ECG and Blood Pressure Work Shop

1. Purpose of ECG and blood pressure taking is for research only. Remember this is nonclinical. Should any concerns arise you need to contact a licensed person such as a nurse or physician.

2. ECG rhythms that need further attention: Sinus bradycardia, second-degree AV block, third degree AV block, sinus tachycardia, atrial fibrillation, ventricular tachycardia, ventricular fibrillation, supraventricular tachycardia, junctional rhythm, right bundle branch block, left bundle branch block.

3. The ideal ECG rhythm is normal sinus rhythm.

4. Please keep in mind that lead placement may be difficult with women that have large breasts and men that have a lot of hair on their chest.

5. Blood pressure readings that need further attention: Systolic blood pressure greater than 180 and less than 90, diastolic blood pressure greater than 90 and less than 50.

6. Remember to check blood pressures after patient has rested for 3-5 minutes or per protocol. Patient may be either in a seated or supine position for blood pressure checking.

7. Please ensure that the proper blood pressure cuff is being used. A blood pressure cuff that is too small for the arm will give a falsely elevated blood pressure reading. A blood pressure cuff that is too large for the arm will give a falsely lowered blood pressure reading.

8. Please contact the CCRC if you feel you need more practice or training with human models.
Blood Pressure Measurement

The Korotkoff technique for measuring blood pressure has continued to be used without any substantial improvement. The brachial artery is occluded by a cuff placed around the upper arm and inflated to above systolic pressure. As it is gradually deflated, pulsatile blood flow is re-established and accompanied by sounds that can be detected by a stethoscope held over the artery just below the cuff. Traditionally, the sounds have been classified as 5 phases: phase I, appearance of clear tapping sounds corresponding to the appearance of a palpable pulse; phase II, sounds become softer and longer; phase III, sounds become crisper and louder; phase IV, sounds become muffled and softer; and phase V, sounds disappear completely. The fifth phase is thus recorded as the last audible sound.

The sounds are thought to originate from a combination of turbulent blood flow and oscillations of the arterial wall. The disappearance of sounds (phase V) corresponds to diastolic. No clinical significance has been attached to phases II and III. There is a role for other types of device in office use, both as a substitute for the traditional mercury readings (eg, aneroid and hybrid sphygmomanometers) and as supplements to them (eg, oscillometric automatic devices).

Subject Preparation

A number of factors related to the subject can cause significant deviations in measured blood pressure. These include room temperature, exercise, alcohol or nicotine consumption, positioning of the arm, muscle tension, bladder distension, talking, and background noise. The patient should be asked to remove all clothing that covers the location of cuff placement. The individual should be comfortably seated, with the legs uncrossed, and the back and arm supported, such that the middle of the cuff on the upper arm is at the level of the right atrium (the midpoint of the sternum). The patient should be instructed to relax as much as possible and to not talk during the measurement procedure; ideally, 5 minutes should elapse before the first reading is taken.
The “ideal” cuff should have a bladder length that is 80% and a width that is at least 40% of arm circumference (a length-to-width ratio of 2:1). A recent study comparing intra-arterial and auscultatory blood pressure concluded that the error is minimized with a cuff width of 46% of the arm circumference. The recommended cuff sizes are:

For arm circumference of 22 to 26 cm, the cuff should be “small adult” size: 12×22 cm

For arm circumference of 27 to 34 cm, the cuff should be “adult” size: 16×30 cm

For arm circumference of 35 to 44 cm, the cuff should be “large adult” size: 16×36 cm

For arm circumference of 45 to 52 cm, the cuff should be “adult thigh” size: 16×42 cm

Prior to initiating blood pressure measurement cleanse hands; then turn the machine on, place the correct cuff size on the right or left arm, and press the button to start the blood pressure measurement. Do not touch the patient or the machine while the blood pressure measurement is taking place.
Using the 12-Lead

- Skin prep is important
- Dry wet skin
- Shave or clip chest hair
- Gently abrade dead skin
# Electrode Placement

