How to Perform a 12-Lead Resting ECG using a Welch Allyn CP 150
WHEN PERFORMING A RESTING ECG

ALWAYS follow Richmond State Hospital Policy!
# 940.02 Electrocardiogram

• Electrocardiograms are kept in the Medical Clinic exam room or 417 Center Exam Room. When possible, perform the ECG’s in one of these areas and ALWAYS clean up after yourself.

• When an ECG is ordered, licensed nursing staff will document on the log by the ECG machine that an ECG was obtained and will send the ECG printout via FAX to the Richmond Cardiology Associates at Reid Hospital for evaluation by a cardiologist.
• When a routine ECG is ordered, the ECG is to be completed within 72 hours of the time of the order. Routine ECG’s include those ordered as baseline, for workup prior to a medication change, to determine cardiac drug effectiveness, and for the evaluation of a cardiac pacemaker or implanted defibrillator functions.

• Annual orders for ECGs will be completed within the month of the order.

• All RN’s and LPN’s should be able to perform an ECG at this facility.
WHEN PERFORMING A RESTING ECG

HAVE THE APPROPRIATE EQUIPMENT

- **Use 2 patient identifiers** before you do anything!!
- **2nd employee with you and the patient**
- **Completed Request for ECG (SF-1968)**
- **CP 150 ECG machine** (with Welch Allyn cables and paper)
- **Electrodes** (will need 10 per patient)
- **Skin Prep**
- **Gloves**
- **Wash Cloths and Towels**
- **Gown or blanket**
- **Warm water & soap**
- **Shaving Cream**
- **Razor & Sharps Container**
- **Trash bag**

Have the ECG machine ready with all of the patients information already added in the system before you attach the electrodes.
On this diagram, you should only be using the power connection. Keep the machine should plugged in at all times (exception is if patient cannot be brought to where the machine is kept).

<table>
<thead>
<tr>
<th>No.</th>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ethernet connector</td>
<td>Provides a hardwired connection to the computer network. The LEDs indicate active network status when the ethernet cable is connected to a network.</td>
</tr>
<tr>
<td>2</td>
<td>Clients USB</td>
<td>USB, type “mini B.” Provides connection to an enabled host.</td>
</tr>
<tr>
<td>3</td>
<td>Host USB</td>
<td>USB, type “A.” Provides four host USB connections for optional accessories.</td>
</tr>
<tr>
<td>4</td>
<td>Power connection</td>
<td>Provides an external AC power connection.</td>
</tr>
<tr>
<td>5</td>
<td>AC fuse</td>
<td>Provides access to AC fuse.</td>
</tr>
<tr>
<td>6</td>
<td>Ground lug (equipotential terminal)</td>
<td>Provided for electrical safety testing and as a means for connection of a potential equalization conductor.</td>
</tr>
<tr>
<td>7</td>
<td>Battery compartment (behind cover)</td>
<td>Houses the Li-ion battery.</td>
</tr>
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</table>
### Controls, indicators, and connectors

![Machine Diagram]

Know The Machine You Are Using

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<td>LCD screen</td>
<td>800 x 480 pixels color touchscreen provides a graphical user interface.</td>
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</table>
| 2   | Power switch and LED     | Power-on/Standby switch. The LED indicates the charging status when connected to AC power:  

- **Green**: The battery is charged.  
- **Amber**: The battery is charging.  |
| 3   | Patient cable connector  | Provides connection for patient cable.                                      |
| 4   | Printer                  | Printer provides a printout of patient Auto ECG, Stat ECG, or Rhythm ECG.   |

Also referred to as **Home Screen**
To perform an ECG, select the 1st choice, *Enter patient information and print ECG.* Patient information is saved and can be pulled up for future ECG’s without reentering information. This ECG stores 100 test results.

### ECG home screen

The ECG home screen includes the following areas:

1. **Device status**
2. **Content**
3. **Navigation**
# About the test types

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<td><strong>Auto ECG</strong></td>
<td>A report typically showing a 10-second acquisition of 12 leads of ECG information combined with patient data, measurements, and optional interpretation. Auto ECGs can be saved to the electrocardiograph’s test directory or to a USB mass-storage device.</td>
</tr>
<tr>
<td><strong>Rhythm ECG</strong></td>
<td>A continuous, real-time printout of rhythm strips with a user-defined lead configuration. Rhythm ECGs are printouts only. They cannot be saved.</td>
</tr>
<tr>
<td><strong>Stat ECG</strong></td>
<td>An auto ECG that starts without waiting for you to enter patient data.</td>
</tr>
</tbody>
</table>
Entering Patient Information

