Office BP Measurement: Current Challenges and Best Practices

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Heart Health Now!
The North Carolina Cooperative for AHRQ’s EvidenceNOW
Advancing Heart Health in Primary Care

Office BP Measurement:
Current Challenges and Best Practices

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LENGTH: About 11 minutes

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Hi. My name is Anthony Viera. I’m with the Heart Health Now Evidence Team, and this Webinar will talk about office blood pressure measurement, current challenges, and best practices.
I want to start by offering three practical tips. The first is to train staff to use proper technique, make sure your office has a full range of cuff sizes available. The second is to ensure that your blood pressure monitors are validated models, and they’re periodically checked for proper functioning. And, the third is, if the first blood pressure measurement is elevated and it’s retaken toward the end of the visit, make sure to update the blood pressure field in the chart. If the initial reading is not elevated, even if perfect technique is not followed, a repeat measurement is probably not needed.
4 Objectives

The objectives of this Webinar are to discuss the importance of accurate BP measurement, to review some of the limitations of office BP, and to describe guidelines for correctly performing office BP measurement, and to provide practical tips for improving office blood pressure measurement.
What I’m not covering in this session is home blood pressure monitoring, ambulatory BP monitoring, or treatment of high blood pressure which will be covered in another Webinar.
Clinical Case

Let’s begin with a clinical case. A 44-year-old woman with body mass index of 28 presents for a routine health maintenance visit. She arrives five minutes late for her appointment. The blood pressure is taken and recorded by the medical office assistant using the automatic monitor at 152/75 mm Hg. The patient has no history of cardiovascular disease, and her only medication is an occasional dose of Zolpidem before bedtime.
Office blood pressure measurement is the basis for the most-common diagnosis in adult primary care. Unfortunately, office blood pressure measurement is fraught with error, and no practice is immune to the challenges of measuring blood pressure accurately. We are working in busy environments, and a rush atmosphere, where clinicians want patients roomed promptly. But a key is that just measuring the blood pressure better improves quality of care. There are two kinds of blood pressure monitors currently in use: The Aneroid Manual Manometer, and the Oscillometric automatic Manometer.
I want to pause for just a moment and let you look at these photographs and think about what’s wrong with these pictures. In Picture A, you can see that the arm is not at the heart level. In Picture B, the arm is not at the heart level nor are the feet on the floor. And Picture C, the arm is not at the heart level while the patient is talking on the phone, and their feet are dangling off the exam table. And in Picture D, she’s way too casual with her back not supported, her arm is not at heart level, and she might be talking to medical office assistant as well.
Limitations of office blood pressure are mainly around the poor quality control due to technical error. For example: Using the wrong cuff size, not positioning the patient properly, or failing to allow the five minutes of rest. When a manual sphygmomanometer is used, errors include: Letting air out of the cuff too quickly; digit bias, that is, rounding the measurement to the nearest 5 or 10 mmHg; expectation bias, that is, asking the patient what his or her usual blood pressure is, and, then, the measurement somehow being close to that; and, then, difficulty with Korotkoff cuff sounds – either knowing which Korotkoff sound to use, the fourth or the fifth; or, frankly, just hearing the sounds properly.
This slide depicts correct technique for blood pressure measurement: Properly-sized cuff is being used with a palm facing up, and the arm supported at heart level; the feet are flat on the floor.
11 Does it really matter?

Does it really matter about office blood pressure and how accurate we are? Well, overestimating blood pressure equates to about 30 million American adults receiving unwarranted antihypertensive treatment each year, in addition to the unneeded labeling, side effects, and costs. And we might not think about it as often, but underestimating blood pressure leads to missing about 21 million people who probably have hypertension which translates to missed opportunities for cardiovascular-risk reduction.
We remember that blood pressure varies. There is inherent variability from moment to moment. As I sit here my blood pressure is different than when I would get up and walk out of the building, when I’m in busy traffic, my blood pressure will be higher, etc. It’s also influenced by external factors as I mentioned. For these reasons, diagnosis of hypertension should be based on repeated measurements, ideally, two visits over about two weeks’ time.
A standardized approach to technique is to document whether the right or left arm is used, and, then, take subsequent measures from the same arm. Make sure blood pressure measurements are taken in a quiet, calm environment, the patient’s feet are flat on the floor with the back supported against the chair, the patient’s arm is resting and supported at heart level, and the appropriately-sized cuff is used.
14 Cuff size

In terms of cuff size, the bladder should encircle 80% of the arm. Ideally, the arm is bare. However, a thin-sleeve is acceptable, but there should be no rolled sleeved tourniquet cutting the circulation. Remember that too small a cuff will overestimate blood pressure and loose application of a cuff also results in a faulty reading.
Some Factors that Increase BP

<table>
<thead>
<tr>
<th>Factor</th>
<th>Magnitude of BP effect (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm unsupported</td>
<td>1-7/5-11</td>
</tr>
<tr>
<td>Back unsupported</td>
<td>6-10</td>
</tr>
<tr>
<td>Being cold</td>
<td>6/3-10</td>
</tr>
<tr>
<td>Talking</td>
<td>7/8</td>
</tr>
<tr>
<td>Recent smoking</td>
<td>6-20</td>
</tr>
<tr>
<td>Measuring on exam table</td>
<td>10</td>
</tr>
<tr>
<td>Full bladder</td>
<td>15/10</td>
</tr>
<tr>
<td>Pain or anxiety</td>
<td>May be large</td>
</tr>
</tbody>
</table>

