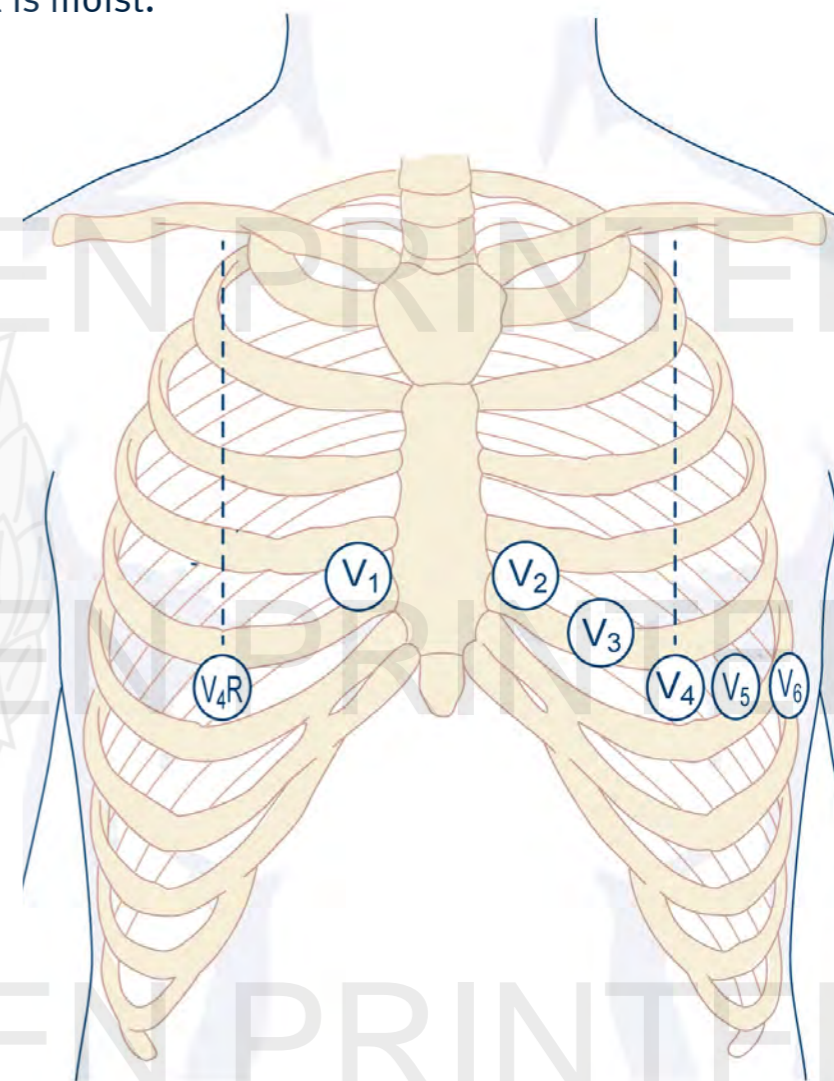
Procedure – 12-Lead ECG acquisition

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 the 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 ₁	4th Intercostal space, right of the sternum
2nd	V ₂	4th Intercostal space, left of the sternum
3rd	V ₄	5th Intercostal space, on left midclavicular line
4th	V ₆	On the left mid-axillary line, level with V ₄
5th	V ₃	Midway between V ₂ and V ₄
6th	V ₅	Midway between V ₄ and V ₆
Optional*	V _{4R}	5th Intercostal space, on the right midclavicular line

* For evaluation of right ventricular involvement with inferior STEMI. Consider acquiring a 12-Lead ECG with V₄ repositioned to V_{4R}. If V_{4R} is acquired, the 12-Lead ECG must be annotated to indicate that V₄ is now representing V_{4R}. Furthermore when V_{4R} is acquired, the defibrillators interpretive statement must not be relied upon.^[1]



corpuls³: *For comprehensive instructions refer to the corpuls³ operating instructions*

