



**Center for Clinical and
Translational Research
Standard Operating Procedure**



Section: **Clinical Research Center**

Date Created: **November 1, 2010**

Title: **Performing an Electrocardiogram**

Version Date: **January 1, 2023**

SOP Number: **CO04**

PURPOSE: The purpose of this standard operating procedure (SOP) is to be able to perform the diagnostic procedure of an electrocardiogram (ECG) on a patient providing immediate information leading to appropriate treatment decisions.

SCOPE: This SOP applies to all ECGs that Clinical Research Center (CRC) personnel may perform for a clinical research study.

PERSONNEL RESPONSIBLE: ECG's may be performed by Clinical Research Center (CRC) nursing staff and Clinical Research Associates when part of a clinical trial or if there is an urgent need. The interpretation of ECGs and the treatment decisions for the patients are the responsibility of the provider.

DEFINITIONS:

Electrocardiogram: The electrocardiogram (ECG or EKG) is a noninvasive test that is used to reflect underlying heart conditions by measuring the electrical activity of the heart. By positioning leads (electrical sensing devices) on the body in standardized locations, information about many heart conditions can be learned by looking for characteristic patterns on the ECG.

PROCEDURES:

1. Verify the physician's order and timing of the ECG in the research protocol. This is not required if there is an emergent need to have an ECG performed.
2. If using the CRC provided ECG, turn the machine on and enter the study required data, which may include the following:
 - Patient Name/Initials
 - Patient Identification Number (medical record number or study number)
 - Location (by default to preprogrammed location number, otherwise identify patient care area)
 - Patient Age
 - Patient Gender
 - Patient Race
 - Referred By: Enter the attending/staff physician's last name and first initial
 - Room number (location)

NOTE: In an urgent/emergent situation, entering the patient demographic information is not required. Enter only the required patient's medical record number. After obtaining ECG, enter the remaining required patient demographic information prior to transmission or placement in the patient's medical record.

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3.If using a sponsor provided ECG, follow the manual of procedures and/or study protocol for ECG machine use.

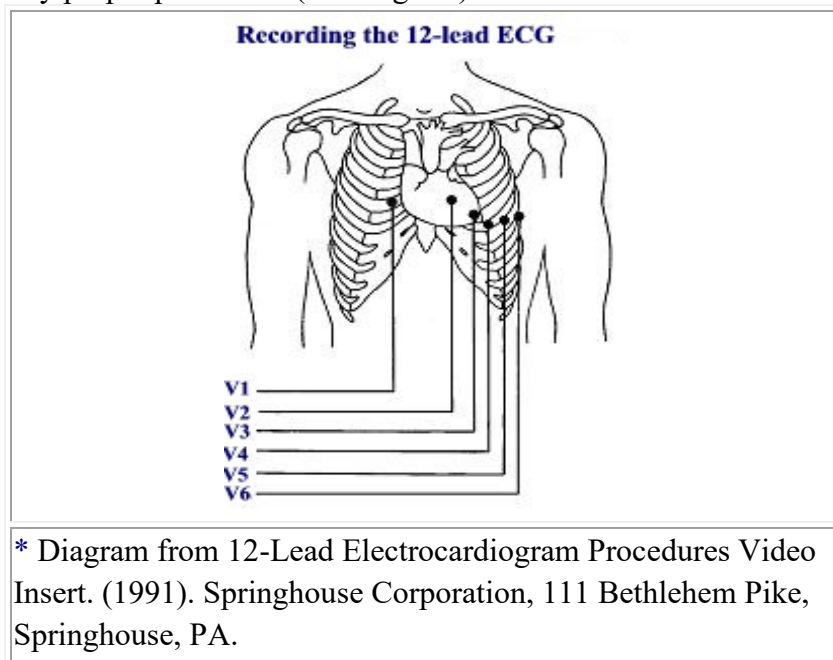
Explain the procedure to the patient. Provide privacy. If tolerated, place the patient in the supine position. Expose and prepare the skin for maximum electrode contact and avoid contact with clothing. Acceptable skin preparation techniques include the following:

- If significant hair is present, shave/clip hair on chest and/or limb lead sites.
- Gently abrade skin with dry gauze 4 x 4's or a dry washcloth.
- Cleanse skin with alcohol wipes and allow to air dry.

