

Measuring Blood Pressure Accurately and Hypertension Control

Linda Murakami, RN, BSN, MSHA
 Senior Program Manager, Quality Improvement

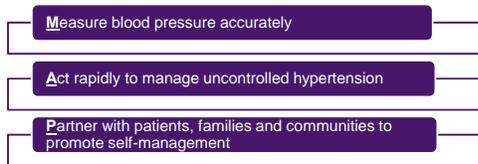


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Objectives

- Learn the importance of accurate blood pressure measurement
- Understand how accurate blood pressure measurement and other interventions hypertension control

The M.A.P. framework

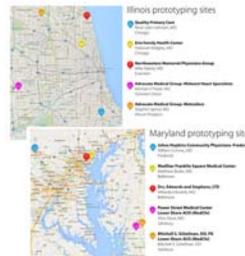


Actionable data

Evidence-based tools

Adaptive change

Prototyping tools and resources



- Partner: Johns Hopkins Medicine
- Armstrong Institute for Patient Safety and Quality (Dr. Peter Pronovost)
 - Center to Eliminate Cardiovascular Health Disparities (Dr. Lisa Cooper)

Advisory group of national experts in HTN care

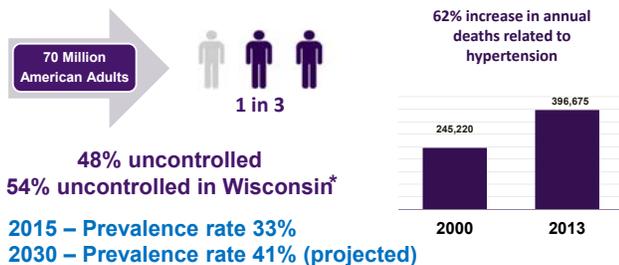
Patient and family advisory group

10 Diverse Practice Sites

- From solo practitioner to multispecialty practice with 14 physicians
- Diverse patient panels ranging from 95% African-American to 87% Latino, 60% Medicaid to 55% Medicare

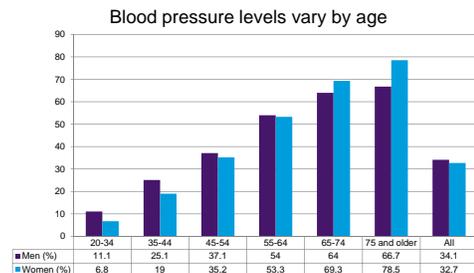
Feedback on a framework, tools and resources and curriculum

Hypertension statistics



<http://www.cdc.gov/bloodpressure/facts.htm>
 *MMWR, 09/07/2012; 81(35):703-709. Based on the National Health and National Evaluation Survey (NHANES)

Hypertension statistics



<http://www.cdc.gov/bloodpressure/facts.htm>
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Hypertension statistics

- HTN is the leading cause of death and disability in every country
- HTN is the most common primary diagnosis for office visits in U.S.
- HTN is ranked as the number one nursing home diagnosis in Wisconsin on the Minimum Data Set (MDS)
- The estimated cost of treating high blood pressure in the U.S. in 2011 was \$46 billion¹

1. <http://www.cdc.gov/bloodpressure/faqs.htm#5>
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Hypertension statistics

Wisconsin costs for treating all cardiovascular disease

- > \$8 billion

Wisconsin costs for treating high blood pressure

- \$600 million

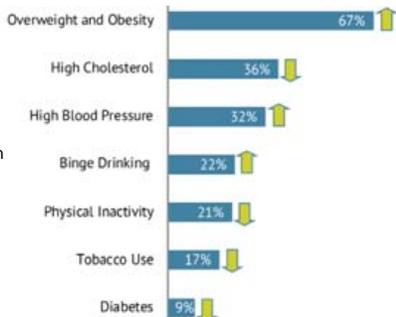
Source: <http://www.ncsl.org/research/health/wisconsin-state-profile-and-policy-report.aspx>

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Hypertension statistics: Wisconsin

These risk factors can lead to an increased risk of cardiovascular disease.

This graph shows the rates of each risk factor among Wisconsin adults.



Binge Drinking = males having 5+ and women having 4+ drinks on one occasion
 *The yellow arrows signify whether Wisconsin's numbers are higher or lower than the national average.

Wisconsin Department of Health Services. About Health
 in Wisconsin. Chronic Disease Prevention Program Fact Sheet, June 2016.

Barriers to success

- Patient factors
 - Non-adherence
 - Financial
 - Literacy
- Clinician factors
 - Time
 - Financial
 - Knowledge of evidence
- System factors
 - Quality reporting
 - Work flow
 - Management (buy-in)



The 2015 M.A.P. checklists for improving BP control

Measure accurately	Act rapidly	Partner with patients, families and communities
<p>Screening checklist</p> <ul style="list-style-type: none"> When screening patients for high blood pressure: <ul style="list-style-type: none"> Use a validated, automated device to measure BP* Use the correct cuff size on a bare arm** Ensure patient is positioned correctly^{1,2,3,4} <p>Confirmatory checklist</p> <ul style="list-style-type: none"> If screening blood pressure is $\geq 140/90$ mm Hg, obtain a confirmatory measurement: <ul style="list-style-type: none"> Repeat screening steps above Ensure patient has an empty bladder^{1,2,3,4} Ensure patient has rested quietly for at least five minutes^{1,2,3,4} Obtain the average of at least three BP measurements^{1,2,3,4} <p>Evidence-based tips for correct positioning</p> <ul style="list-style-type: none"> Ensure patient is seated comfortably with: <ul style="list-style-type: none"> Back supported Arm supported Cuff at heart level Legs uncrossed Feet flat on the ground or supported by a foot stool No one talking during the measurement 	<p>If a patient has blood pressure $\geq 140/90$ mm Hg confirmed:</p> <ul style="list-style-type: none"> Use evidence-based protocol to guide treatment^{5,6} Re-assess patient every 2-4 weeks until BP is controlled^{5,6} Whenever possible, prescribe single-pill combination therapy^{5,6} <p>Evidence-based protocols typically include:</p> <ul style="list-style-type: none"> Control on oral medication therapy Control early lifestyle and self-management interventions as appropriate, until BP is controlled For most patients, give preference to: <ul style="list-style-type: none"> Thiazide diuretics Calcium channel blockers (CCBs) Angiotensin receptor blockers (ARBs) Use ACE inhibitors (ACEIs) or Angiotensin receptor blockers (ARBs) in some patients Use beta-blockers (BBs) and ARBs in some patients If BP $\geq 160/100$ mm Hg, start therapy with two medications or a single-pill combination <p>Evidence-based tips for patient self-measurement of BP</p> <ul style="list-style-type: none"> Initial patient to measure BP accurately using a validated, validated device and correct positioning for measurement Ask patient to record ≥ 2 morning BP measurements and ≥ 2 evening BP measurements for 4 consecutive days between office visits Develop a systematic approach to ensure patients can act rapidly to address elevated BP readings between office visits Control patients that self-measured BP $\geq 130/80$ mm Hg in controlled manner <p>Evidence-based strategies to lower BP include:</p> <ul style="list-style-type: none"> Following the DASH diet, which is rich in fruits, vegetables and whole grains, low fat dairy products, fish and plant-based oils, and limits sodium, sweets, sugary drinks, red meat and saturated fats Engaging in moderate physical activity, such as brisk walking, for 40 minutes a day at least four days a week Maintaining a healthy body mass index (BMI) Limiting alcohol to ≤ 2 drinks/day in men, ≤ 1 drink/day in women 	<p>Screening checklist</p> <ul style="list-style-type: none"> When screening patients for high blood pressure: <ul style="list-style-type: none"> Use a validated, automated device to measure BP* Use the correct cuff size on a bare arm** Ensure patient is positioned correctly^{1,2,3,4} <p>Confirmatory checklist</p> <ul style="list-style-type: none"> If screening blood pressure is $\geq 140/90$ mm Hg, obtain a confirmatory measurement: <ul style="list-style-type: none"> Repeat screening steps above Ensure patient has an empty bladder^{1,2,3,4} Ensure patient has rested quietly for at least five minutes^{1,2,3,4} Obtain the average of at least three BP measurements^{1,2,3,4} <p>Evidence-based tips for correct positioning</p> <ul style="list-style-type: none"> Ensure patient is seated comfortably with: <ul style="list-style-type: none"> Back supported Arm supported Cuff at heart level Legs uncrossed Feet flat on the ground or supported by a foot stool No one talking during the measurement

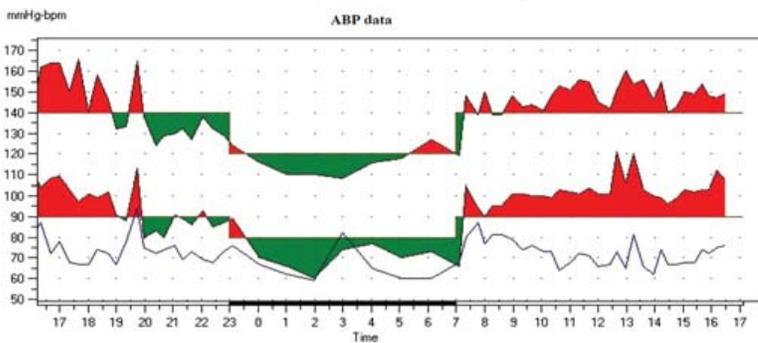
These checklists are not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

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Blood pressure variability



Measure BP accurately

White coat effect (WCE) is a transient increase in blood pressure due to being in a medical environment.

WCE is a major problem in clinical practice because:

- It prevents BPs obtained in a clinical setting from being representative of a patient's "true" BP
- WCE can be > 25 mm Hg in some patients
- People with hypertension may continue exhibit WCE making it difficult to determine when control has been achieved

Mancia G, Parati G, Grassi G, Zaccarelli A. White coat hypertension: An unresolved Diagnostic and Therapeutic Problem. Springer International Publishing Switzerland 2015.

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Why measuring blood pressure accurately is important

- Uncertainty of patients' true blood pressure is the leading cause for failure of a clinician to act on a high blood pressure in the office
- Significant BP variability exists in all patients
- Poor measurement technique decreases reliability of a patient's BP, which can lead to poor clinical decisions, adversely affecting the health of a patient

How does this impact clinicians in practice?

Kerr E et al. The Role of Clinical Uncertainty in the Treatment Decisions for Diabetic Patients with Uncontrolled Blood Pressure. Annals of Internal Medicine (148) Number 10: 717-727

Why measuring blood pressure accurately is important

It's estimated that a 1 mm Hg rise in blood pressure above normal on average reduces life expectancy by one year

Summary report: National High Blood Pressure Education Program (NHBPEP/NHLBI) and AHA working meeting on blood pressure measurement. Bethesda: National Institute of Health; 2002. Available at: <http://www.nhlbi.nih.gov/health/od/heart/hbp/measure.pdf>

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Accurate methods of BP measurement for diagnosing HTN

24-Hour Ambulatory Blood Pressure Monitoring (ABPM)

Pros

- Most evidence for accurate diagnosis of HTN
- Best predictor of future events
- Rule-out white coat HTN
- Identifies patients with masked HTN
- Gives BP information during sleep

Cons

- Expensive
- Inconvenient for patients
- Hard to get one scheduled

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Accurate methods of BP measurement for diagnosing HTN

Self-Measured Blood Pressure (SMBP) or Home Blood Pressure Monitoring

Pros

- Compares well to 24-hour ABPM for accuracy (not equal)
- Better predictor of future events than routine office BP
- Rule-out white coat HTN
- Identifies patients with masked HTN
- Inexpensive
- Convenient



Cons

- Requires the patient have a home monitor
- Requires clinical support for maximum benefit

Automated Office Blood Pressure (AOBP)

- Validated, automated BP monitors with multiple cuff sizes
- Monitors can take 3-6 measurements with no clinical staff in the room
- Intervals can be set at 1-5 minutes between measurements
- The machines averages the BPs



Automated blood pressure devices

- 2014 guidelines of the International Society of Hypertension/American Society of Hypertension: *"The electronic device is preferred (to record BP) because it provides more reproducible results than the older (auscultatory) method and is not influenced by variations in technique or by the bias of observers"*
- More importantly is the recognition that manual BP measurement, regardless of the type of sphygmomanometer used, is inferior because it is subject to multiple sources of error in routine clinical practice.

Blood pressure measurement

Pros

- Convenient
- Predicts future events, if done correctly
- Inexpensive

Cons

- Impacted by observer (person taking the BP), patient and environmental factors
- Many offices not set up for proper positioning
- Requires time (>5 minutes) to be done effectively – but can be accomplished
- Terminal digit preference if done manually
- Cannot rule-out white coat HTN
- Cannot identify patients with masked HTN
- Rarely performed correctly

Why use office BP measurement?

- Opportunity to obtain BPs
- Technology has improved measurement reliability (validated, automated machines → less human error)
- Protocols improve reliability, reduce variability and errors and can improve workflow efficiency
- Obtaining confirmatory measurements increases diagnostic accuracy and reduces misclassification of hypertension
- By reducing errors and increasing reliability of BP measurement, clinicians are less likely to hesitate when initiating or escalating treatment (clinical inertia)

Cuff size and cuff placement

- Using the wrong size cuff is the most common error in BP measurement
- Wrist and finger cuffs are not recommended – use upper arm cuff
- Mid-arm, center the cuff bladder over brachial artery, at heart level

<u>Adult Arm Circumference</u>	<u>Recommended cuff size - width x length</u>
22 to 26 cm	12 x 22 cm
27 to 34 cm	16 x 30 cm (adult)
35 to 44 cm	16-17 x 36 cm (large adult)
45 to 52 cm	19-20 x 42 cm (adult thigh)

A properly-fitted cuff should have a bladder length that is at least 80-100% of the circumference of the arm and a width that is at least 40% of the circumference of the arm, creating a length-to-width ratio of roughly 2:1.

Cuff size and cuff placement

The best way to know you have the correct cuff size is to use the guide markings on the cuff. The edge of the cuff when wrapped around the arm should fall between the lines for the "range".



Manual blood pressure measurement: Korotkoff sounds

There are five phase of Korotkoff sounds

- PHASE I/ K-1 - Clear tapping sound (SBP)
- PHASE II/ K-2 - Onset of swishing sound or soft murmur
- PHASE III/ K-3- Loud crisp sound
- PHASE IV/ K-4 - Blowing sound
- PHASE V/ K-5 - Disappearance of sound (DBP)

Manual BP measurement technique tips: Two-step technique

1. Inflate cuff until you cannot feel radial/brachial pulse, then pump another 10 mm Hg higher
2. Deflate at 2 mm Hg / second
3. Note the number at the first clear sound you hear. This is the systolic blood pressure (K-1).
4. Note the number at which the sound disappears. This is the diastolic blood pressure (K-5).
5. Record BP. Repeat.
6. Repeat inflating 30 mm Hg higher than palpated pressure. If change between the first two pressures is > 5 mm Hg, take a 3rd BP
7. Training suggested every six months to maintain skill

Manual BP measurement technique tips: One-step technique

1. Inflate cuff until you cannot feel radial/brachial pulse, then pump another 30 mm Hg higher
2. Deflate at 2 mm Hg / second
3. Note the number at the first clear sound you hear. This is the systolic blood pressure (Korotkoff I).
4. Note the number at which the sound disappears. This is the diastolic blood pressure (Korotkoff V).
5. Record BP
6. Training suggested every six months to maintain skill

Manual BP measurement technique tips

Terminal Digit Preference

- Rounding to 0 or 5 is extremely common (80-85% in some studies)
- Eliminated with automated devices

For more information on manual blood pressures and Korotkoff sounds go to:

<http://goo.gl/yqF1ki>

Rest and environment

- Rest for five minutes (if you cannot, take as last vital)
- No talking
- No listening (to music, no one talking to you, etc.)
- No texting, reading, writing
- BP device not mounted over exam table
- Winter raises BP 5 mm Hg, summer decreases 5 mm Hg

Physiologic factors and stimulants

- Empty bladder
- No meal within at least 30 minutes
- No exercise within at least 30 minutes
- No smoking within at least 15 minutes
- No stimulants (caffeine, decongestants, etc.) within at least 2-3 hours
- Pain and anxiety are a factor

Confirmatory measurement

- Performed if blood pressure is elevated at $\geq 140/90$
- Ensure patient has an empty bladder
- Ensure patient has rested quietly for five minutes
- Use of a validated, automated BP device is preferred

Confirmatory measurement

- Take 3-5 blood pressure measurements at least one minute apart
- Average the results of all of the readings when taking three confirmatory measurements
- Eliminate the first reading and average the remaining four readings when taking five confirmatory measurements
- Use this average as the treatment blood pressure

Validation, calibration and biomed stickers

Use a validated, automated machine (AAMI, BHS, ESH)

- www.dableducational.org
- Aneroid sphygmomanometer and automated clinic devices cannot be calibrated
- Aneroid devices, if out of alignment, need to be serviced by the manufacturer
- Automated devices, if tested and is not accurate, need to be serviced by the manufacturer

Most biomed inspectors look for cracks in tubing and holes in bladders

- Most do not check for accuracy

IHO: BP Measure Accurately Environmental Scan Tool

General Information	
Facility Name:	State:
Location: Building (e.g., clinic or unit) / Department:	
Equipment and Setup	
1. Are all BP devices (manual and automated) validated?	Yes/No
2. Are all BP devices (manual and automated) calibrated?	Yes/No
3. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
4. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
5. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
6. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
7. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
8. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
9. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
10. Are all BP devices (manual and automated) checked for accuracy?	Yes/No
Additional notes for accuracy and equipment issues (BP accuracy required)	
1. _____	
2. _____	
3. _____	
4. _____	
5. _____	
6. _____	
7. _____	
8. _____	
9. _____	
10. _____	
Additional notes for accuracy and equipment issues (BP accuracy required)	
1. _____	
2. _____	
3. _____	
4. _____	
5. _____	
6. _____	
7. _____	
8. _____	
9. _____	
10. _____	

Use this tool to assess your clinical environment

Download it at:
<http://www.ama-assn.org/go/improving-bp-control>

IHO: BP Measure Accurately Technique Quick Check

General Information		Patient Information			
Facility Name:	State:	Patient #1	Patient #2	Patient #3	Patient #4
Location: Building (e.g., clinic or unit) / Department:					
Equipment and Setup					
1. Used a manual device	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
2. Used an automated device	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Additional notes for accuracy, usability, quality, safety, or patient safety (BP accuracy required)					
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
Additional notes for accuracy and equipment issues (BP accuracy required)					
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					

Use this tool to assess your clinical team when measuring blood pressure

Download it at:
<http://www.ama-assn.org/go/improving-bp-control>

How many errors in BP measurement do you see?



How many errors in BP measurement do you see?

1. Back is not supported
2. Arm is not supported near heart level
3. Cuff is over sweatshirt
4. Legs are crossed
5. Legs are not both flat on the stool
6. She is talking
7. She is listening

Listen to Korotkoff sounds

- <https://youtu.be/RAGxm32ftbU?t=323>

Leading the effort for change

- Review how blood pressures are currently taken where you work
 - What changes need to be made?
 - For ambulatory patients, where do they sit for blood pressure measurement?
 - How can you support the patient's arm if there is no table, bed or armchair?
 - For non-bedbound inpatients, do you have them sit for blood pressure measurements? Considered only during the day/evening shifts
 - Who has the authority to make those changes
 - Purchasing automated blood pressure devices
 - Purchasing a foot stool
 - Reconfiguring the space where blood pressures are measured