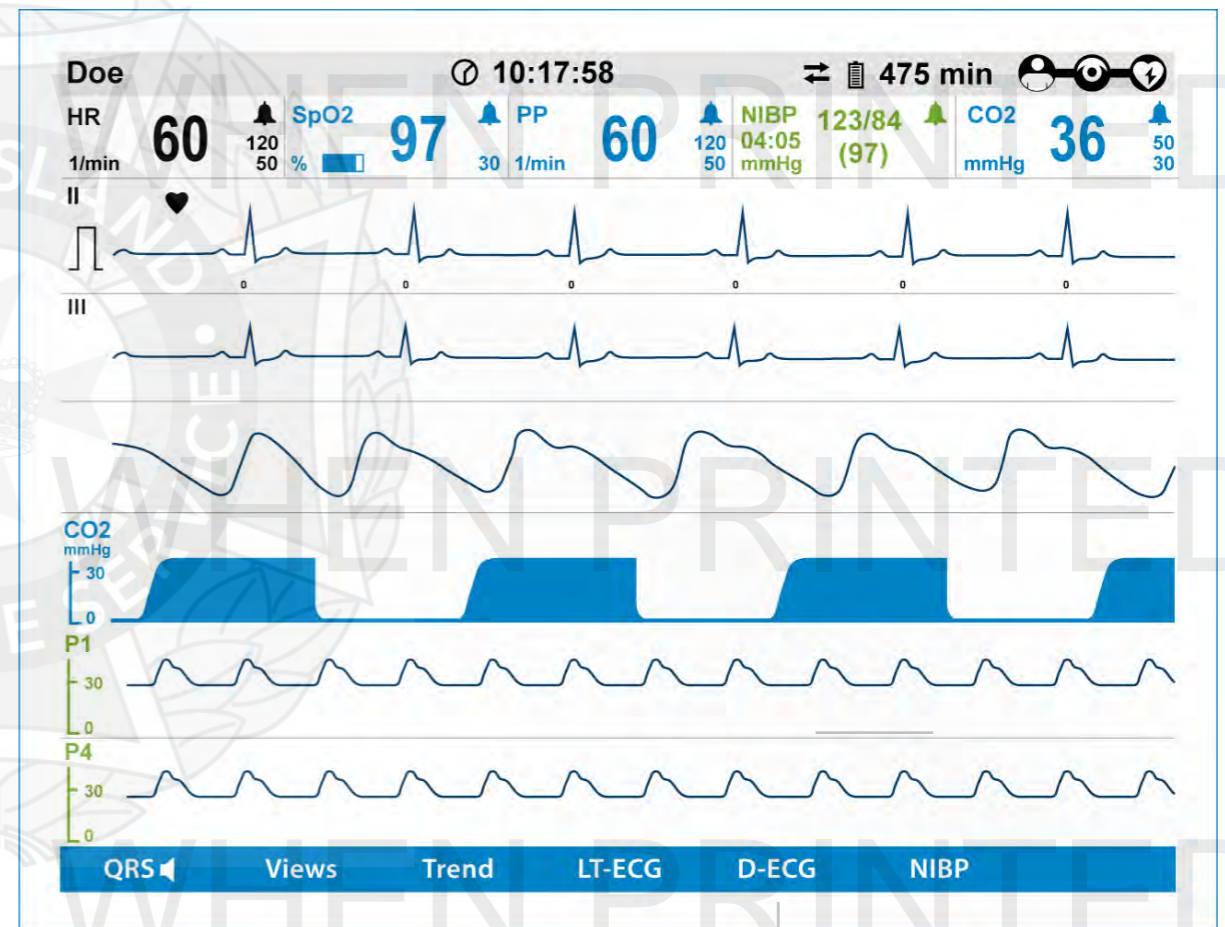
1. Ensure the corpuls³ is on.
2. Press the **Monitor** Key.
3. Press the **D-ECG** soft-key.
4. Encourage the patient to remain as still as possible.
5. Ensure that all leads are displayed and that the signal quality is appropriate. If the signal quality is poor, confirm correct electrode positioning and contact.