1. Touch the 🎤 (Auto ECG) button.
2. The summary tab appears and the following information should be entered:
   – Patient ID. Touch the OK button.
   – Birth date (MM/DD/YYYY). Touch the OK button.
   – Last name. Touch the OK button.
   – First name. Touch the OK button.
   – If the patient has a pacemaker, touch the Pacemaker present button.
3. Touch the Next button.
4. Enter the following patient information;
   – Gender
5. Touch the Next button.
6. Attach the leads to the patient.
ATTACHING LEADS TO THE PATIENT

Proper lead attachment is important for a successful ECG. The most common ECG problems are caused by poor electrode contact and loose leads.

• Prepare the patient by describing the procedure. Explain the importance of holding still during the test. (Movement can create artifact.)
• Position the patient in a reclining position with the head slightly higher than the heart and legs (the Semi-Fowler’s position).
• Verify the patient is comfortable, warm and relaxed.
• Look at electrode locations (look for flat areas, avoid fatty areas, bony areas, scar tissue and major muscles).
• Prepare the electrode locations (shave the hair and thoroughly clean the skin, and lightly rub it dry).
• You may use soap and water, isopropyl alcohol or skin preparation pads.
ATTACHING LEADS TO THE PATIENT

• Apply the electrodes to the patient. (See next slide for proper location.)
• Secure cardiac monitor cables (lead wires) to the patient. (See next slide for proper placement of the different lead wires.)
• View electrode placement by looking at the ECG preview screen. To do this you need to touch the (ECG preview) button on the home screen.
• The ECG preview screen will appear;

Touch the torso button to enlarge the lead placement or to close it.

Any flashing yellow dots on the ECG preview screen indicates unattached or poorly attached leads.

A green constant dot indicates good placement of the lead.
Correct Electrode Placement & Lead Wire Attachment

A  V1  Fourth intercostal space at the right sternal border
B  V2  Fourth intercostal space at the left sternal border
C  V3  Midway between V2 & V4
D  V4  Fifth intercostal space to the left of the midclavicular line.
E  V5  Anterior axillary line at the same horizontal level as V4
F  V6  Mid-axillary line at the same horizontal level as V4 & V5
G  LA  Just above the left wrist on the inside of the arm
H  LL  Just above the left ankle
I  RL  Just above the right ankle
J  RA  Just above the right wrist on the inside of the arm
Extra Views of Electrode Placement

When counting intercostal spaces, start with the space below the clavicle for 1.
Artifact Message

If an Artifact message appears, you need to minimize the artifact by troubleshooting. You should ensure that the patient is comfortably warm, reprepare the patient’s skin, use fresh electrodes or minimize patient motion. If the patient is having tremors in the hands or feet, you may need to move the electrodes on the affected limb(s).
You may place the limb electrodes closer to the torso if need be. Placement of leg electrodes must always be below the umbilicus.
Artifact Message

Some extra helpful hints to prevent artifacts;

• Instruct the patient to undress from the waist up
• Bras and nylons should be removed
• Jewelry and watches should be removed
• Wash the skin as skin oil, topical medications, sunblock, lotions, etc may interfere with electrode contact
• Shave if too much hair to prevent electrode contact with skin, do not just tape down over chest hair
• Correctly attach leads to electrodes
• Instruct the patient to lie still and not talk (if they take deep breaths, laugh, etc it may result in artifacts.)
Wandering Baseline

Causes
- Electrodes are dirty, corroded, loose or positioned on bony areas.
- Electrode gel is insufficient or dried.
- The patient has oily skin or used body lotions.
- Rising and falling of the chest during rapid or apprehensive breathing.

Actions
- Clean the patient’s skin
- Reposition or replace the electrodes
- Verify the patient is comfortable, warm and relaxed.
Printing the ECG

- If an *Artifact* message appears, minimize the artifact.
- Touch the *Print* button to perform the Auto ECG test.
- If *Print preview on* is selected in the ECG configuration settings, a single screen of the ECG Report Print Preview appears. Touch *Print* to continue with the Auto ECG test or touch *Retest* to discard the test and return to the previous screen.
- If a *Waiting for 10 seconds of quality data* message appears, at least 10 seconds of ECG data have been collected with the excessive artifact. Time requirements in the message may vary, based upon selected print format. Minimize the artifact using the tips slide. Then wait for the test to print.
- There will be a place to touch to print an extra copy of the ECG test.
- Once you are done, touch *Exit* and then turn off the machine.
After the ECG is Completed

• Make sure you documented on the ECG log all ECG’s you obtained and if they were faxed to the Cardiology Center or not.