NOTE: For babies, infants or small children, utilize pediatric electrodes.

4.ADULT:

- Apply the four limb lead electrodes over the inner (medial) aspect of each of the four extremities distally: right arm, left arm, right leg, left leg. Be sure that limb electrodes are placed on flat, non-muscular areas of the body to minimize artifact.
- Apply the six precordial electrodes (chest), V1-V6, using bony landmarks to identify proper placement (see diagram)



- V1 – 4th Intercostal space, right sternal border
- V2 – 4th Intercostal space, left sternal border
- V3 – ½ the distance between V2 & V4

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- V4 – Left midclavicular line, 5th Intercostal space V5—Left anterior axillary line, on the same horizontal plane as V4.
- V6 – Left mid-axillary line, on the same horizontal plane as V4 & V5.

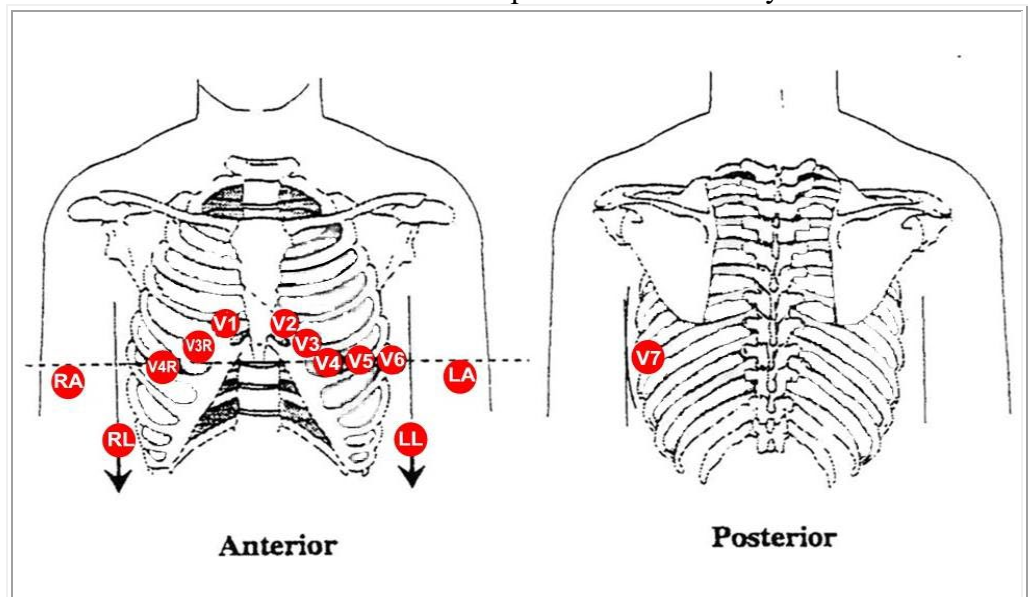
NOTE: Adaptations for patient specific needs may include the following:

Amputees, burns and tremors in extremities may require more proximal placement of the limb lead electrodes. Attach electrodes high on the extremities near the trunk. There is also sufficient distance from the heart with placement in the supraclavicular area or over the scapula for upper extremity leads and pelvic/hip placement for the lower extremity leads

Assistance may be needed for breast tissue displacement on large breasted women for accurate precordial lead placement below breast tissue. For extreme respiratory movement, move lead wires away from areas with the greatest respiratory movement.

