

**Learning Module for
Unlicensed Research Coordinators:**

**Obtaining Blood Pressure & Pulse with
Noninvasive Automatic Electronic Device**

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Purpose:

Research Coordinators who have not received blood pressure and pulse measurement as part of their education and who are delegated by the Principal Investigator to obtain these measurements using a noninvasive automatic electronic device must be certified as competent. It is the Principal Investigator's responsibility to ensure the research coordinator is qualified and trained for this task.

Learning Objectives:

To become competent, Research Coordinators will:

1. Understand the definitions of blood pressure and pulse
2. Be aware of normal values for blood pressure and pulse for the general adult population
3. Identify correct blood pressure cuff size and placement
4. Practice the procedures and demonstrate skills to competent RN/LPN
5. Maintain a record of for training of this post-hire competency in Section 6 of training binder (provided at Orientation to Research)
6. Repeat training annually and document in training binder

Learning Methods:

1. Learning Module Completion (review of this module)
2. Completion of self-test
3. Demonstration of skills to RN/LPN and documentation in training binder

Theory

Blood pressure is the measurement of the force exerted on the walls of an artery by blood being ejected by the heart ventricles (systolic pressure) and the pressure remaining in the arteries when the ventricles relax (diastolic pressure). Systolic and diastolic pressure is measured in millimeters of mercury (mmHg) and is expressed as Systolic/Diastolic (S/D) (example 120/70).

Pulse (heart beat) is the palpable sensation of the blood being ejected from the heart ventricle. Pulse (heart rate) is measured as the number of palpable sensations occurring over one minutes and is expressed is beats per minutes (bpm) (example 60 bpm).

Preparation for blood pressure measurement

Check the study protocol and source documentation for specific instructions for obtaining blood pressure measurement including selection of which arm. Examples include, but not limited to:

- Which arm is to be used
- Participant has abstained for smoking, caffeine, or exercise for a specified time.
- Sequence of blood pressure (done prior to venipuncture or EKG or order of measurement if blood pressure measurement is done while standing and/or laying
- Participant should be sitting quietly in with both feet on floor for predetermined amount of time.
- Participant should have removed outer garments and any tight upper arm clothing. Sleeves of loose fitting clothing should have been rolled up until upper arm is bare.

Do not use an arm with any type of indwelling shunt (example dialysis fistula), and active intravenous, or side of previous mastectomy.

Positioning of the arm to measure blood pressure

The participant's arm should be resting on a base of the antecubital fossa (bend in elbow) is at the level of the heart and the palm facing up. To achieve this position, the chair should be adjusted or the arm should be raised by using a pillow or other support.



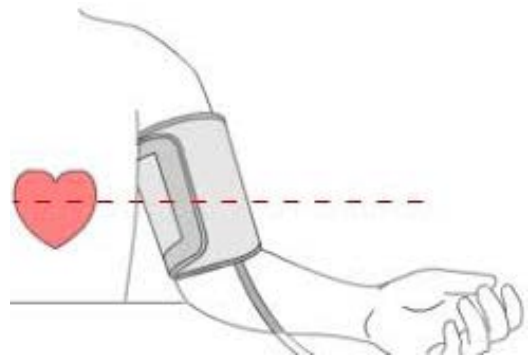
Selection of blood pressure cuff size

If blood pressure cuff size has not been noted or the subject has lost or gained weight, the greatest circumference of the upper arm should be measured using a non-elastic tape measure while the arm is relaxed and in the normal blood pressure measurement position (see diagram). The measurement should be done to the nearest centimeter. Match the measurement of the arm to the guideline printed on the blood pressure cuff. The blood pressure cuff should fit easily around the arm and the Velcro should close tightly.



Proper Cuff Placement

Prepare selected cuff by squeezing all the air out of the cuff if required. The cuff should be placed on the arm so the bottom edge of the cuff sits 2-3 centimeters above the antecubital fossa (bend in elbow). The cuff position should not be restricted by clothing or be placed over clothing. The arrow on the cuff (if present) or the tubing should be placed over the brachial artery (middle of the elbow bend). The cuff should be snugly wrapped around the arm; only one finger should fit between the cuff and the arm. See diagram for reference of correct placement.



Proper position, cuff size, and placement are important to ensure blood pressure measurements are accurate.

Safety

All medical devices to be used on Nova Scotia Health Authority Care patients, including blood pressure machines must be inspected and approved by Biomedical Engineering as per policy CH20-010. Please contact Biomedical Engineering prior to purchasing or using any noninvasive automatic electronic blood pressure device to ensure an appropriate/approved device is being used.

Results of measuring blood pressure and pulse can vary widely depending on the patient, hydration status, current health, and medications, however a normal blood pressure range can be considered between **90/60 and 130/80**. A normal pulse rate is considered to be **60-100 bpm**. Baseline blood pressure and pulse measurements along with documentation of normal deviations, such as a low pulse rate in an athletic person, permanent atrial fibrillation, or history of asymptomatic low blood pressure, should be recorded in the study participant's record and reviewed/confirmed by the study PI or Sub-I.

Automatic blood pressure machines may not measure pulse rate, or may measure pulse rate but not denote rhythm or pulse quality. The pulse rate should be palpated by PI/RN/LPN to assess rhythm and strength as this reflects health of the circulatory system.

An unlicensed research coordinator is only responsible for the collection of the blood pressure and pulse measurements as trained and deemed competent. All blood pressure and pulse measurements taken by an unlicensed research coordinator on a noninvasive automatic electronic blood pressure device **must be reviewed by the PI, RN, or LPN prior to the study participant leaving the visit for patient safety.** Any blood pressure and/or pulse measurement outside the normal range or study participant report of adverse health symptoms must be reported immediately to the PI, RN, or LPN for appropriate follow-up care. The unlicensed research coordinator and reviewer of the blood pressure and pulse results are responsible to record in the study participant's source document the time and sequence of the process.

The research team should have an SOP for the entire process and procedure, including training.

Demonstration of Competency

Please demonstrate skills for this post-hire competency to RN or LPN trainer and document training in Section 6 of training binder.

Repeat annually to document review and continued competency for this task.

References:

Potter and Perry. *Fundamentals of Nursing*. 8th ed. Elsevier Mosby St. Louis Missouri, pgs. 452-455,465

Self-test

1. Which of the following measurements are normal?
 - a) BP 120/70, pulse 76
 - b) BP 140/80, pulse 66
 - c) BP 120/80, pulse 50
 - d) BP 120/80, pulse 110

2. You wrap the cuff around the participant's arm and as it inflates the Velcro starts to separate. You should do which of the following:
 - a) Contact the manufacturer because the cuff is defective
 - b) Hold the cuff in place to prevent it from coming off
 - c) Nothing
 - d) Remove and use a larger cuff

3. When placing the cuff on a participant the arrow should be placed:
 - a) On the side of the arm
 - b) Over the brachial artery
 - c) Slightly to the side of the brachial artery
 - d) None of the above

4. The participant's sweater is rolled above the elbow and the cuff overlaps the sweater edge by 1 inch. This is acceptable.
 - a) True
 - b) False

5. Before using a noninvasive automatic blood pressure device, you should read the manufacturer's directions and instructions for use:
 - a) True
 - b) False

6. Before a patient study patient leaves the clinic, the blood pressure and pulse should be reviewed by the PI, Sub-I, RN or LPN?
 - a) True
 - b) False

Answers:

1.a 2.d 3.b 4.b 5.a 6.a