

## The M.A.P. Framework and Hypertension Control

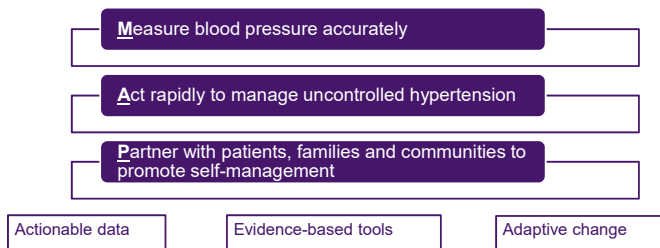
Linda Murakami, RN, BSN, MSHA  
Senior Program Manager, Quality Improvement



## Objectives

- Understand the M.A.P. Framework
- Learn the importance of accurate blood pressure measurement
- Understand how to partner with patients and engage them in blood pressure self-measurement

## The M.A.P. framework

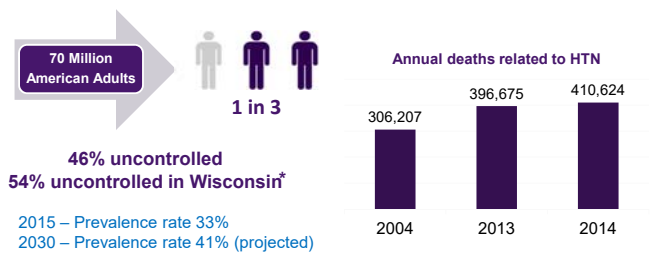


## Prototyping tools and resources



- 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)

## Barriers to success

- Patient factors
  - Non-adherence
  - Financial
  - Literacy
- Physician 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><b>Screening checklist</b></p> <p>When screening patients for high blood pressure:</p> <ul style="list-style-type: none"> <li>Use a validated, automated device to measure BP<sup>1,2</sup></li> <li>Use the correct cuff size on a bare arm<sup>1,2,3</sup></li> <li>Ensure patient is positioned correctly<sup>1,2,3</sup></li> </ul> <p><b>Confirmatory checklist</b></p> <p>If screening blood pressure is <math>\geq 140/90</math> mm Hg, obtain a confirmatory measurement:</p> <ul style="list-style-type: none"> <li>Repeat screening steps above</li> <li>Ensure patient has an empty bladder<sup>1,2,3</sup></li> <li>Ensure patient has rested quietly for at least five minutes<sup>1,2,3</sup></li> <li>Obtain the average of at least three BP measurements<sup>1,2</sup></li> </ul> <p><b>Evidence-based tips for correct positioning</b></p> <ul style="list-style-type: none"> <li>Ensure patient is seated comfortably with:</li> <li>Back supported</li> <li>Arm supported</li> <li>Cuff at heart level</li> <li>Legs uncrossed</li> <li>Feet flat on the ground or supported by a foot stool</li> <li>No one talking during the measurement</li> </ul>	<p>If a patient has blood pressure <math>\geq 140/90</math> mm Hg confirmed:</p> <ul style="list-style-type: none"> <li>Use evidence-based protocol to guide treatment<sup>1,2,3</sup></li> <li>Re-assess patient every 2-4 weeks until BP is controlled<sup>1,2,3</sup></li> <li>Whenever possible, prescribe single-pill combination therapy<sup>1,2</sup></li> </ul> <p><b>Evidence-based practices typically include:</b></p> <ul style="list-style-type: none"> <li> Counsel on and reinforce lifestyle modifications</li> <li> Ensure early follow-up and add/adjusted medications in a step-wise fashion, until BP is controlled</li> <li> For most patients, give preference to:             <ul style="list-style-type: none"> <li>Thiazide diuretics</li> <li>Dihydropyridine calcium channel blockers</li> <li>ACE inhibitors (ACEI) or</li> <li>Angiotensin receptor blockers (ARB)</li> </ul> </li> <li> Do not prescribe both ACEI and ARB to same patient</li> <li> If BP <math>\geq 160/100</math> mm Hg, start therapy with two medications or a single pill combination</li> </ul>	<p>To empower patients to control their blood pressure:</p> <ul style="list-style-type: none"> <li>Engage patients using evidence-based communication strategies<sup>1,2</sup></li> <li>Help patients accurately self-measure<sup>1,2</sup></li> <li>Direct patients and families to resources that support medication adherence and healthy lifestyles</li> </ul> <p><b>Evidence-based communication strategies include:</b></p> <ul style="list-style-type: none"> <li>Begin with open-ended questions about adherence including correct medication use</li> <li>Ensure patients are possible non-adherers or a single pill combination</li> <li>Elicit patient views on options and priorities to enhance a care plan for each patient</li> <li>Reassess non-adherence at all times</li> <li>Use teach-back to ensure understanding of the care plan</li> </ul> <p><b>Evidence-based tips for patient self-measurement of BP</b></p> <ul style="list-style-type: none"> <li>Instruct patient to measure BP accurately using a validated, automated device and correct positioning for measurement</li> <li>Ask patient to record 12 morning BP measurements and 12 evening BP measurements for 4 consecutive days between office visits</li> <li>Develop a systematic approach to ensure patients can act rapidly to address elevated BP readings between office visits</li> <li>Counsel patients that self-measured BP <math>\geq 135/85</math> mm Hg is considered elevated</li> </ul> <p><b>Evidence-based lifestyle changes to lower BP include:</b></p> <ul style="list-style-type: none"> <li>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</li> <li>Engaging in moderate physical activity, such as brisk walking, for 30 minutes a day at least five days a week</li> <li>Maintaining a healthy body mass index (BMI)</li> <li>Limiting alcohol to <math>\leq 2</math> drinks/day for men, <math>\leq 1</math> drink/day for women</li> </ul>

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

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SEE PAGES 9-10 OF HANDOUT

### 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 Institutes of Health, 2002. Available at: <http://www.nhlbi.nih.gov/health/heart/hbp/bpmeasu.pdf>

7 SIMPLE TIPS TO GET AN ACCURATE BLOOD PRESSURE READING

AMA logo

SEE PAGE 11 OF HANDOUT

### 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



### Accurate methods of BP measurement for diagnosing HTN

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#### 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

### Office blood pressure measurement

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**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
- Cannot rule-out white coat HTN
- Cannot identify patients with masked HTN
- Rarely performed correctly

### Why use office BP measurement?

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- 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

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- 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 × 22 cm
27 to 34 cm	16 × 30 cm (adult)
35 to 44 cm	16-17 × 36 cm (large adult)
45 to 52 cm	19-20 × 42 cm (adult high)

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

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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 BP measurement technique tips

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- Inflate cuff until you cannot feel radial pulse, then 10 mm Hg higher
- Deflate at 2 mm Hg / second. Record BP. Repeat.
- Repeat inflating 30 mm Hg higher than palpated pressure. If change between the first two pressures is > 5 mm Hg, take a 3rd BP
- Training required every six months to maintain skill

#### Terminal Digit Preference

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

### Rest and environment

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- 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

### Physiologic factors and stimulants

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- 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

### Validation, calibration and biomed stickers

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

- [www.dableducational.org](http://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

### Automated Office Blood Pressure (AOBP)

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- 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