5. PEDIATRIC:

- Place all leads according to step 4
- Additional leads to be placed:
 - V3R – Halfway between right V1 and V4R
 - V4R – At the mid-clavicular line in the fifth right intercostal space
 - V7—At the same horizontal level of V4 in the posterior left axillary line



6. Remove the patient cable from the machine and lay it beside the patient or on the patient's abdomen. Attach each lead wire to the correct electrode. The machine will alert by LCD



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display if an electrode is not firmly placed on the patient and/or if a lead wire is not attached securely to the limb or chest electrodes. The machines will not alert staff of reversed electrode placement such as right limb leads on left extremities.

NOTE: Disposable electrodes have conductive material pre-applied on the adhesive side. The electrode tab must be placed between the jaws of the electrode adapter and remain flat.

7. Immediately prior to obtaining the ECG, instruct the patient to lie still and relax.

NOTE: The actual recording of the ECG takes approximately 12 seconds.

8. Record the 12 lead ECG.

9. Determine if the physician wishes a rhythm strip and/or additional copies before removing the electrodes and leads from the patient.

10. Review ECG tracing to:

- a. Ensure limb leads were not reversed.
- b. Verify patient name and medical record number is correct.

11. Remove electrodes. Cleanse the patient's skin removing any remaining adhesive.

12. Provide the ECG for physician review and/or interpretation, if present.

- a. Retain a copy of the ECG tracing in the case report form and send a copy to the designated physician for interpretation.

13. Transmit ECG via MUSE or as directed by sponsor.

ASSOCIATED FORMS:

EKG Checklist

RESOURCES:

Nebraska Medicine:

- Unit specific policy, [Non-Invasive Cardiology, TP 15 ECGs 12 lead, Pediatric, Rhythm Strip,](#)
- [RI10 Patient Identification](#)

Department Approval



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Signed Serena Gaines
Research Nurse Manager

Signed: 2/9/2023

Signed [Signature]
Assistant Vice Chancellor for Clinical Research

Signed: 2/7/2023



CO04 Clinical Research Center
12 lead ECG Checklist

Name (Please Print) _____ Date _____

Instructions: All steps must be performed as indicated for an accurate ECG.

REQUIRED PERFORMANCE	
Procedure:	Completed
1. Check the accuracy of participant's name and birthdate per identification policy before starting the procedure	
2. Wash hands.	
3. Explain procedure to patient.	
4. Maintain privacy for patient.	
5. Press the power key to turn the ECG machine on.	
6. In the order manager interface, press "Load Orders." Select location 245 and wait for orders to load into the queue.	
7. Select the appropriate participant and verify that their name matches the order. Press continue.	
8. Input data into ECG machine: <ul style="list-style-type: none"> ○ Patient Name/Initials ○ Patient Identification Number (medical record number or study number) ○ Location (May default to preprogrammed location number, otherwise identify patient care area) ○ Patient Age ○ Patient Gender ○ Patient Race ○ Referred By: Enter the attending/staff physician's last name and first initial ○ Room number (location) ○ Technician Initials ○ Study ID ○ Visit Number 	
9. Prep the skin prior to placing leads on patient.	
10. Place electrodes on proper anatomical location on patient.	
11. Attach leads to the corresponding electrodes.	
12. Allow waves to steady to baseline with minimal visible noise.	
13. Correct leads if prompted by error messages.	
14. Wait 5-10 seconds after the green dot appears on the screen, then press the ECG key to initiate a tracing. Selecting "continue" will print a copy of the ECG.	
15. Press "Copy" button if second copy is requested by nurse/physician.	
16. Press "Rhythm" button if rhythm strip is requested.	
17. Select "Main Menu."	
18. Select "File Manager."	
19. Locate and select the correct patient record and verify that the time matches the completed ECG.	
20. Select "Transmit" and wait until screen indicates files have been deleted and it has disconnected from the network.	
21. Turn ECG machine off.	
22. Locate power supply connection and plug in when not in use.	
23. Explain or demonstrate procedure to change paper.	