How to measure blood pressure manually

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Rationale and key points
This article aims to help nurses to measure blood pressure (BP) manually using an aneroid sphygmomanometer.

› BP measurement is an essential clinical skill, and nurses must be competent in performing this procedure and taking accurate readings.
› Nurses should be aware of manual BP measurement techniques and understand the patient and environmental factors that may result in inaccurate readings that could compromise patient care.
› Nurses should regularly undertake manual BP measurement to ensure they remain competent to perform the procedure.

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Preparation and equipment
› The nurse should explain to the patient that their blood pressure (BP) needs to be measured. The nurse should gain their informed consent.
› The nurse should ensure that the appropriate equipment is available and in good working condition. This includes:
  – A sphygmomanometer (working and calibrated).
  – A stethoscope.
  – An appropriate-size BP cuff (British Hypertension Society 2009) (Table 1).
  – Bactericidal soap or bactericidal alcohol hand gel.
  – Detergent wipes (no alcohol).
  – An observation sheet or early warning score chart to record BP.
› The nurse should know how to feel for the radial and brachial pulses before undertaking the procedure.

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Procedure
1. Wash your hands using bactericidal soap and water or bactericidal alcohol hand gel.
2. Ask the patient or visually check if they have had any trauma or surgery to their arm or have an intravenous infusion in progress. If they have, or if there are any contraindications, use the other arm. If it is not possible to use either arm, the thigh can be used by applying a thigh cuff to the mid-thigh area.
3. Ensure the patient is relaxed and seated comfortably, with their back supported and feet uncrossed and flat on the floor.
4. Ensure the BP cuff is the correct size for the arm (British Hypertension Society 2009) (Table 1).
5. Check that the patient’s arm is not restricted by any tight clothing. Support the arm with a pillow, ensuring that it is level with the person’s heart (midsternal level).
6. Wrap the BP cuff around the patient’s bare arm. The cuff should be positioned 2-3cm above the brachial artery (Figure 1).
7. Ask the patient not to talk during the procedure.

Online
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8. Locate the radial pulse (Figure 2). Inflate the BP cuff by pumping the cuff bulb, until the radial pulse can no longer be felt. Note the reading on the dial. This figure is the estimated systolic pressure.

9. Deflate the BP cuff completely and wait for 15–30 seconds.

10. Palpate the brachial artery to ensure the correct placement of the stethoscope. Place the centre of the stethoscope bell over the brachial artery (Figure 3).

11. Inflate the cuff again to 20–30mmHg above the predicted systolic BP.

12. Deflate the cuff slowly at a rate of 2mmHg per second (British Hypertension Society 2006) listening for Korotkoff sounds – often described as whooshing, pounding, swishing or thudding sounds. As you deflate the cuff, note when the loud thudding occurs; this is the systolic BP. These sounds will gradually change and become muffled, eventually disappearing. At this point, record the number on the sphygmomanometer; this is the diastolic BP. In some patients with hypertension, there may be a notable auscultatory gap in the sounds, this is a period of diminished or absent Korotkoff sounds during the measurement, and should be reported.

13. Deflate the cuff fully once no further sounds can be heard and remove it from the patient’s arm.

14. If you need to recheck the patient’s BP, wait one to two minutes before proceeding.

15. Inform the patient that the procedure is finished.

16. Wash your hands using bactericidal soap and water or bactericidal alcohol hand gel.

17. Clean the bell and diaphragm of the stethoscope and the cuff with a detergent wipe.

18. Record the BP reading clearly on the observation sheet or early warning score chart. Compare the measurement with previous results. Inform medical staff if there are significant changes or if this is required in accordance with the early warning scoring system.

19. Calculate and document the mean arterial pressure using the formula in Box 1. The mean arterial pressure is the amount of pressure

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**TABLE 1**

<table>
<thead>
<tr>
<th>Blood pressure cuff sizes</th>
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<tbody>
<tr>
<td><strong>Indication</strong></td>
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<tr>
<td>Small adult/child</td>
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<tr>
<td>Standard adult</td>
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<tr>
<td>Large adult</td>
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(British Hypertension Society 2009)
required by the body to ensure that all organs receive an adequate blood supply (Marieb 2013); the normal range is 70-105mmHg.

**Evidence base**

BP recording is essential to establish baseline measurements, which can provide vital information about a patient’s health and are central to diagnosis, monitoring and treatment of a range of conditions.

In the past, staff may have relied on automated BP measuring devices. However, the use of these devices can be problematic, because of inaccurate readings and shortages of appropriate equipment (Alexis 2009). The accuracy and reliability of these devices has been questioned, particularly in patients with cardiac arrhythmias (Cork 2007). The accuracy of BP measurement is ensured by the latest evidence. (Wallymahmed 2008). Postural hypotension is defined as a drop in BP of >20/10mmHg. The prevalence of postural hypertension increases with age because the baroreflex mechanisms that control heart rate and vascular resistance decline with age. Other causes of hypotension include long-term neurological conditions such as Parkinson’s disease and drugs that affect reflex control, such as antidepressants and alcohol.

The Nursing and Midwifery Council (2010) identified the measurement of BP as an essential skill that all nurses must be able to undertake, both manually and using electronic devices. There has been an increase in the measurement of BP using a manual sphygmomanometer, with healthcare organisations reporting a reduction in the number of deteriorating patients and cases of unexpected cardiac arrest as a result of increased awareness of the signs of patient deterioration (Snow 2011).

Automated BP monitoring equipment should not be used on patients with a high or a low BP, since diastolic BP measurements have been found to be incorrect and unreliable (Heinemann et al 2008). Automated devices are also not suitable for patients with abnormal heart rhythms or weak pulses (Cork 2007, MHRA 2013). Fallon (2015) discussed the inaccuracies of BP recordings for patients with atrial fibrillation or an irregular heart rhythm and the difficulty in determining a definite end point for diastolic BP, since automated devices have not been validated for use in patients with arrhythmias.

Nurses should regularly undertake manual BP measurement to ensure they are competent to perform the procedure and take accurate readings. Whichever device is used for measuring BP, it must be validated, regularly maintained and recalibrated according to the manufacturer’s instructions (Fallon 2015) NS

**Disclaimer:** please note that information provided by Nursing Standard is not sufficient to make the reader competent to perform the task. All clinical skills should be formally assessed at the bedside by a nurse educator or mentor. It is the nurse’s responsibility to ensure their practice remains up to date and reflects the latest evidence.

**USEFUL RESOURCES**


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**BOX 1**

**Calculating the mean arterial pressure**

Mean arterial pressure = systolic blood pressure + (2 x diastolic blood pressure)/3
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