This table lists some of the factors that may increase blood pressure. As I mentioned, arm unsupported, back unsupported both raise the blood pressure, as does talking, recent smoking, and a full bladder.
What kind of monitor should we use to measure blood pressure? First, we know that mercury has been phased out of clinical settings. So, it is no longer used. The aneroid manometer has become the manual alternative. These manometers used a column of air instead of mercury, but they are highly susceptible to loss of calibration due to bumps and temperature changes. They can even lose accuracy without any obvious signs. The needle may be at the zero mark, but the accuracy of the monitor may still be in question. The oscillometric electronic devices are now in common use, and they help eliminate some of the sources of error. Remember that there are clinical grade monitors, as well as the home-type monitors that are oscillometric.
Oscillometric devices eliminate some sources of systematic error such as the observer bias, terminal digital bias, and improper inflation and deflation of the cuff, because the monitor does all of those things for us. They also eliminate the need for the stethoscope and the pressure gauge and, therefore, eliminate any errors related to hearing, sight, or mistakenly using the diaphragm instead of the bell.
The monitors work by using a transducer to capture pressure oscillations of the blood pressure. And, then, translating those into a systolic and diastolic via an algorithm. The validated devices are compared to mercury measurements in a minimum number of patients across BP ranges. The main caution is in patients with atrial fibrillation, oscillometric monitors may not be able to capture an accurate reading.
The Website shown on the screen is one that can be reviewed to make sure that the monitor you are using is indeed a validated model. When you go to the Website, you can click the link to validation status of devices.

www.dableducational.org
...which will take you to a page that looks like this. And you can see what the type of monitor you have, or its analogous model is recommended, questionable, or not recommended for use in clinical settings.
In terms of who should measure the blood pressure, ideally the medical assistant or nurse should be taking the measurement. Physicians tend to cause a white-coat or alerting reaction that makes the blood pressure of the patient rise. The other important point is that when the medical assistant initially takes the blood pressure if you want the blood pressure repeated, and you do it yourself as the physician, then you’re introducing another variable into the mix of many things that can already influence blood pressure. So, a key message is not to change people, and not to change devices. Have the same medical assistant measure the blood pressure using the same device.
22 Repeating Measurements

Wait at least one minute between readings. And if there is a greater than 5 millimeter difference in diastolic, the recommendation is to repeat it again.

What about obese arms? Ideally, you have a large enough cuff size available, and you might need to use the thigh cuff. So make sure you know where it’s located. A forearm measurement can be used as very last resort, but it will overestimate blood pressure. Obese arms are, indeed, a challenge for cuff manufacturers, and there are some wrist cuff devices that have been validated, but these are not generally recommended for clinical use.
In terms of quality metrics, evidence does show that you need several measurements to assess blood pressure control. A single systolic blood pressure in the range of 120 to 157, for example, is not sufficient to classify a patient as in- or out-of-control with 80% certainty. However, current quality-of-care measures of blood pressure generally base the quality on the most-recently documented blood pressure.
Let’s return to our clinical case. Near the end of the visit you ask the medical assistant to repeat the blood pressure measurement ensuring the cuff is the correct size, her feet are on the floor, her arm is supported at heart level, and no talking during measurements. The repeat measurement is 129/72. The medical office assistant updates the blood pressure in the chart and, indeed, this patient’s blood pressure is in control.
Let me recap with the three practical tips. Train staff to use proper technique, making sure the office has the full range of cuff sizes available; make sure monitors are validated models, and are periodically checked for proper functioning. If the first BP is elevated, repeat it and update that blood pressure field in the chart. If the initial reading is not elevated (even if technique was not perfect), repeat measurement probably not needed.
Congratulations on Completing the Module

Click Exit at top right of screen

Please review the attachments and begin the next course.
The Evidence Team

Weeranun Bode, MD
Assistant Professor, Division of Cardiology, UNC – Chapel Hill

Crystal Wiley Cené, MD, MPH
Assistant Professor, Division of General Internal Medicine, UNC – Chapel Hill

Sam Cykert, MD
Professor, Division of General Internal Medicine and Director, Program on Health and Clinical Informatics, UNC – Chapel Hill; Associate Director for Medical Education, NC AHEC Program

Adam Goldstein, MD, MPH
Professor, Department of Family Medicine and Director of Tobacco Intervention Programs, UNC - Chapel Hill

The Evidence Team

Jacquie Halladay, MD, MPH
Associate Professor, Department of Family Medicine, UNC – Chapel Hill

Michael Pignone, MD, MPH
Professor of Medicine and Chief, UNC Division of General Internal Medicine
Director, UNC Institute for Healthcare Quality Improvement

Carol Ripley-Moffitt, MDiv, CTTS
Director, Nicotine Dependence Program, UNC Department of Family Medicine

Stacey Sheridan, MD, MPH
Associate Professor, Division of General Internal Medicine, UNC – Chapel Hill

Anthony Viera, MD, MPH
Associate Professor, Department of Family Medicine
Director, Hypertension Research Program, UNC – Chapel Hill