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<p>Screening checklist</p> <p>When screening patients for high blood pressure:</p> <ul style="list-style-type: none"> □ Use a validated, automated device to measure BP¹ □ Use the correct cuff size on a bare arm^{1,2} □ Ensure patient is positioned correctly^{1,3-5} <p>Confirmatory checklist</p> <p>If screening blood pressure is ≥140/90 mm Hg, obtain a confirmatory measurement:</p> <ul style="list-style-type: none"> □ Repeat screening steps above □ Ensure patient has an empty bladder^{1,6} □ Ensure patient has rested quietly for at least five minutes^{1,6} □ Obtain the average of at least three BP measurements^{1,6} <p>Evidence-based best practices for correct positioning</p> <ul style="list-style-type: none"> • Patient is seated comfortably with: – Back supported – Arm supported – Cuff at heart level – Feet flat on the ground or supported by a foot stool – No one talking during the measurement 	<p>Screening checklist</p> <p>If a patient has blood pressure ≥140/90 mm Hg on two occasions:</p> <ul style="list-style-type: none"> □ Use evidence-based protocol to guide treatment^{1,6} □ For asymptomatic patient every 2-4 weeks until BP is controlled^{1,6} □ Whenever possible, prescribe single-pill combination therapy^{1,6} <p>Confirmatory checklist</p> <p>If screening blood pressure is ≥140/90 mm Hg, obtain a confirmatory measurement:</p> <ul style="list-style-type: none"> □ Repeat screening steps above □ Ensure patient has an empty bladder^{1,6} □ Ensure patient has rested quietly for at least five minutes^{1,6} □ Obtain the average of at least three BP measurements^{1,6} <p>Evidence-based best practices for correct positioning</p> <ul style="list-style-type: none"> • Patient is seated comfortably with: – Back supported – Arm supported – Cuff at heart level – Feet flat on the ground or supported by a foot stool – No one talking during the measurement 	<p>Screening checklist</p> <p>To engage patients to control their blood pressure:</p> <ul style="list-style-type: none"> □ Engage patients using evidence-based communication strategies^{1,7} □ Help patients accurately self-measure^{8,9} □ Direct patients and families to resources that support medication adherence and healthy lifestyles <p>Confirmatory checklist</p> <p>Evidence-based communication strategies include:</p> <ul style="list-style-type: none"> • Single visit, one-on-one patient education including written medication use • Patient resources for possible non-adherence or a single pill combination • Telephone advice • Collaborative chronic disease management • Self-management education (SME) • Angiotensin receptor blockers (ARB) • Do not prescribe beta-CCB and ARB to same patient • If BP ≥160/100 mm Hg, start therapy with two medications or a single pill combination <p>Evidence-based best practices for patient self-measurement of BP</p> <ul style="list-style-type: none"> • Instruct patient to measure BP accurately using a validated, automated device and correct positioning for measurement • Ask patient to record 12 morning BP measurements and 12 evening BP measurements for 4 consecutive days between office visits • Develop a systematic approach to ensure patients can and regularly do achieve intended BP readings between office visits • Counsel patients that self-measured BP ≥135/85 mm Hg is considered elevated <p>Evidence-based lifestyle changes to lower BP include:</p> <ul style="list-style-type: none"> • Following the DASH diet, which is rich in fruits, vegetables and whole grains, low fat dairy, poultry, fish and plant-based oils, and which reduces, restricts, restricts alcohol, red meat and saturated fat • Engaging in moderate physical activity, such as brisk walking, for 60 minutes a day at least four days a week • Maintaining a healthy body mass index (BMI) • Limiting alcohol to 12 drinks for men, 8 drinks for women

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Measure accurately	Act rapidly	Partner with patients, families and communities
<p>Screening checklist</p> <p>When screening patients for high blood pressure:</p> <ul style="list-style-type: none"> □ Use a validated, automated device to measure BP¹ □ Use the correct cuff size on a bare arm^{1,2} □ Ensure patient is positioned correctly^{1,3-5} <p>Confirmatory checklist</p> <p>If screening blood pressure is ≥140/90 mm Hg, obtain a confirmatory measurement:</p> <ul style="list-style-type: none"> □ Repeat screening steps above □ Ensure patient has an empty bladder^{1,6} □ Ensure patient has rested quietly for at least five minutes^{1,6} □ Obtain the average of at least three BP measurements^{1,6} <p>Evidence-based best practices for correct positioning</p> <ul style="list-style-type: none"> • Patient is seated comfortably with: – Back supported – Arm supported – Cuff at heart level – Feet flat on the ground or supported by a foot stool – No one talking during the measurement 	<p>Screening checklist</p> <p>If a patient has blood pressure ≥140/90 mm Hg confirmed on two occasions:</p> <ul style="list-style-type: none"> □ Use evidence-based protocol to guide treatment^{1,6} □ For asymptomatic patient every 2-4 weeks until BP is controlled^{1,6} □ Whenever possible, prescribe single-pill combination therapy^{1,6} <p>Confirmatory checklist</p> <p>If screening blood pressure is ≥140/90 mm Hg, obtain a confirmatory measurement:</p> <ul style="list-style-type: none"> □ Repeat screening steps above □ Ensure patient has an empty bladder^{1,6} □ Ensure patient has rested quietly for at least five minutes^{1,6} □ Obtain the average of at least three BP measurements^{1,6} <p>Evidence-based best practices for correct positioning</p> <ul style="list-style-type: none"> • Patient is seated comfortably with: – Back supported – Arm supported – Cuff at heart level – Feet flat on the ground or supported by a foot stool – No one talking during the measurement 	<p>Screening checklist</p> <p>To engage patients to control their blood pressure:</p> <ul style="list-style-type: none"> □ Engage patients using evidence-based communication strategies^{1,7} □ Help patients accurately self-measure^{8,9} □ Direct patients and families to resources that support medication adherence and healthy lifestyles <p>Confirmatory checklist</p> <p>Evidence-based communication strategies include:</p> <ul style="list-style-type: none"> • Single visit, one-on-one patient education including written medication use • Patient resources for possible non-adherence or a single pill combination • Telephone advice • Collaborative chronic disease management • Self-management education (SME) • Angiotensin receptor blockers (ARB) • Do not prescribe beta-CCB and ARB to same patient • If BP ≥160/100 mm Hg, start therapy with two medications or a single pill combination <p>Evidence-based best practices for patient self-measurement of BP</p> <ul style="list-style-type: none"> • Instruct patient to measure BP accurately using a validated, automated device and correct positioning for measurement • Ask patient to record 12 morning BP measurements and 12 evening BP measurements for 4 consecutive days between office visits • Develop a systematic approach to ensure patients can and regularly do achieve intended BP readings between office visits • Counsel patients that self-measured BP ≥135/85 mm Hg is considered elevated <p>Evidence-based lifestyle changes to lower BP include:</p> <ul style="list-style-type: none"> • Following the DASH diet, which is rich in fruits, vegetables and whole grains, low fat dairy, poultry, fish and plant-based oils, and which reduces, restricts, restricts alcohol, red meat and saturated fat • Engaging in moderate physical activity, such as brisk walking, for 60 minutes a day at least four days a week • Maintaining a healthy body mass index (BMI) • Limiting alcohol to 12 drinks for men, 8 drinks for women

