



## Pulse Oximetry



# Pulse Oximetry Preparation

Pulse Oximeter: Devon Medical Handheld Pulse Oximeter PC-66

- Resting oxygen saturation will be measured while the participant is resting for blood pressure measurement.
- Explain the procedure to the participant
- Verify that the probe is clean, dry and in good condition before applying it to the participant.
- Ask the participant to remove her nail varnish or acrylic nails that may impair the effective transmission of light (have some nail varnish remover on hand just in case).

# Reading the Pulse Oximeter

Place	Place oximeter on participant's finger during the beginning of the resting period prior to blood pressure measurements.
Verify	Verify that the probe is well positioned
Record	Record the apparent median value obtained while observing the monitor over a one-minute observation period

# For Participants Using Oxygen

If the subject is using oxygen:

1. The pulse oximeter should be placed on the subject's finger first.
2. The subject's oxygen should be discontinued while monitoring the oximeter for a period of five minutes.
  - a. If the pulse oximeter reading falls to 82% or less, oxygen will be replaced and a reading of 82% will be recorded as the subject's oximetry.
3. The apparent median value obtained while observing the monitor over a one-minute observation period should be recorded.

Pulse Oximetry

Questions??



# Exam 7: Seated Blood Pressure



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# Equipment

- Dinamap<sup>®</sup> Monitor Pro 100 automated blood pressure device



- Blood pressure cuffs (Dura-cuf<sup>®</sup> Adult Assortment Pack).
- Measuring tape (for arm circumference).
- Watch or stop watch (to time rest period and resting heart rate).
- Hand calculator.
- Copy of Critikon<sup>®</sup> chart for choosing correct BP cuff size.
- Information sheet on interpretation of BP.
- Resting Heart Rate/Blood Pressure Form.

# Seated Blood Pressure

## Measurements Recorded in the MESA Study:

- Arm Circumference
- Time of day
- Systolic Blood Pressure
- Diastolic Blood Pressure
- Pulse rate



# Measure The Right Arm Circumference

- Ask the participant to bare the upper arm.
- Ask the participant to sit or stand holding forearm horizontal, i.e., parallel to the floor.
- Measure arm length from the acromion (bony extremity of the shoulder girdle) to the olecranon (tip of the elbow) using a metric tape.
- Mark the midpoint on the dorsal (back) surface of the upper arm.
- Ask participant to relax arm along side of the body.
- Draw the measuring tape snugly around the arm at the midpoint mark, keeping the tape horizontal. Only pull the tape snug enough so that the first red-bead marker can be seen. Tape should not indent the skin. If you can see both bead, the tape is too tight. *Record the arm circumference measured to the closest (0.1) cm in Field 1 on the Seated Blood Pressure Form.*

Arm Circumference* (cm)*	Cuff Name**	Bladder Length (cm)
12-19	Child	8
19.1-25	Small Adult	10
25.1-33	Adult	13
33.1-40	Large Adult	17
40.1-50	Thigh	

Use the criteria shown in Table, to determine cuff size. *Check the cuff size used in Field 2 on the Blood Pressure Form by filling in the appropriate circle.*



# Contraindications

Avoid taking measurements on right upper arm if participant is affected on the right side by:

- stroke
- mastectomy
- renal fistula
- if the participant has IV catheter

# Blood Pressure Measurement

The workstation should be free of excessive noise or distractions.

## Positioning the Participant

The participant should be seated and relaxed in a comfortable chair:

- He or she is sitting up (not slouched).
- Both feet are on the floor (legs/ankles not crossed).
- Right forearm is supported resting on the table.

The participant should not talk, eat, or drink during the procedure.

Dinamap output should not be visible to the participant during the measurement.

# Application of the Blood Pressure Cuff

Place the appropriate cuff around the upper right arm so that the mid-height of the cuff is at heart level. Palpate the participant's brachial artery and place cuff so that the artery is aligned with the cuff arrow marked "artery."

Place the lower edge of the cuff, with its tubing connections, two centimeters above the natural crease across the inner aspect of the elbow.

Wrap the cuff snugly around the arm, with the palm of the participant's hand turned upward.

Secure the wrapped cuff firmly by applying pressure to the locking fabric fastener over the area where it is applied to the cuff.

Do not wrap the cuff too tightly around the arm. You should be able to insert the first joint of two fingers under the cuff. The cuff should be snug but not tight.

Be sure all air is squeezed out of the cuff before each inflation.

# Blood Pressure Measurement

## Rest Period

The participant should rest for five minutes (timed using a watch or stop watch) prior to the heart rate and blood pressure measurement.

When the five-minute rest period is over, but **before the first blood pressure measurement is started, record the time of day on the Seated Blood Pressure Form** (examples: 04:25 P [p.m.] or 11:38 A [a.m.]).