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



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<b>Confirmatory checklist</b> If screening blood pressure is $\geq 140/90$ mm Hg, obtain a confirmatory measurement: <input type="checkbox"/> Repeat screening visits above <input type="checkbox"/> Ensure patient has an empty bladder <sup>14,15</sup> <input type="checkbox"/> Ensure patient has rested quietly for at least five minutes <sup>14,15</sup> <input type="checkbox"/> Obtain the average of at least three BP measurements <sup>14,15</sup>	<b>Evidence-based protocols typically include:</b> <ul style="list-style-type: none"> <li>• Counsel on and reinforce lifestyle modifications</li> <li>• Ensure early follow-up and add preferred medications in a step-wise fashion, until BP is controlled</li> <li>• For most patients, give preference to:                             <ul style="list-style-type: none"> <li>- Thiazide diuretics</li> <li>- Dihydropyridine calcium channel blockers</li> <li>- ACE inhibitors/ARBs/AT2R</li> <li>- Long-acting nitrates (beta-blockers)</li> </ul> </li> <li>• Do not prescribe beta-blockers and ACE to same patient</li> <li>• If BP <math>\geq 160/100</math> mm Hg, start therapy with two medications or a single pill combination.</li> </ul>	<b>Evidence-based communication strategies include:</b> <ul style="list-style-type: none"> <li>• Begin with open-ended questions about adherence, including recent medication use</li> <li>• Explore reasons for possible non-adherence or a single pill non-adherence</li> <li>• Check patient issues on options and priorities to customize a care plan for each patient</li> <li>• Monitor for judgmental or all-or-none</li> <li>• Use teach-back to ensure understanding of the care plan</li> </ul>
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## Most common factors contributing to uncontrolled hypertension

- Clinicians miss opportunities to treat a patient with a BP  $\geq 140/90$ 
  - Fail to initiate or escalate therapy during an office visit
  - Fail to stress frequent follow up until BP is controlled

### CLINICAL INERTIA

- Patient non-adherence to treatment plan
  - Usually due to not taking medications as instructed

## Factors leading to clinical inertia

### CLINICIAN

- Failure to initiate treatment
- Failure to titrate to goal
- Failure to recommend follow-up
- Failure to set clear goals
- Underestimating patient needs
- Failure to identify and manage comorbid conditions
- Not enough time
- Insufficient focus or emphasis on goal attainment
- Reactive rather than proactive

Adapted from Milani RC et al *J Am Coll Cardiol.* 2013; 62: 2185-2187

## Factors leading to clinical inertia

### PATIENT

- Medication side effects
- Failure to take meds
- Too many medications
- Cost of medications
- Denial of disease
- Forgetfulness
- Perception of low susceptibility
- Absence of symptoms
- Poor communication
- Mistrust of clinician
- Mental illness
- Low health literacy

Adapted from Milani RC et al *J Am Coll Cardiol.* 2013; 62: 2185-2187

## Factors leading to clinical inertia

### HEALTH SYSTEM

- Lack of clinical guideline
- Lack of care coordination
- No visit planning
- Lack of decision support
- Poor communication between office staff
- No disease registry
- No active outreach

Adapted from Milani RC et al *J Am Coll Cardiol.* 2013; 62: 2185-2187

## Why standardized treatment protocols are important

In patients with HTN with systolic BPs  $>150$  mm Hg, increased risk of acute cardiovascular events or death can occur with

- Delays in medication intensification  $>6$  weeks
- Delays in follow-up appointments  $>10$  weeks after medication intensification

Xu et al. *BMJ* 2015;350:h158 doi: 10.1136/bmj.h158



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## 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.”*