<table>
<thead>
<tr>
<th>ELECTRODE</th>
<th>PLACEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>4th Intercostal space to the right of the sternum</td>
</tr>
<tr>
<td>V2</td>
<td>4th Intercostal space to the left of the sternum</td>
</tr>
<tr>
<td>V3</td>
<td>Midway between V2 and V4</td>
</tr>
<tr>
<td>V4</td>
<td>5th Intercostal space at the midclavicular line</td>
</tr>
<tr>
<td>V5</td>
<td>Anterior axillary line at the same level as V4</td>
</tr>
<tr>
<td>V6</td>
<td>Midaxillary line at the same level as V4 and V5</td>
</tr>
<tr>
<td>RL</td>
<td>Anywhere above the ankle and below the torso</td>
</tr>
<tr>
<td>ELECTRODE</td>
<td>PLACEMENT</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>RA</td>
<td>Anywhere between the shoulder and the elbow</td>
</tr>
<tr>
<td>LL</td>
<td>Anywhere above the ankle and below the torso</td>
</tr>
<tr>
<td>LA</td>
<td>Anywhere between the shoulder and the elbow</td>
</tr>
</tbody>
</table>
Handwashing (Hand Hygiene)

I. SETTING

Medical Center

II. GENERAL STATEMENTS

A. Studies indicate hand washing reduces carriage of pathogens on the hands. The World Health Organization recommends five key moments when health care workers should wash hands:

1. before touching a patient;
2. before clean/aseptic procedures;
3. after body fluid exposure/risk;
4. after touching a patient; and
5. after touching patient surroundings.

B. UCDMC is implementing The Joint Commission's hand hygiene project which emphasizes decontaminating hands with alcohol hand rub when crossing the threshold of a patient care area, both entry and exit.

C. Because microorganisms proliferate on the hands within the moist environment of gloves, hand hygiene is required both before and after wearing gloves.

D. Handwashing (hand hygiene) results in the reduction of patient morbidity and mortality from healthcare acquired infections.

E. The Centers for Disease Control and Prevention (CDC) states that handwashing is the single most important procedure for preventing healthcare acquired infections.

F. Artificial nails are more likely than natural nails to harbor pathogens that can lead to healthcare acquired infections.

G. There are four types of hand hygiene:

1. Hand rub/degerming (alcohol foam/gel):
   a. Purpose: to destroy transient and resident microorganisms on unsoiled hands.
   b. Method: alcohol-based hand gel/foam rubbed vigorously until dry, at least 20 seconds.

2. Routine handwashing:
   a. Purpose: to remove soil and transient microorganisms.
   b. Method: soap or detergent and water for a 15 second minimum.

3. Hand asepsis:
   a. Purpose: to remove soil and remove or destroy transient microorganisms.
b. Method: antimicrobial soap and water for a 15 second minimum, or alcohol-based hand gel/foam for at least 20 seconds.

4. Surgical hand scrub:
   a. Purpose: to remove or destroy transient microorganisms and reduce resident flora.
   b. Method: antimicrobial soap or detergent preparation and water with brush to achieve friction for at least 120 seconds.

III. POLICY

A. The choice of plain soap, antimicrobial soap, alcohol-based hand rub or surgical hand scrub should be based on the degree of hand contamination and whether it is important to reduce and maintain minimal counts of resident flora, as well as to mechanically remove the transient flora on the hands of healthcare personnel.

1. Handwashing with plain soap or hand rub (if hands are not soiled) is indicated before and after routine patient care activities and non-patient care activities.

2. Hand asepsis with antimicrobial soap or hand rub/degerming with alcohol-based hand rub is indicated before and after all patient care in high-risk areas, i.e., ICU/NICU, Dialysis, Hematology, Oncology and when caring for patients with immunosuppression or multi-drug resistant organism; before invasive procedures such as IV insertion, bronchoscopy; and where no sinks are available (alcohol gel).