• Fax the ECG strip to the appropriate facility with a cover sheet that includes the name of the patient, their unit and the attending physician.

• Place a copy of the ECG strip in the unit physician’s book.

• After signed and dated by physician it is filed in patient’s chart.

• If additional electrodes, skin prep pads or ECG print paper is needed, request it from the Central Supply clerk or the Health Clinic nurse.

• If you experience problems with the ECG machine, contact the Central Supply clerk or the Health Clinic nurse.
After the ECG is Completed

• Be sure you unhook all the leads, remove all the electrodes from the patient and assess for any signs of a reaction to the electrodes.

• Clean the lead wires that may have touched the patient and the outside of the ECG machine per manufacturer’s instructions.

• Make sure that any open electrode packages are in a sealed bag to prevent them from drying out.

• If you removed the ECG from the area where it is kept, make sure it is returned to it’s proper place ASAP.

• Clean up after yourself by properly disposing of trash, any used razors, dirty linens, etc.
Loading the thermal paper

The electrocardiograph prints on z-fold thermal paper.

- Store the paper in a cool, dry, dark place.
- Do not expose it to bright light or UV sources.
- Do not expose it to solvents, adhesives, or cleaning fluids.
- Do not store it with vinlys, plastics, or shrink wraps.
To clean the equipment

1. Disconnect the power plug from the AC outlet.

2. Turn off the electrocardiograph. (Press and hold the power button for at least six seconds until the screen goes blank.)

3. Dampen a cloth with any of the acceptable cleaning solutions, and wipe the exterior of the patient cable and electrocardiograph. Dry all components with a clean, soft cloth, or paper towel.

4. Before you turn on the electrocardiograph again, wait at least 10 minutes for all traces of liquid to evaporate.

70 percent isopropyl alcohol

Wipe the electrocardiograph with a clean cloth slightly dampened with 70 percent isopropyl alcohol.

10 percent chlorine bleach solution

1. Wipe the electrocardiograph with a clean cloth slightly dampened with a 10 percent bleach and water solution. Follow the cleaning agent manufacturer’s guidelines.

2. Rinse with a clean cloth slightly dampened with water that meets EP and USP quality standards.

3. Allow the electrocardiograph surface to dry for a minimum of 10 minutes before using the electrocardiograph.
WARNINGS – INDICATE CONDITIONS OR PRACTICES THAT COULD LEAD TO ILLNESS, INJURY OR DEATH.

Warnings related to the environment

**WARNING** The power cord is considered the disconnect device for isolating this equipment from supply mains. Do not position the equipment so that it is difficult to reach or disconnect.

**WARNING** To avoid a possible explosion, do not use the electrocardiograph in the presence of flammable anesthetics: mixtures containing air, oxygen, or nitrous oxide.

**WARNING** When transporting the electrocardiograph on a cart, tuck the patient cable away to keep them clear of the wheels and to minimize trip hazards.

Warnings related to accessories and other equipment

**WARNING** To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

**WARNING** Defective batteries can damage the electrocardiograph. Visually inspect the battery at least monthly, if the battery shows any signs of damage or cracking, it must be replaced immediately and only with a battery approved by Welch Allyn.

**WARNING** Improper disposal of batteries may create an explosion or contamination hazard. Never dispose of batteries in refuse containers. Always recycle batteries according to local regulations.
Warnings related to using the electrocardiograph

WARNING No modification of this equipment is allowed.

WARNING This device captures and presents data reflecting a patient’s physiological condition. When reviewed by a trained physician or clinician, this data can be useful in determining a diagnosis. However, the data should not be used as a sole means for determining a patient’s diagnosis or prescribing treatment.

WARNING To provide CF protection use only accessories approved by Welch Allyn. Visit www.welchallyn.com. The use of any other accessories can result in inaccurate patient data, can damage the equipment, and can void your product warranty.

WARNING To prevent the spread of infection, take these precautions:
- Dispose of single-use components (for example, electrodes) after using them once.
- Regularly clean all components that come in contact with patients.
- Avoid ECG testing for patients with open, infectious sores.

WARNING Avoid positioning any leads or cables so that they could easily trip someone or become wrapped around a patient’s neck.

WARNING To ensure safe use of the device, follow the documented maintenance procedures.

WARNING Only qualified service personnel should attempt to repair the electrocardiograph. In case of a malfunction, call Technical Support.
You have completed the inservice on

How to Perform a 12-Lead Resting ECG

Legibly Print Your Name Below to receive credit!

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