Searith, 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

## 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

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

Measure accurately	Act rapidly	Partner with patients, families and communities
<p><b>Screening checklist</b></p> <p>When screening patients for high blood pressure:</p> <ul style="list-style-type: none"> <li>Use a validated, automated device to measure BP<sup>1,2</sup></li> <li>Use the correct cuff size on a bare arm<sup>1,3</sup></li> <li>Ensure patient is positioned correctly<sup>1,4-6</sup></li> </ul> <p><b>Confirmatory checklist</b></p> <p>If screening blood pressure is <math>\geq 140/90</math> mm Hg, obtain a confirmatory measurement:</p> <ul style="list-style-type: none"> <li>Repeat screening steps above</li> <li>Ensure patient has an empty bladder<sup>1,4,5</sup></li> <li>Ensure patient has rested quietly for at least five minutes<sup>1,4,5</sup></li> <li>Obtain the average of at least three BP measurements<sup>1,4,5</sup></li> </ul> <p><b>Evidence-based tips for correct positioning</b></p> <ul style="list-style-type: none"> <li>Ensure patient is seated comfortably with:</li> <ul style="list-style-type: none"> <li>Back supported</li> <li>Arm supported</li> <li>Cuff at heart level</li> <li>Legs uncrossed</li> <li>Feet flat on the ground or supported by a foot stool</li> <li>No one talking during the measurement</li> </ul> </ul>	<p>If a patient has blood pressure <math>\geq 140/90</math> mm Hg continue:</p> <ul style="list-style-type: none"> <li>Use evidence-based protocol to guide treatment<sup>7,8</sup></li> <li>Re-assess patient every 2-4 weeks until BP is controlled<sup>7,8</sup></li> <li>Whenever possible, prescribe single-pill combination therapy<sup>7,8</sup></li> </ul> <p><b>Evidence-based protocols typically include:</b></p> <ul style="list-style-type: none"> <li>Consistent and regular medication modifications</li> <li>Ensure early follow-up and add preferred medications in a step-wise fashion, until BP is controlled</li> <li>For most patients, give preference to:                     <ul style="list-style-type: none"> <li>Thiazide diuretics</li> <li>Calcium channel blockers (CCBs)</li> <li>Angiotensin receptor blockers (ARBs)</li> <li>Angiotensin-converting enzymes (ACEs)</li> </ul> </li> <li>Do not prescribe beta-blockers (BBs) to most patients</li> <li>If BP <math>\geq 160/100</math> mm Hg, start therapy with two medications or a single-pill combination</li> </ul>	<p>To engage patients using evidence-based communication strategies<sup>9-11</sup>:</p> <ul style="list-style-type: none"> <li>Engage patients accurately using evidence-based communication strategies<sup>9-11</sup></li> <li>Help patients accurately self-measure<sup>9,12</sup></li> <li>Direct patients and families to resources that support medication adherence and healthy lifestyles</li> </ul> <p><b>Evidence-based communication strategies include:</b></p> <ul style="list-style-type: none"> <li>Begin with open-ended questions about adherence, including insight medication use</li> <li>Explore reasons for possible non-adherence or a single pill combination</li> <li>Elicit patient views on options and priorities to customize a care plan for each patient</li> <li>Remain non-judgmental at all times</li> <li>Use teach-back to ensure understanding of the care plan</li> </ul> <p><b>Evidence-based tips for patient self-measurement of BP:</b></p> <ul style="list-style-type: none"> <li>Instruct patient to measure BP accurately using a validated, automated device and correct positioning for measurement</li> <li>Ask patient to record 12 morning BP measurements and 12 evening BP measurements for 7 consecutive days between office visits</li> <li>Describe a systematic approach to ensure patients use and rapidly to address elevated BP readings between office visits</li> <li>Consider patients that self-measured BP <math>\geq 130/80</math> mm Hg to be considered elevated</li> </ul> <p><b>Evidence-based lifestyle changes to lower BP include:</b></p> <ul style="list-style-type: none"> <li>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</li> <li>Engaging in moderate-intensity aerobic activity, such as brisk walking, for 40 minutes a day at least four days a week</li> <li>Maintaining a healthy body mass index (BMI)</li> <li>Limiting alcohol to 1-2 drinks/day in men, 1-1 drink/day in women</li> </ul>

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



## 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

## 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

### Fast facts

**Measuring accurately:**  
Self-measured blood pressure monitoring

Self-measured blood pressure: Health care professional

**Measure accurately:**  
A guide for blood pressure measurement

Self-measured blood pressure: Health care professional

Diagnosis, communication, documentation and management

### Diagnosis

When patients have elevated blood pressures in the office and the diagnosis of hypertension is suspected, self-measured blood pressure (SMBP) can be very useful in distinguishing between white coat hypertension (or isolated office hypertension) and true hypertension. White coat hypertension occurs when a patient's blood pressure is persistently elevated in the office setting, but out-of-office blood pressures are in the normal range. SMBP is also useful in identifying patients with masked hypertension. Masked hypertension occurs when office blood pressures are normal, but out-of-office blood pressures are elevated. This is one of the most dangerous types of hypertension, as both the patient and physician can remain unaware for long periods of time.

