

Rhode Island Department of Health
Chronic Care and Disease Management Program Presents:

Protocols For Diagnosing Hypertension

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Learning Objectives

At the conclusion of this session, attendees should be able to:

- Explain the importance of accurately diagnosing hypertension (HTN)
- Describe the 2015 USPSTF recommendation for HTN screening
- Identify guideline recommendations to diagnose HTN
- Implement practical workflows for diagnosing HTN in clinical practice

Target Audience

Practice teams including physicians, nurses, nurse care managers, medical assistants, and other team members as well as public health professionals.

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Protocols for diagnosing hypertension

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Objectives:

Gain a better understanding of:

- The importance of accurately diagnosing hypertension (HTN)
- The 2015 USPSTF recommendation for HTN screening
- Guideline recommendations to diagnose HTN
- Practical workflows for diagnosing HTN in clinical practice

The most common factors contributing to uncontrolled hypertension

1. Clinicians miss opportunities to treat patients with BPs \geq 140/90 because of:
 - Failure to make a diagnosis of hypertension
 - Failure to initiate or escalate therapy during an office visit
 - Failure to recommend frequent follow up until BP is controlled

CLINICAL INERTIA = Diagnostic + Therapeutic inertia

2. Patients are non-adherent to treatment plans:
 - Usually due to not taking medications as instructed

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Strategies for improving BP control AMA-Johns Hopkins

1. **Measure blood pressure accurately**
 - increases reliability of BP measurements provides actionable information to make effective clinical decisions in diagnosing HTN
 - more accurate registries ensure the right people can be targeted with treatment
2. **Act rapidly to manage uncontrolled patients**
 - evidence-based treatment protocol
 - emphasize single pill combination therapy
 - frequent follow up until BP controlled
 - outreach to patients with uncontrolled blood pressures
3. **Partner with patients (families and communities) to promote self-management using**
 - evidence-based communication strategies
 - self-measured blood pressure monitoring (SMBP) otherwise known as home BP monitoring
 - diet and exercise
4. **Use a team approach / create a culture of quality**
 - to deliver safer, more effective care

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Accurately diagnosing HTN White coat effect

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 patients “true” BP
- WCE can be > 25 mm Hg in some patients
- Hypertensive patients may continue exhibit WCE making it difficult to determine when control has been achieved

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

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Accurately diagnosing HTN White coat hypertension

White coat hypertension (WCH) is when a person has persistently elevated BP values in a medical environment, and persistently normal BP values during daily life (in a patient not yet receiving antihypertensive medication).

- Can be determined using 24-hour ambulatory BP monitoring or SMBP
- Prevalence of WCH is estimated at 10-60% in the literature, but many agree it is closer to 15-30%

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

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Accurately diagnosing HTN

Masked hypertension

Masked hypertension is occurs when a person has persistently normal BP values in the medical environment, and persistently elevated daytime or asleep BP values on 24-hour ABPM (not on medication)

- Can be determined using 24-hour ABPM or SMB
- Prevalence of masked HTN is estimated at 14-30 % in the literature, but as high as 40% in African Americans in some studies
- People with masked HTN are at increased risk for CV events

Shimbo D, Marwah A, Falzone L, Townsend R et Al. Role of Ambulatory and Home Blood Pressure Monitoring in Clinical Practice: A Narrative Review. *Ann Intern Med* . 2015; 163. 691-700

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Accurately diagnosing HTN

Sustained HTN

To make a diagnosis of HTN - JNC-7 (2003)

Assuming BP is < 180/110 mm Hg and no organ damage present:

- Two or more BP readings taken during each office visit
- BP readings from a visit are averaged – and if $\geq 140/90$ mm Hg these are consistent with HTN
- Must have two or more visits with BPs $> 140/90$ mm Hg to diagnose

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USPSTF 2015 Recommendation for Screening: High Blood Pressure in Adults

High Blood Pressure in Adults: Screening		
Release Date: October 2015		
Recommendation Summary		
Population	Recommendation	Grade (What's This?)
Adults aged 18 years or older	The USPSTF recommends screening for high blood pressure in adults aged 18 years or older. The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment (see the Clinical Considerations section).	A



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USPSTF 2015 Recommendation for Screening: High Blood Pressure in Adults

The USPSTF is calling for all patients with elevated office BP readings to have either 24 hour ABPM or SMBP monitoring to diagnose sustained hypertension (and rule out WCH).

Why does this pose a problem?