# To Begin Blood Pressure Measurement

- To begin the blood pressure procedure, access the Main Menu on the Dinamap<sup>®</sup> by pushing the “Start/Stop” button at the lower right of the monitor
- Use the grey knob and rotate to select the set bp option from the menu and then press the knob to implement the selection. The next menu appears automatically.
- Use the knob to select AUTO BP and then press the knob.
- Immediately after you select AUTO BP the monitor will start the first blood pressure measurement.

# Blood Pressure Measurement

When the radial pulse is obliterated at maximal inflation, the first blood pressure measurement will be obtained.

The device will automatically obtain the 2<sup>nd</sup> and 3<sup>rd</sup> measurements, at one-minute intervals.

Record the three sequential blood pressure (and heart rate) readings into the Seated Blood Pressure section in laptop or Form.

Print the results and set the machine to manual.

Remove the blood pressure cuff from the participant's arm and thank the participant for his/her time.

# Reporting results

## Reporting Blood Pressure Results to Participants

The technician may verbally provide the participant with the blood pressure reading (the average of the last two pressures), *if asked*, after the procedure has been completed.

- If the blood pressure is normal ( $<120/80$ ), the technician may say that it is normal, particularly if asked.
- If the blood pressure is not normal ( $\geq 120/80$ ) but not at an alert level (systolic  $>210$  mm Hg), the technician should exercise the standard option of not discussing the interpretation or stating that it does appear to be high (or “somewhat elevated”) but that, again, it will be discussed later.
- If an alert level is identified, the technician should calmly notify the clinic coordinator when the procedure has been completed. (If symptoms of severe hypertension are present, the technician should notify the clinic coordinator immediately.)



# Alert Levels

Alert levels requiring **immediate referral** (send participant directly to a physician or hospital)

**Systolic BP >210 mm Hg**

**Diastolic BP >120 mm Hg**

Alert levels requiring **urgent referral** (*within one week*) are:

*Systolic BP 180–210 mm Hg*

*Diastolic BP 110–120 mm Hg*

Alert levels requiring **follow-up within two months time**, and, therefore, we recommend physician notification for systolic or diastolic BP above these levels.

*BP > 140/90 mm Hg*

# Blood Pressure Measurement

## BP Measurement Instructions for Participants With Short, Thick Arms

Occasionally there will be a participant whose upper arm is too thick and short for the thigh cuff or on whom the thigh cuff pops open on inflation. The alternative procedure in this case is to obtain the resting blood pressure in the right *forearm*.

Measure the forearm circumference at the midpoint between the olecranon (elbow) and the ulnar styloid (wrist bone on pinkie side). Select the proper size cuff based on the forearm measurement. The blood pressure procedure is otherwise the same.

You must document on the Seated Blood Pressure Form that you have measured the *forearm blood pressure*.

# Maintenance and Calibration

Once a week each device should be used simultaneously with a paired device to simultaneously measure the blood pressure in each arm of a non-smoker under the age of 50, in whom there is no reason to suspect that the blood pressure in the two arms should differ.

- Repeat the measurement three times.
- If the paired blood pressure measurements agree within 4 mm Hg or less, for both systolic and diastolic BP, the devices are considered to be in calibration.
- Investigate any systematic divergence, even if less than 4 mm Hg (e.g., by switching arms and/or pairing the devices with a third device).
- If the two devices differ by more than 4 mm Hg, calibration must be done. It should be recognized that, if the cuff deflation rate is 2 mm Hg/sec and the heart rate is 60 bpm, divergences of 2–4 mm Hg would be expected, even if the device is in perfect calibration.

# THANK YOU



# Blood Pressure Measurement

## Setting up the Dinamap<sup>®</sup> BP Machine

Load the printer paper by opening the flap on the side of the device.

Turn on the Dinamap<sup>®</sup> device by pushing the "Off/On" button on the front control panel (lower left).

After five seconds an initial message will appear on the LCD screen. It will consist of a WARNING and the instruction, "PUSH A FRONT PANEL KEY TO START."

In the main menu select PRINT using the gray toggle knob. In the next menu, select AUTO and then push the toggle knob. This will program the device to print the blood pressure measurements.

Do not touch the monitor again until you have completed cuff placement, rest period, and you are ready to proceed with blood pressure measurement.



# Blood Pressure Measurement

Palpate the radial pulse during inflation. The radial pulse should not be palpable at peak inflation pressure. If the participant's radial pressure remains palpable when the device begins to deflate, the device will complete its deflation procedure and then should automatically reset itself for a higher inflation pressure and repeat the measurement.

In the unlikely event that higher inflation pressure is needed but the machine does not automatically reset to a higher pressure:

- Check carefully to be sure that the cuff is properly positioned on the participant's arm with the arrow at the brachial artery.
- Manually reset the inflation pressure (210, 260, 300).

It is not necessary to repeat or prolong the five-minute rest period, if this happens, but explain the change in the procedure to the participant (e.g., “I think we need to use a higher inflation pressure—I'm just going to reset the machine”).