To confirm the diagnosis of hypertension in a patient with elevated office blood pressures or to increase the chance of diagnosing a patient suspected of having masked hypertension, it is best to use multiple readings over time. This is due to

## SMBP monitoring program

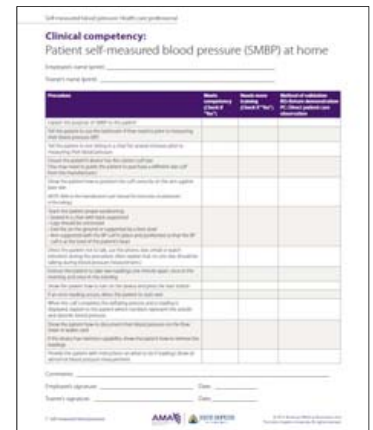
Table of contents delineates the documents by audience and the program type

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

## Clinical competency

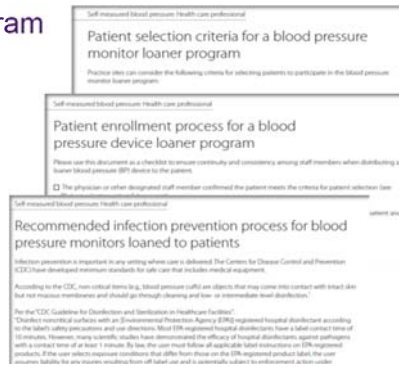
This clinical competency ensures your staff consistently teach the patient

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



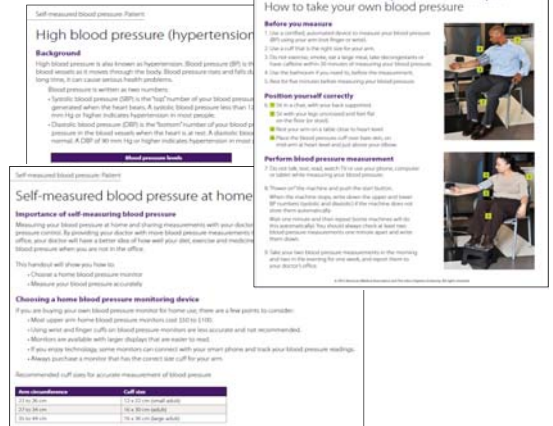
## Device loaner program

Guidance documents will help the practice or health center develop a program that will loan home blood pressure monitors to patients when short-term SMBP monitoring is useful



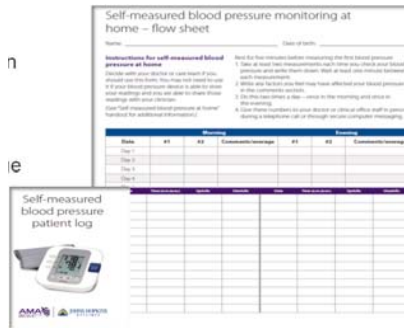
## Patient-specific information

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



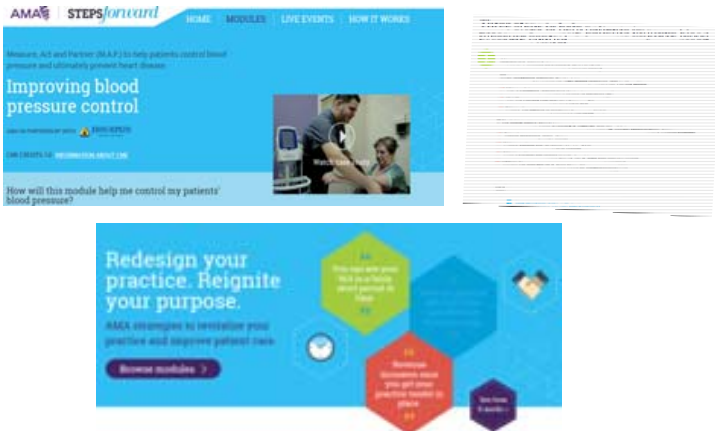
### Download resources

<https://www.ama-assn.org/search/ama-assn/iho>

- 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](http://www.stepsforward.org)



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