1. 24 hour ABPM is not routinely available in primary care
2. Clinical teams are not trained to effectively implement SMBP in primary care

WE HAVE A LARGE GAP WE NEED TO FILL



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Methods of measuring out-of-office blood pressure to comply with the new USPSTF recommendation

- 24-hour ambulatory blood pressure monitoring (ABPM)
- Self-measured blood pressure (SMBP)

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24-hour ambulatory blood pressure monitoring

Pros

- Most evidence for accurate diagnosis of HTN
- Best predictor of future events
- Can rule-out white coat HTN
- Can identify patients with masked HTN
- Provides BPs during sleep

Cons

- Expensive to purchase and requires training to interpret in primary care
- Inconvenient for patients if they have to be referred
- Payment varies for the service (0-\$150) and only for the diagnosis of “white coat HTN”
- Lack of availability – often long waits to see specialist



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24-hour ambulatory blood pressure monitoring Diagnosing HTN using ABPM

Based on most recent recommendations - American Society of Hypertension (ASH) and European Society of Hypertension (ESH):

Thresholds for diagnosing hypertension

- Daytime mean BP \geq 135/85 mm Hg
- Asleep mean BP \geq 120/75 mm Hg (ASH) 120/70 mm Hg (ESH)
- 24 hour mean BP \geq 130/80 mm/Hg

Shimbo D, Marwah A, Falzone L, Townsend R et Al. Role of Ambulatory and Home Blood Pressure Monitoring in Clinical Practice: A Narrative Review. *Ann Intern Med*. 2015; 163. 691-700

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Self-measured blood pressure (SMBP)

Pros

- Complements 24-hour ABPM, but does not replace it
- Superior to office BP for providing multiple measurements over longer period of time (more representative BPs)
- Better predictor of future events than routine office BP
- Helps to rule-out white coat HTN
- Helps to identify patients with masked HTN
- Relatively Inexpensive and cost effective (NHS)
- Convenient

Cons

- Requires the patient have a home monitor
- Does not provide BPs during sleep
- Can be limited by cognitive impairment or physical limitations
- Requires additional clinical support for maximum benefit (education of care team and patient, communication of results, plan for what to do if readings are low or high, pharmacist involvement, telehealth/patient portals etc..)



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Self-measured blood pressure (SMBP) Diagnosing HTN using SMBP

Based on recommendations from American Society of Hypertension (ASH), American Heart Association (AHA), Preventive Cardiovascular Nurses Association (PCNA), European Society of Hypertension (ESH), European Society of Cardiology (ESC):

Thresholds for diagnosing hypertension using SMBP

- $\geq 135/85$ mm Hg
- Asleep mean BP N/A
- 24 hour mean BP N/A

Shimbo D, Marwah A, Falzone L, Townsend R et Al. Role of Ambulatory and Home Blood Pressure Monitoring in Clinical Practice: A Narrative Review. *Ann Intern Med*. 2015; 163: 691-700

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Alternatives to measuring out of office blood pressures

- Automated office blood pressure (AOBP)
- Multiple office BP measurements

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Automated office blood pressure (AOBP)

Pros

- Validated, fully automated BP monitors that take 3-6 measurements with no staff in the room
- Intervals between readings can be set at 1-5 minutes
- AOBP machines average the readings into a single systolic and diastolic BP
- Automated office BPs correlate better with daytime mean BP obtained during 24-hour testing and research quality BPs performed in studies and surveys
- Most “white coat” effect or alerting response is mitigated by AOBP machines
- Increased accuracy/reliability strengthens medical decisions, with less uncertainty



Cons

- Machines are expensive (\$600-\$1000 each)
- Takes more time



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Automated office blood pressure (AOBP)

Diagnosing HTN using AOBP

No clear consensus. According to Martin Meyers, the Canadian Cardiologist who has performed many of the studies in this area:

Thresholds for diagnosing hypertension using AOBP in the office (Mean of multiple readings with no one in the room) should be

- $\geq 135/85$ mm Hg

However confirmation with out of office testing is recommended when available

Meyers, MG. Eliminating the Human Factor in Office Blood Pressure Measurement. The Journal of Clinical Hypertension Vol 16 | No 2 | February 2014



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Office blood pressure measurement

Pros

- Convenient
- Can predicts future events, if done correctly. USE A STANDARDIZED PROTOCOL by a trained observer
- 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
- Terminal digit preference
- Cannot rule-out white coat HTN
- Cannot identify patients with masked HTN
- Routine auscultatory OBPs are 9/6 mm Hg higher than research protocol BPs *
- Rarely performed perfectly (human error and bias) leading to clinical indecision/clinical inertia

Myers MG, et al. Can Fam Physician 2014;60:127-32

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Office blood pressure measurement

Diagnosing HTN using Office BPs

What do the guidelines say?

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Guideline recommendations for the diagnosis of HTN

	JNC-VII 2003	JNC-VIII 2014	ASH/ISH 2014	NICE 2011-13	ESH/ECC 2013	CHEP 2015
# visits required (If BP <180/110 and NO ORGAN DAMAGE)	2 or more	Not Addressed	2 at least 1 week apart	1 + 24-hour ABPM or SMBP	2 visits	5 \geq 140/90 -159/99 3 \geq 160/100 1 + ABPM/SMBP – visit 2 w/in 1 mo.
# Office BPs taken at each visit	2 or more	Not Addressed	2 readings 1 minute apart	2 readings, but a 3 rd If the 1 st two differ	2 readings, but a 3 rd If the 1 st two differ	3 or AOBP
Office measurements averaged?	Yes (all)	Not Addressed	Yes	No, but use the lowest of the measurements taken	"Consider the average if deemed appropriate"	3 taken, average latter 2 or use AOBP
AOBP (automated office blood pressure)	No	Not Addressed	No	No	Yes, preferred	Yes, is acceptable
24-hour ABPM (ambulatory blood pressure monitoring)	No	Not Addressed	If Available	Yes, required unless not tolerated	Optional	Recommended to confirm dx if office BP high
Self-measured BP: SMBP (Home BP monitoring)	No	Not Addressed	If available	Yes if 24-hour ABPM not tolerated	Optional	Acceptable alternative to ABPM

How to confirm elevated office readings in clinical practice

When patient has elevated BP readings in the office or clinic (or reports from home or community)



OBP \geq 140/90 mm Hg or Out-of-office BP \geq 135/85 mm Hg

Use confirmatory office blood pressures (multiple readings during a visit)



If OBP mean \geq 140/90 mm Hg on 2 or more visits

Use out-of-office 24-hour ABPM or SMBP for a week to confirm if available.
If not available, have patient return every 2-4 weeks for OBP measurements (or use AOBP if available)



A practical approach when you suspect hypertension

In patients with elevated office BPs

1. Rule out organ damage and conditions requiring immediate treatment
2. Rule-out white coat HTN (which rules in sustained HTN)
3. Remember to think about masked HTN if office BP is labile or suspicious in any way

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Rule out organ damage / conditions requiring treatment

- History of ischemic stroke, transient ischemic attack, or intracerebral bleed or vascular dementia
 - Hypertensive retinopathy
 - Left Ventricular Hypertrophy (LVH)
 - Chronic Kidney Disease (GFR < 60 or albuminuria)
 - Peripheral Arterial Disease (intermittent claudication)
 - BP \geq 180/110 mm Hg
 - Diabetes, CHF, CAD
1. EKG
 2. Chem panel, A1C, Lipid panel
 3. Retinal exam
 4. Urinalysis

CHEP 2015

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Rule-out white coat hypertension

1. Use AOBP if available
2. Use 24 hour ABPM
 - or
 - Use SMBP
 - (1 week of 2 BPs in am and 2 BPs in PM, one minute apart after a 5 minute rest period)

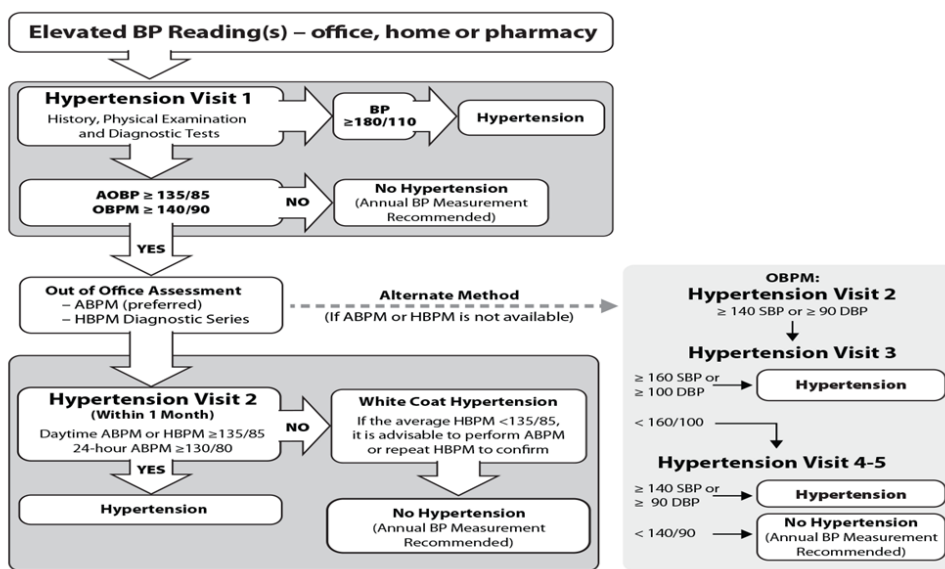
If neither is available to rule out white coat HTN, use office BPs, at least two additional office visits 2 weeks apart (they do not have to be physician visits) to make the diagnosis of hypertension.



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Putting it all together



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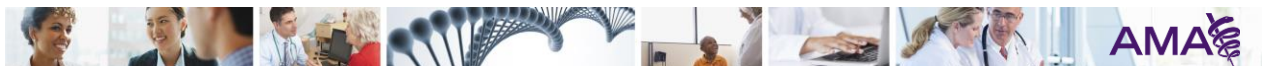
What is the cost of delaying treatment and follow-up?

In patients with HTN and systolic BP >150 mm Hg...

- delays in medication intensification >6 weeks or
- delays in follow-up appointments >10 weeks after medication intensification

can increase the risk of acute cardiovascular events or death

Xu W, Goldberg S, Shubina M et al. Optimal systolic blood pressure target, time to intensification, and time to follow-up in treatment of hypertension: population based retrospective cohort study. *BMJ* 2015;350:h158 doi: 10.1136/bmj.h158



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<http://www.ama-assn.org/ama/pub/about-ama/strategic-focus/improving-health-outcomes/improving-blood-pressure-control.page>

Scroll down to the tool you would like to download. You will have to log into the AMA website but you do not need to be a member or a physician to do so. Just hit "Create an account" and you will gain instant access.



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