Monitor key


6. Confirm that the diagnostic frequency of 0.05–150 Hz is displayed (this is the preferred corpuls³ setting).

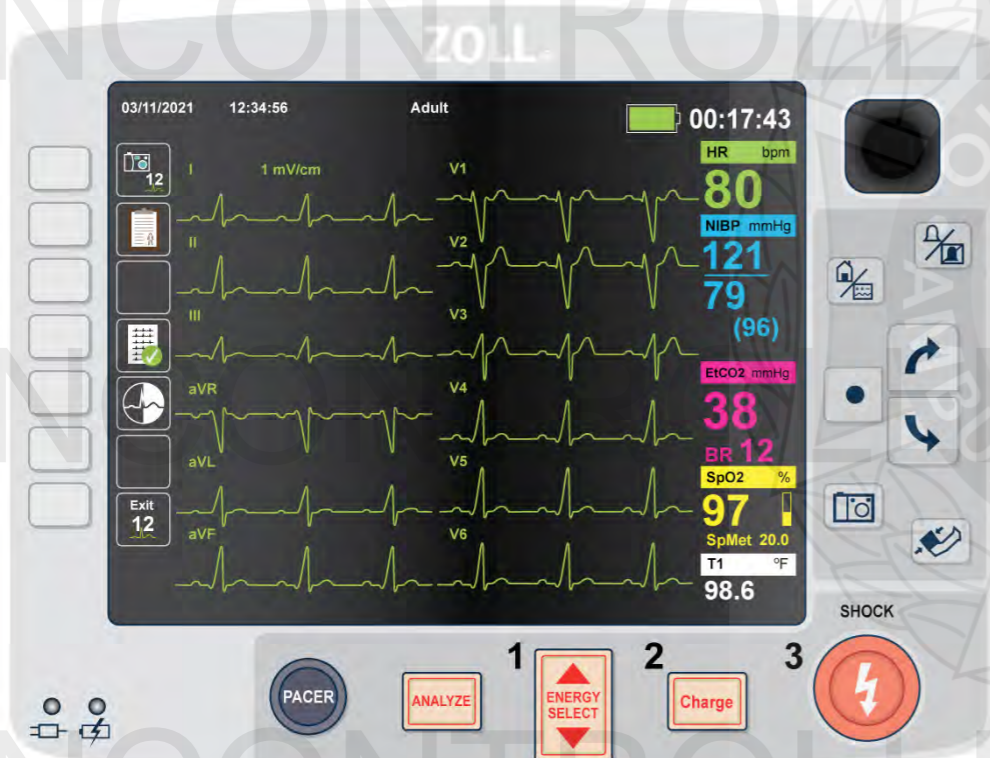
7. When the message 'Ready for D-ECG' is displayed, press the **Start** soft-key. The 12-Lead ECG recorded up to this moment is discontinued and saved.
8. When requested, enter the patient's gender and age, confirm the details by pressing the **OK** soft-key.
9. Press the **Print** soft-key.






D-ECG soft key locator

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

1. Ensure the ZOLL X Series® or X Series Advanced® 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. Enter the age and sex of the patient. Use the **Arrow** keys  &  to highlight the  icon and press the **Select** key. The 12-Lead will automatically acquire and print.

7. In instances that 12-Lead ECG transmission for decision-support thrombolysis is required, repeat steps 1–2 and enter the QAS Case Number into the ‘Patient ID’ field (*see below*).

Patient Info

Patient Age	55
Patient Sex	M
Patient First Name	
Patient Middle Name	
Patient Last Name	
Patient ID	20123456



- a). Press the **Transmit** key  and select ‘QAS STEMI Group’.

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 to acquire an ECG 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. A photo must also be captured and stored as a clinical image in DARF.