PURPOSE:
To measure the systolic and diastolic blood pressure.

CONSIDERATIONS:
1. Blood pressure is an index of:
   a. Elasticity of the arterial walls.
   b. Peripheral vascular resistance.
   c. Efficiency of the heart as a pump.
   d. Blood volume.
   e. Blood viscosity.
2. The systolic pressure (the upper reading) measures the maximum pressure against the arteries by the left ventricular systole and is a clue to the integrity of the heart, arteries and the arterioles.
3. The diastolic pressure (the lower reading) measures the force exerted during ventricular relaxation and filling and indicates blood vessel resistance.
4. Blood pressure values for adults aged 18 years or greater:

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120 mm Hg</td>
<td>&lt; 80 mm Hg</td>
</tr>
<tr>
<td>Pre-Hypertension</td>
<td>120 – 139 mm Hg</td>
<td>80 – 89 mm Hg</td>
</tr>
<tr>
<td>Hypertension</td>
<td>140 - 159 mm Hg</td>
<td>90 - 99 mm Hg</td>
</tr>
<tr>
<td>Stage 1</td>
<td>&gt; 160 mm Hg</td>
<td>&gt; 100 mm Hg</td>
</tr>
<tr>
<td>Hypertension</td>
<td>&gt; 180 mm Hg</td>
<td>&gt; 110 mm Hg</td>
</tr>
<tr>
<td>Stage 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertensive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>&lt; 95 mm Hg</td>
<td></td>
</tr>
<tr>
<td>Hypotension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthostatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotension</td>
<td>decrease in systolic pressure &gt; 20 mm Hg and the diastolic pressure &gt; 10 mm Hg with posture changes</td>
<td></td>
</tr>
</tbody>
</table>
5. Hypertension is defined as systolic pressure equal to, greater than 140 mm Hg, diastolic pressure equal to, or greater than 90 mm Hg.
6. Hypotension is a persistent systolic reading below 95 mm Hg.
7. Orthostatic hypotension is a change of > 20 mm Hg in blood pressure reading with posture changes.
8. Blood pressure is usually lowest in the early morning after sleep.
9. Blood pressure rises after meals, during exercise, with emotional upsets and/or disease processes.
10. Blood pressure is normally slightly lower when lying down than sitting or standing. In postural hypotension, pressure decreases when position is from lying to sitting or standing.
11. Blood pressure is slightly higher when monitored in the lower extremities.
12. Because pressure differences of more than 10 mm Hg exist between the arms of 6% of hypertensive patients, blood pressure should be measured in both arms at the initial assessment and in the arm with the higher pressure for future blood pressure measurements.
13. Ideally, the width of the cuff should be 40% of the circumference or 20% wider than the diameter of the midpoint of the limb. The bladder should encircle at least 80% of the adult upper arm.
14. The cuff should be wide enough to reach from just below the armpit to the inside of the elbow. The cuff size is based on the distance from the shoulder to the elbow. If the distance is less than 13 inches the cuff size is 5 by 9 inches (small), 13 to 16 inches the cuff size is 6 by 13 inches (medium) and greater than 16 inches the cuff size is 7 by 14 inches.
15. A falsely high reading may result when a cuff is too narrow or short. A falsely low reading may result when a cuff is too wide or long.
16. In some patients, an auscultatory gap may be present. During the auscultatory gap the sounds disappear, reappearing 10 – 15 mm Hg later. This auscultatory gap has no clinical significance, but if the cuff is not inflated to a point above the auscultatory gap, a falsely low systolic reading may occur.
17. Avoid taking blood pressure in the arm on the affected side of a mastectomy, an arteriovenous fistula, hemodialysis shunt or IV.
18. If the blood pressure cannot be auscultated. (See Circulator - Blood Pressure – Palpation.)
19. Placement of brachial artery below heart level may result in blood pressure being falsely high, and conversely if the artery is above the heart level the blood pressure may be falsely low.

EQUIPMENT:
Sphygmomanometer
Stethoscope

PROCEDURE:
1. Adhere to Standard Precautions.
2. Explain procedure to patient.
3. Choose an appropriate-sized cuff for the patient; the bladder should encircle at least 80% of the upper arm.
4. Keep patient in a stable, relaxed position for 5 to 10 minutes. Make sure that he has not had caffeine or smoked for at least 30 minutes.
5. The patient may lie supine or sit erect during blood pressure measurement. If the patient is sitting erect, make sure that he has both feet flat on the floor because crossing the legs may elevate blood pressure.
6. Place arm at heart level and keep well supported. If the artery is below heart level, you may get a falsely high reading.
7. Expel any air from cuff.
8. Place center of cuff over the brachial artery and wrap cuff evenly. The lower border of the cuff should be about 2.5 cm above the antecubital crease.
9. Apply the cuff snugly. A falsely high reading can result if the cuff is too loose.
10. Avoid constriction of the arm by a rolled sleeve above the cuff.
11. Palpate radial artery. Palpating the radial pulse while inflating the cuff helps prevent the underestimation of the blood pressure if an auscultatory gap is present.
12. Inflate cuff as rapidly as possible until pulse is gone, and then inflate an extra 20-30 mm Hg.
13. Place diaphragm of stethoscope over the brachial artery, listen carefully and release cuff at even rate, no faster than 2-3 mm Hg per/second. The systolic pressure is the reading at the first return of the pulse sound.
14. The diastolic pressure is the reading at which sounds stop (if there is a "muffling" or damping of the sound prior to loss of sound, record both readings). After you hear the last sound, deflate the cuff slowly for at least another 10 mm Hg to ensure that no further sounds are audible.
15. Occasionally, blood pressure must be measured in both arms or with the patient in two different positions (such as lying and standing or sitting and standing). In such cases, observe and record significant differences between the two readings.
16. Deflate and remove cuff.

AFTER CARE:
1. Document in patient's record:
   a. Blood pressure reading.
   b. Position.
   c. Site.
2. Report changes in blood pressure to the physician if not within physician designated range.

COMPLICATIONS:
Impaired circulation can affect blood pressure and cause an inaccurate reading. Therefore, DO NOT measure blood pressure on a patient's affected arm if the:
1. Shoulder, arm or hand is injured or diseased.
2. Arm has a cast or bulky bandage.
3. Patient has had a mastectomy or removal of lymph nodes on that side because it may decrease already compromised lymphatic circulation, worsen edema, and damage the arm.
4. Patient has an arteriovenous fistula or hemodialysis shunt because blood flow through the vascular device may be compromised.

REFERENCES: