

3.5.2 Seated Blood Pressure

I. PURPOSE

Seated Blood Pressure was obtained in the MESA “Baseline Exam” or Exam 1. The purpose is as for previous exams and is obtained in MESA Exam 4 for longitudinal studies.

Again, the Dinamap[®] automated device will be used for consistency and to reduce the potential for observer biases.

II. MATERIALS AND EQUIPMENT

- Dinamap[®] automated blood pressure device (Dinamap Monitor Pro 100[®], which includes printer paper, power cable, and power converter.)
- Blood pressure cuffs in a variety of sizes (Dura-cuf Adult Assortment Pack[®] [#2699]).
- Measuring tape (for arm circumference).
- Watch or stop watch (to time five-minute rest and resting heart rate).
- Hand calculator (to average 2nd and 3rd BP readings).
- Copy of Critikon[®] chart for choosing correct BP cuff size (see Table 2).
- Information sheet on interpretation of BP from JNC VI (see Table 1).
- Resting Heart Rate/Blood Pressure Form.

III. DEFINITIONS

1. Sphygmomanometry: Measurement of blood pressure.
2. Oscillometric device: Method for measuring blood pressure that relies on the oscillation or fluctuation in arterial pressure generated by the cardiac cycle and transmitted to an inflated blood pressure cuff overlying an artery. This method differs from the auscultatory method, which relies on audible changes over an artery during deflation of an inflated cuff.

IV. CLASSIFICATION OF THE PARTICIPANT'S BLOOD PRESSURE WITHIN THE JNC VI CATEGORIES AND CRITERIA FOR ALERTS AND REFERRALS

This classification and the criteria for alerts have not changed from previous exams. However, they are important and are reiterated here.

The 1997 Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) defines categories of blood pressure and recommends follow-up according to the following criteria:

Table 1. Classification of BP in Adults Aged 18 Years or Older*.

BP Category	SBP (mm Hg)		DPB (mm Hg)	Action
Optimal	<120	and	<80	Recheck in 2 years
Normal	<130	and	<85	Recheck in 2 years
High-normal	130–139	or	85–89	Recheck in 1 year
Hypertension*				
Stage 1	140–159	or	90–99	Refer within 2 months
Stage 2	160–179	or	100–109	Refer within 1 month
Stage 3	>180	or	>110	Refer within 1 week or immediately

* When recommendation for follow-up of DBP and SBP are different, the shorter recommended time for recheck and referral should take precedence. This classification applies only to participants not taking antihypertensive drugs.

** Diagnosis of hypertension must be based on two or more readings taken at each of two or more visits following an initial screening.

SBP= systolic blood pressure. DBP= diastolic blood pressure.

1. Alert levels requiring **immediate referral** (send participant directly to a physician or hospital) for MESA participants are:
 - **Systolic BP >210 mm Hg**
 - **Diastolic BP >120 mm Hg**
2. Alert levels requiring *urgent referral (within one week)* are:
 - *Systolic BP 180–210 mm Hg*
 - *Diastolic BP 110–120 mm Hg*
3. 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
4. JNC VI states that blood pressure classifications and referral recommendations are based on the average of two or more readings on two or more occasions. In MESA we intend to use the average of the 2nd and 3rd blood pressure readings (see below) in order to reduce the impact of reactivity (higher first reading) on the estimate of the value of the underlying blood pressure. Thus, in deciding whether a participant meets criteria for an alert level, the average of the 2nd and 3rd readings should be used. This will require on-the-spot arithmetical manipulation of the systolic and diastolic values. A hand calculator may be useful. The data forms include fields for these averaged values and for any actions taken.

V. METHODS

1. Preparation

- 1.1 Record the date of the procedure and the Dinamap[®] number on the Seated Blood Pressure Form during the five-minute rest period.
- 1.2 Before the BP measurement procedure, explain to the participant what to expect and how long the procedure will take. The following script is suggested:

This part of the exam involves taking your resting blood pressure. It will take about 10 minutes. We would like you to sit with both feet on the floor and your arm supported on the table. We will have you sit quietly for five minutes. Then we will take your blood pressure three times, one minute apart, using an automated device. We will give you your blood pressure readings and some material to help you interpret them at the end.

Make sure the room temperature is between 70° and 76° Fahrenheit.

2. Cuff Size Selection

2.1 Use the proper cuff size to avoid under- or over-estimation of the correct blood pressure. Selection of the proper sized cuff is based on the guideline that the length of the inflatable bladder in the cuff should be at least 40% of the arm circumference. Measurement of the bladder length in the Critikon® cuffs confirms that the chart in Table 3 conforms to this guideline. A copy of this chart should be available during the BP measurement procedure for easy reference. *Selection of cuff size should be based on the Critikon® chart in Table 2, and only Critikon® cuffs should be used.* If the participant's arm size falls in a range in which there is overlap of two Critikon® cuff sizes, use the larger cuff.

2.2 Measure the right arm circumference as follows:

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

Table 2. Cuff Size Indicated by Measured Arm Circumference

Arm Circumference*	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	

* These circumferences are printed on the corresponding cuff for verification.

** Critikon Dura-cuf® nomenclature is also printed on the cuff.

3. Setting up the Dinamap® BP Machine

3.1 Refer to the “Baseline Exam MOP” for further details.

4. Positioning the Participant

4.1 The workstation should be free of excessive noise or distractions.

4.2 The participant should be seated and relaxed in a comfortable chair, to ensure that:

- 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.

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

4.4 Ideally, the Dinamap output will not be visible to the participant during the measurement, as this

may cause anxiety.

5. Application of the Blood Pressure Cuff

5.1 Procedure unchanged from Baseline Exam. Refer to the “Baseline Exam MOP” for further details.

6. Rest Period

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

6.2 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.]).

6.3 *Record the room temperature on the Seated Blood Pressure Form.*

7. Blood Pressure Measurement

7.1 Refer to the “MESA FC MOP Exam 1” for details related to using the Dinamap[®] and obtaining blood pressure measurements.

7.2 *Record the three sequential blood pressure readings and pulse rates in Fields 3, 4, and 5 on the Seated Blood Pressure Form*

8. BP Measurement Instructions for Participants With Short, Thick Arms

8.1 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*.

8.2 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.

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

9. Reporting Blood Pressure Results to Participants

9.1 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.

9.2 Alternatively, if the blood pressure is normal (<140/90), the technician may say that it is normal, particularly if asked.

- 9.3 If the blood pressure is not normal (>140/90) but not at an alert level (>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.
- 9.4 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.)

VI. QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES FOR DINAMAP PRO 100®

1. 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.
2. Procedure unchanged from Baseline Exam. Refer to the “Baseline Exam MOP” for further details.