Measuring accurately:
Self-measured blood pressure monitoring

What is self-measured blood pressure monitoring?

Self-measured blood pressure (SMBP) monitoring, sometimes called home blood pressure monitoring, is a patient-performed measurement of their own blood pressure outside of a clinical setting. Research shows that SMBP:

- Can improve adherence and health outcomes for hypertensive patients[1]
- Is different from, and more convenient than, ambulatory blood pressure monitoring, which requires a more specialized monitor to measure multiple blood pressures at set intervals over a 24-hour period[2]
- Should always be accompanied by additional support, such as a one-time training session by a health care professional, during which patients should be observed to determine that they measure blood pressure readings correctly
- Is proven to improve blood pressure control when a patient/clinician feedback loop is used to provide personalized support and advice based on the patient's data[1]

Which SMBP device should patients use?

Most of the methods shown to improve patient outcomes have used an automated (oscillometric) device. With automatic devices, patients wrap a cuff around their arm and press a button to obtain a digital blood pressure reading.

When recommending an automated blood pressure measurement device for self-monitoring, take the following features into careful consideration.

Is the device valid? Automatic devices should be certified by one of three respected organizations:

- Association for the Advancement of Medical Instrumentation
- British Hypertension Society
- European Society of Hypertension

Does the device measure blood pressure from the upper arm? Only upper arm (not wrist) monitors produce reliable measures and these are the only type of monitors that reputable organizations recommend for home use.[2,3]

Will patients find the device easy to use? Devices come in a range of models with varying features. For example, patients with visual, motor or hearing impairments may prefer devices with large digital display and large buttons and/or that use voice commands to operate.

Does the device make it easy for patients to share results with their provider? Consider whether the device has the ability to:

- Store readings and report them back at a later time
- Calculate an average measure over multiple readings
- Transmit information to other devices, including to apps or to your electronic health record (EHR) system

Does your EHR permit the direct transmittal of blood pressure measurements via a patient portal?
If so, you should establish a protocol to ensure that dangerously abnormal readings reported into the EHR receive timely responses.

How much does the device cost? Many public and private health insurance plans do not cover the cost of self-monitoring devices. Prices for a typical, high-quality device (available for purchase at most drug stores) can range between $50 and $150.

How should you and your patients use a home blood pressure monitor?

A universally accepted protocol for self-monitoring blood pressure does not exist. However, many patients and providers have found the following instructions useful. They are adapted from the Finn Protocol[4] by Michael Rakotz, MD, at Northwestern Medical Group.

- Ask your patients to find a space where they can position themselves appropriately: seated comfortably in a chair with their legs uncrossed, feet flat on the floor, and arm and back supported. The cuff should be wrapped snuggly but not tightly around their upper arm.
- Ask your patient to take two blood pressure readings at one- to two-minute intervals, both in the morning and in the evening for seven consecutive days. This will provide four blood pressure measurements a day, totaling 28 measurements for the week, which is ideal. However, it is worth noting that even three days of measurements (i.e., 12 readings) also has prognostic value.
- Ask your patient to record each blood pressure measurement.
- When you receive these measurements calculate the average (mean) value of all the systolic and diastolic blood pressures. Use this single average value to determine if your patient has hypertension or if your patient's blood pressure is controlled.
- It is important to note that self-monitored blood pressure values trend approximately 5mm Hg lower than those obtained by nurses in research settings. Thus a self-monitored systolic blood pressure of 135mm Hg is equivalent to a high-quality systolic blood pressure of 140mm Hg. The American Society of Hypertension recommends that when diagnosing or treating hypertension, providers and patients should consider a mean blood pressure >135/85 as the threshold for diagnosing hypertension or for treating high blood pressure.

Resources

List of validated home blood pressure monitors

Dabl Educational Trust website: http://bit.ly/1pLvucM
British Hypertension Society website: bhsoc.org//index. php?cID=247

Additional information on home blood pressure monitors

Association for the Advancement of Medical Instrumentation website: aami.org
European Society of Hypertension website: eshonline.org
Article on wireless blood pressure cuffs and Smartphone applications: http://bit.ly/1pLvFF4

References

1. Centers for Disease Control and Prevention Self-Measured Blood Pressure Monitoring: Action Stepsfor Public health Practitioners, GA: Centers for Disease Control and Prevention, US Dept. of Health and Human Services; 2013.
2. Pickering TG, Miller NH, Ogedegbe G, Krakoff LR, Artinian NT, Goff D. Call to action on use and reimbursement for home blood pressure monitoring: A Joint Scientific Statement from the American Heart Association, American Society of Hypertension, and Preventive Cardiovascular Nurses Association. Hypertension. 2008; 52:10-29.
3. Uhlig K, Balk EM, Patel K, Ip S, Kitsios GD, Obadan NO, et.al. Self- Measured Blood Pressure Monitoring: Comparative Effectiveness. Comparative Effectiveness Review No. 45. (Prepared by the Tufts Evidence-based Practice Center under Contract No. HHSA 290- 2007-10055-I.) AHRQ Publication No. 12-EHC002-EF. Rockville, MD: Agency for healthcare Research and Quality, US Dept. of Health and Human Services; 2012. http://www.effectivehealthcare. ahrq.gov/ehc/products/193/893/CER45_SMBP_20120131.pdf. Accessed July 9, 2014.
4. Niiranen TJ, Johansson JK, Reunanen A, Jula AM. Optimal Schedule for Home Blood Pressure Measurement Based on Prognostic Data: The Finn-Home Study. Hypertension. 2011; 57: 1081-1086. doi: 10.1161/HYPERTENSIONAHA.110.162123
5. Improving Health Outcomes: Blood Pressure. Murakami L, Astalas A, Boonyasai R, Wynia M, Rush C, Rakotz M. Fast Facts: Home Blood Pressure Monitoring. 1st ed. Daniel D and Prall M, eds. American Medical Association and the Johns Hopkins University School of Medicine; May 2014.

Make sure patients know what to do should they have a blood pressure measurement that is outside the pre-determined acceptable range, or if they experience any symptoms with a high or low blood pressure measurement, including seeking emergency treatment if appropriate. This guidance to the patient should be individualized by the clinician and reinforced by clinical staff at the initiation of any SMBP monitoring program.

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