These checklists are not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Use evidence-based communication strategies

- Patient engagement is important if we expect patients to adhere to therapy
- When clinicians use this style of communicating – which is essentially talking less and listening more – we often learn important details that help us determine a preferred treatment approach
- When patients use this kind of communication, they are more engaged/committed, and as a result, are more likely to adhere
- Using these communication techniques does not lengthen visits (it actually shortens them), especially if all practice staff are using them

"Evidence indicates that in primary care clinics, brief physician motivational interviewing has a positive effect on weight loss attempts, exercise efforts, decreased substance use, and blood pressure control."

Seagriff, RH. Realistic approaches to counseling in the office setting. Am Fam Physician. 2009;79(4):277-284

Use evidence-based communication strategies

STRATEGY
Begin with open-ended questions about adherence, including recent medication use
Explore reasons for possible non-adherence
Elicit patient views on options and priorities to customize a care plan for each patient
Remain non-judgmental at all times
Use teach-back to ensure understanding of the care plan



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Impact of lifestyle changes for improving blood pressure in patients with HTN

LIFESTYLE CHANGE	CAN LOWER SBP/DBP UP TO:
DASH diet, compared with typical American diet	11.6/5.3 mm Hg
Reduce sodium intake by average of 1150 mg/d	4/2 mm Hg
Average weight loss of 11 lbs	4.4/3.6 mm Hg
40 minutes of moderate intensity aerobic physical activity, 3–4 times a week	5/4 mm Hg



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Measure accurately	Act rapidly	Partner with patients, families and communities
<p>Measuring checklist</p> <ul style="list-style-type: none"> Use a validated, automated device to measure BP^{1,2} Use the correct cuff size on a bare arm^{1,3} Ensure patient is positioned correctly^{1,4-6} <p>Confirmatory checklist</p> <ul style="list-style-type: none"> If screening blood pressure is $\geq 140/90$ mm Hg, obtain a confirmatory measurement¹ Repeat screening steps above Ensure patient has an empty bladder^{1,10} Ensure patient has rested quietly for at least five minutes^{1,11-13} Obtain the average of at least three BP measurements^{1,14} <p>Evidence-based tips for correct positioning</p> <ul style="list-style-type: none"> Ensure patient is seated comfortably with: Back supported Feet supported Call of feet level Right arm raised Feet flat on the ground or supported by a foot stool No one talking during the measurement. 	<p>If a patient's blood pressure is $\geq 160/100$ mm Hg confirm:</p> <ul style="list-style-type: none"> Use evidence-based hypertension management^{15,16} Re-assess patient every 2-4 weeks until BP is controlled¹⁷ Whenever possible, prescribe single pill combination therapy^{18,19} <p>Evidence-based practices typically include:</p> <ul style="list-style-type: none"> Control salt and sodium intake Ensure early follow-up and add preferred medications as a step-wise fashion, until BP is controlled Use aspirin, statins, and preference for: Thiazide diuretics Calcium channel blockers ACE inhibitors/ARBs Angiotensin receptor blockers (ARBs) Diuretic monotherapy (CCB and ARB) to some patient If BP is $\geq 160/100$ mm Hg, start therapy with two medications or a single pill combination. 	<p>Informed patient decision-making</p> <ul style="list-style-type: none"> Engage patients using evidence-based communication strategies²⁰ Help patients accurately self-measure²¹ Direct patients and families to resources that support medication adherence and healthy lifestyles <p>Evidence-based communication strategies include:</p> <ul style="list-style-type: none"> Begin with open-ended questions about adherence including recent medication use Explore reasons for possible non-adherence or a single pill combination Elicit patient views on options and priorities to customize a care plan for each patient Remain non-judgmental at all times Use teach-back to ensure understanding of the care plan <p>Evidence-based tips for patient self-measurement of BP</p> <ul style="list-style-type: none"> Train patient to measure BP accurately using a validated, automated device and correct positioning for measurement All patients to record morning BP measurements and 1-2 evening BP measurements for 7-8 consecutive days between office visits Develop a systematic approach to ensure patients can act rapidly to address elevated BP readings between office visits Control patients that self-measured BP $\geq 130/80$ mm Hg in confirmed elevated <p>Evidence-based lifestyle changes to lower BP include:</p> <ul style="list-style-type: none"> Following the DASH diet, which is rich in fruits, vegetables and whole grains, low fat dairy products, fish and plant-based oils, and limits sodium, sweets, sugary drinks, red meat and saturated fats Engaging in moderate physical activity, such as brisk walking, for at least 30 minutes 5 days a week (AHA) Limiting alcohol to 1-2 drinks a day in men, 1-1 drinks in women