3. Surgical hand scrubs are indicated prior to surgical procedures.

B. Clinical staff clean their hands in accordance with recommendations made by professional organizations including the Centers for Disease Control and Prevention. These recommendations include:

1. Washing hands with plain soap or antimicrobial soap and water, as follows:
   a. When hands are visibly dirty or contaminated with proteinaceous material or with blood or other body fluids
   b. Before eating
   c. After using the bathroom
   d. After caring for patients with Clostridium difficile. Do not use alcohol based products after caring for a patient with C. difficile as alcohol is ineffective against this pathogen.

2. If hands are not visibly soiled, use an alcohol based hand rub for routinely decontaminating hands in the following situations:
   a. Upon entry of a patient care area
   b. Upon exit of a patient care area
c. Before direct contact with a patient's skin

d. Before donning non-sterile gloves for patient care

e. Before donning sterile gloves for any sterile procedure

f. Before inserting peripheral vascular catheters or other invasive devices

g. After direct contact with patient skin

h. After contact with body fluids, mucous membranes, non-intact skin and wound dressings if hands are not visibly soiled

i. When moving from a contaminated body site to a clean body site during patient care

j. After contact with inanimate objects in the patient care area.

k. After removing sterile or non-sterile gloves

C. The use of alcohol rub products instead of soap and water is acceptable in situations where the hands are not soiled with physical dirt. Alcohols are poor cleaning agents and hands must be free from dirt for the alcohol to be effective. Exception: Use soap and water after caring for patients with C. difficile.

D. Soap from wall-mounted dispensers is to be used for routine handwashing. Bar soap is unacceptable.

E. Hand lotion is provided to prevent skin dryness and damage. Use only the hospital approved and hospital provided hand lotion while at work. The hospital approved hand lotion is used after each hand wash with Chlorhexidine Gluconate (CHG). Do not bring hand lotions from home for use at work.

1. CHG is compatible with the hospital approved hand lotion. CHG is not compatible with personal hand lotions as most commercial hand lotion products contain petroleum or petroleum based products such as glycerin. CHG is inactivated by petroleum.

2. If latex gloves are used, lotion must be water-based because petroleum and mineral oil interfere with latex.

F. Rings other than plain bands are discouraged for healthcare workers. Bands may be left in place while washing hands.

G. The natural nails of healthcare workers are to be kept short, i.e., not extending beyond the tips of the fingers.

H. Artificial nails, nail tips, acrylic overlays and gel products are prohibited for all healthcare workers and providers who provide direct, hands-on patient care, across the continuum of care, including but not limited to: inpatient, ambulatory and home care, invasive or diagnostic procedures or therapies, perioperative services, intensive care (adult/pediatric/newborn), perinatal services (labor and delivery/post partum/nursery). Nail polish is acceptable only if maintained and in good repair (Exception: Surgical Team – see Item I. 1. Below).

I. All members of the Sterile Surgical Team must properly complete the surgical hand scrub.
1. Fingernails must be trimmed short and be free of polish and artificial nails and tips.

2. Hands and forearms must be free of open lesions and breaks in skin integrity.

IV. PROCEDURE

A. Soap and Water and Antimicrobial Handwashing

1. Stand near sink, but avoid touching as the sink itself may be a source of contamination.

2. Using tepid water, wet hands. Avoid splashing and keep moisture away from sleeves and clothing.

3. Generously apply soap.

4. Rub hands vigorously together causing friction to clean between fingers, around and under fingernails, the back of hands, wrists and palms for 15 seconds.

5. Rinse hands well under running water.

6. Dry hands with paper towels. Use paper towel to turn off faucet if there is no foot or knee control to prevent re-contaminating hands.

B. Antiseptic Hand Rubs (Waterless Cleaners)

1. Assuming hands are not soiled, apply enough alcohol gel or foam to cover the entire surface of hands and fingers.

2. Rub hands vigorously together causing friction to de-germ between fingers, around and under fingernails, the back of the hands, wrists and palms until dry, at least 20 seconds.

3. Wash hands with soap and water after 10-12 uses of antiseptic hand rubs or when hands feel sticky.