These checklists are not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Why SMBP is clinically useful

SMBP better predicts CV morbidity and mortality than office BPs

- Reduces variability and provides more reliable BP measurement
- Provides better assessment of hypertension control
- Empowers patients to self manage their HTN
- May improve medication adherence

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AMA-JHM SMBP monitoring program

- Provides a framework for practices and health centers to implement their own SMBP monitoring program
- Serves as a workbook for staff to design and implement their own SMBP monitoring program



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SMBP monitoring program

Table of contents delineates the documents by audience and the program type

Page	Name of document	Audience			
		Practice staff	Patient	Blood pressure monitor loaner program	Patient-owned blood pressure monitor
4	Measuring accurately: Self-measured blood pressure monitoring	X		X	X
6	Clinical competency: Patient self-measured blood pressure at home	X		X	X
8	Measure accurately: A guide for blood pressure measurement	X		X	X
9	How to check a home blood pressure monitor	X		X	X

Health care professional

Several documents are written to help the health care professional know how to accurately measure blood pressure and what to do with self-measured blood pressure readings

Clinical competency

This clinical competency ensures your staff consistently teach the patient

- How to *properly* measure their blood pressure
- How to document the measurement
- Actions to take if readings are out of range

Patient-specific information

Patient-facing documents provide the patient with information on SMBP monitoring that are easy to understand (also available in Spanish)

Documenting BP measurements

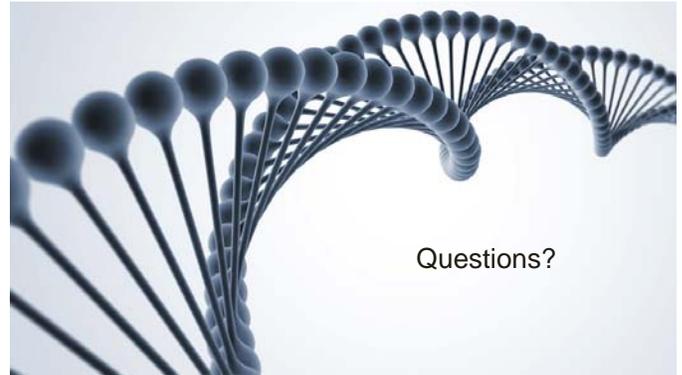
- Patients can document their home BP readings on a flow sheet or a tri-fold wallet card
- Guidance exists for the clinician on how to manage SMBP readings and use them for treatment

Download resources

<http://www.ama-assn.org/go/improving-bp-control>

- You will need to register to download any tools
- You don't need to be an AMA member or physician to do so

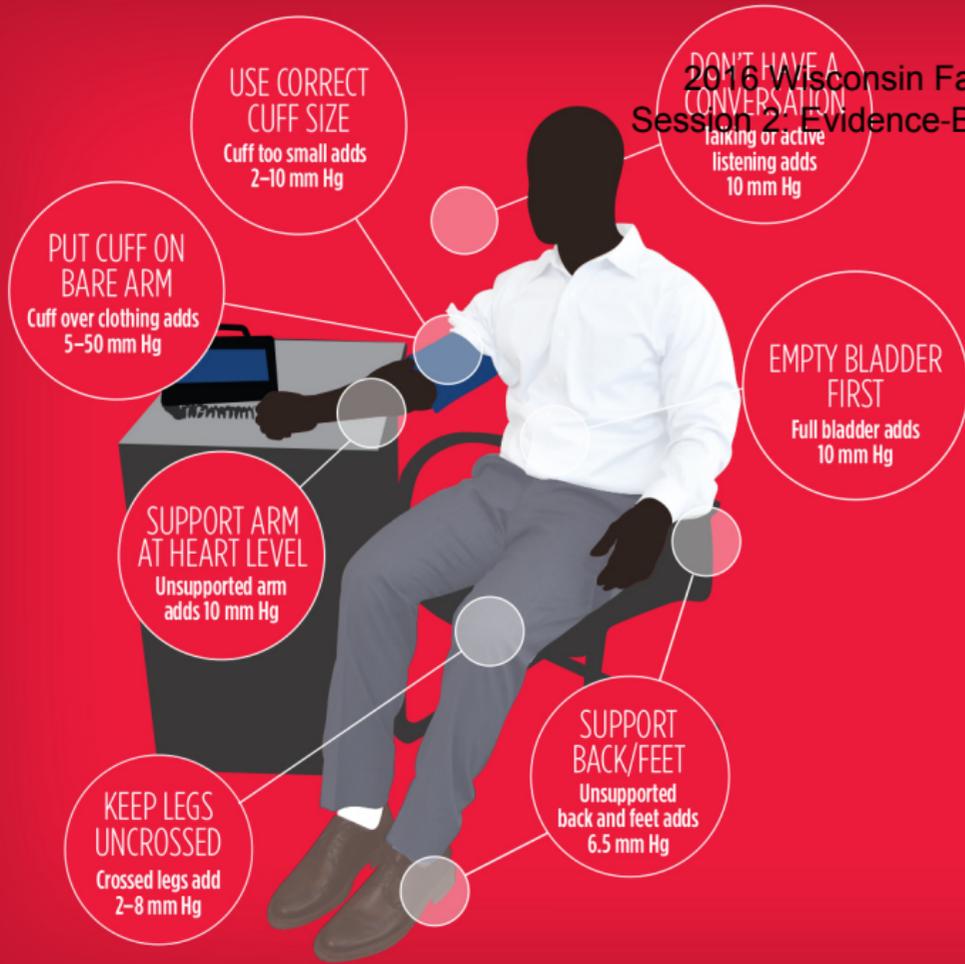
STEPS Forward: Improving blood pressure control
www.stepsforward.org



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2016 Wisconsin Faith Community Nurse Coalition Conference
Session 2: Evidence-Based Proper Blood Pressure Measurement



7 SIMPLE TIPS TO GET AN ACCURATE BLOOD PRESSURE READING

Common positioning errors can result in inaccurate blood pressure measurement. Figures shown are estimates of how improper positioning can potentially impact blood pressure readings.

Sources:

1. Pickering, et al. Recommendations for Blood Pressure Measurement in Humans and Experimental Animals Part 1: Blood Pressure Measurement in Humans. *Circulation*. 2005;111: 697-716.
2. Handler J. The importance of accurate blood pressure measurement. *The Permanente Journal/Summer 2009/ Volume 13 No. 3 51*

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The 2015 M.A.P. checklists for improving BP control

Measure accurately

Screening checklist

When *screening* patients for high blood pressure:

- Use a validated, automated device to measure BP¹
- Use the correct cuff size on a bare arm²⁻¹⁰
- Ensure patient is positioned correctly^{2,3,11-19}

Confirmatory checklist

If screening blood pressure is $\geq 140/90$ mm Hg, obtain a *confirmatory* measurement:

- Repeat *screening* steps above
- Ensure patient has an empty bladder^{2,3,20}
- Ensure patient has rested quietly for at least five minutes^{2,3,21,22}
- Obtain the average of at least three BP measurements^{2,3,23}

Evidence-based tips for correct positioning

Ensure patient is seated comfortably with:

- Back supported
- Arm supported
- Cuff at heart level
- Legs uncrossed
- Feet flat on the ground or supported by a foot stool
- No one talking during measurement

Act rapidly

If patient has blood pressure $\geq 140/90$ mm Hg confirmed:

- Use an evidence-based protocol to guide treatment²⁴⁻²⁶
- Re-assess patient every 2–4 weeks until BP is controlled²⁷⁻²⁹
- Whenever possible, prescribe single-pill combination therapy³⁰⁻³²

Evidence-based protocols typically include

- Counsel on and reinforce lifestyle modifications
- Ensure early follow-up and add preferred medications in a step-wise fashion, until BP is controlled
- For most patients, give preference to:
 - Thiazide diuretics
 - *Dihydropyridine* calcium channel blockers
 - ACE inhibitors (ACEI) or
 - Angiotensin receptor blockers (ARB)
- Do not prescribe both ACEI and ARB to same patient
- If BP $\geq 160/100$ mm Hg, start therapy with two medications or a single pill combination

Partner with patients, families and communities

To empower patients to control their blood pressure:

- Engage patients using evidence-based communication strategies³³⁻³⁵
- Help patients accurately self-measure BP^{36,37}
- Direct patients and families to resources that support medication adherence and healthy lifestyles

Evidence-based communication strategies include

- Begin with *open-ended questions* about adherence, including recent medication use
- *Explore* reasons for possible non-adherence
- *Elicit patient views* on options and priorities to customize a care plan for each patient
- Remain *non-judgmental* at all times
- Use *teach-back* to ensure understanding of the care plan

Evidence-based tips for patient self-measurement of BP

- Instruct patient to measure BP accurately using a validated, automated device and correct positioning for measurement
- Ask patient to record ≥ 2 morning BP measurements and ≥ 2 evening BP measurements for ≥ 4 consecutive days between office visits
- Develop a systematic approach to ensure patients can act rapidly to address elevated BP readings between office visits
- Counsel patients that self-measured BP $\geq 135/85$ mm Hg is considered elevated

Evidence-based lifestyle changes to lower BP include

- Following the DASH diet, which is rich in fruits, vegetables and whole grains; low-fat dairy, poultry, fish and plant-based oils; and limits sodium, sweets, sugary drinks, red meat and saturated fats
- Engaging in moderate physical activity, such as brisk walking, for 40 minutes a day at least four days a week
- Maintaining a healthy body mass index (BMI)
- Limiting alcohol to ≤ 2 drinks/day in men, ≤ 1 drink/day in women

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