Under Pressure: Guidance for managing patients with hypertension

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Disclosures and Conflict of Interest

- Stephanie Schauner and Lisa Cillessen have no personal or financial conflicts of interest to disclose.

Objectives

1. Demonstrate a working knowledge of the 2017 ACC/AHA guideline for the management of hypertension.
2. Compare and contrast the 2017 ACC/AHA hypertension guideline to the Eighth Joint National Committee (JNC 8) guideline on managing hypertension in adults.
3. Establish an awareness of the supporting evidence available for integrating the 2017 ACC/AHA guideline into clinical practice.
4. Justify continued use of the JNC 8 hypertension guideline after the introduction of the 2017 ACC/AHA hypertension guideline.
5. Formulate a therapeutic plan, including treatment goals based on patient specific information.

Patient Case – WR

- CC: "I'm here for a BP check"
- HPI: 53 yo Hispanic female is here today to follow up on her blood pressure. She was out of her chlorthalidone at her last PCP visit (BP was 160/102, HR 70), but has since restarted.
  - Diet: reports no breakfast, frequent fast food
  - Exercise: has a gym membership and walks in the water for 30 min 3 days/week
- PMH: hypertension x 6 yr, diabetes x 13 yr, dyslipidemia x 6 yr
- Immunizations: up to date
- SH: nonsmoker, no alcohol or illicit drugs
- Medications: chlorthalidone 25 mg daily, atorvastatin 80 mg daily, Victoza 1.2 mg SubQ daily, Novolog 12 units TID with meals, Lantus 66 units daily
- Allergies: adhesive, metformin

Patient Case – WR

- Vital signs: BP 150/92 mmHg, HR 88 bpm, Temp. 98.0 °F, RR 18 rpm, Ht 5'6" Wt 300 lbs
- PE: no significant findings
- Labs:

Glu 327	BUN 13	SCr 0.6	eGRF >59	Na 135	K 4.6
Cl 97	CO2 30	Ca 9.7	UACR 30-300	A1c 9.0 (previously 11.6)	ASCVD Risk 14.5%
TC 310	HDL 36	LDL 229	TG 225	VLDL 45	

2017 ACC/AHA/AAPA/ABC/ACPM/ AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

Published on November 13, 2017 in

Hypertension and Journal of the American College of Cardiology

ACC: American College of Cardiology, AHA: American Heart Association, AAPA: American Academy of Physician Assistants, ABC: Association of Black Cardiologists, ACPM: American College of Preventive Medicine, AGS: American Geriatric Society, APhA: American Pharmacists Association, ASH: American Society of Hypertension, ASPC: American Society for Preventive Cardiology, NMA: National Medical Association, PCNA: Preventive Cardiovascular Nurses Association

Blood Pressure Measurements

- Ensure blood pressure measurement is performed accurately
- Recommend use of BP averages of ≥ 2 readings obtained on ≥ 2 occasions
- Encourage the use of home blood pressure monitoring and/or ambulatory blood pressure monitoring to recognize "white coat" or "masked" hypertension

Hypertension. 2018 Jun;71(6):e13-e115.

Categorizing Blood Pressure

2014 Guideline – JNC8

Category	SBP (mmHg)		DBP (mmHg)
Normal	< 120	and	< 80
Pre-HTN	120-139	and	< 90
Stage 1	140-159	or	90-99
Stage 2	≥ 160	or	≥ 100

2017 Guideline

Category	SBP (mmHg)		DBP (mmHg)
Normal	< 120	and	< 80
Elevated	120-129	and	< 80
Stage 1	130-139	or	80-89
Stage 2	≥ 140	or	≥ 90

The prevalence of hypertension is estimated to be 46% of the adult population in the US per the 2017 guideline vs 32% per JNC8

JAMA. 2014;311:507-20.
Hypertension. 2018 Jun;71(6):e13-e115.

Clinical Recommendations

Normal Blood Pressure	• Encourage healthy lifestyle • Re-evaluate yearly
Elevated Blood Pressure	• Recommend healthy lifestyle changes • Re-evaluate in 3-6 months

Hypertension. 2018 Jun;71(6):e13-e115.

Clinical Recommendations

Stage 1 Hypertension	• ASCVD Risk < 10%:
	  • Recommend healthy lifestyle changes
	  • Re-evaluate in 3-6 months
	• ASCVD Risk ≥ 10%, Clinical CVD, DM, CKD:
	  • Recommend healthy lifestyle changes
	  • Initiation of 1 BP-lowering medication
	  • Re-evaluate in 1 month

Stage 2 Hypertension	• Recommend healthy lifestyle changes • Initiation of 2 BP-lowering medications from different classes • Re-evaluate in 1 month

Hypertension. 2018 Jun;71(6):e13-e115.

Blood Pressure Goal

< 130/80

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Blood Pressure Goal – Other Guidelines

< 150/90 mmHg	< 140/90 mmHg	< 130/80 mmHg
≥ 60 years of age and no other conditions on this table (JNC8)	< 60 years of age and no other conditions on this table (JNC8)	CKD with albuminuria ≥ 30mg/day (KDIGO)
	DM (ADA, JNC8)	Kidney transplant (KDIGO)
	CKD with albuminuria < 30mg/day (KDIGO)	
	Stroke or TIA (AHA/ASA)	

Healthy Lifestyle Changes

Lifestyle changes can reduce SBP by approximately 4-11 mmHg

Weight Loss	DASH Diet	Sodium Reduction
• Estimated reduction of 1 mmHg for every 1 kg reduction	• Diet rich in fruits, vegetables, whole grains, low-fat dairy	• Recommended < 1500 mg/day reduction
Dietary Potassium	**Physical Activity**	**Alcohol Consumption**
• Recommended 3500-5000 mg/day	• Recommended 90-150 minutes of aerobic activity/week	• Recommend ≤ 2 drinks/day for men, ≤ 1 drink/day for women

Hypertension. 2018 Jun;71(6):e13-e115.

Initial BP-Lowering Medications

- Thiazide diuretics
  - Chlorthalidone is preferred over hydrochlorothiazide
- Angiotensin converting enzyme inhibitors (ACE-Is)
  - Avoid use in pregnancy and in combination with ARBs
- Angiotensin receptor blockers (ARBs)
  - Avoid use in pregnancy and in combination with ACE-Is
- Calcium channel blockers (CCBs)

- Maximize as tolerated prior to moving to secondary agents unless there is a compelling indication for a secondary BP-lowering medication

JAMA. 2014 Feb 5;311(5):507-20.
Hypertension. 2018 Jun;71(6):e13-e115.

Secondary BP-Lowering Medications

- Loop diuretics
- Aldosterone antagonists
- Beta blockers
- Potassium-sparing diuretics
- Central alpha-1 agonist
- Direct vasodilators
  - In addition to diuretic and beta-blocker to reduce side effects
- Direct renin inhibitor
- Alpha-1 blockers

JAMA. 2014 Feb 5;311(5):507-20.
Hypertension. 2018 Jun;71(6):e13-e115.

Laboratory Tests and Procedures

- Fasting blood glucose
- Complete blood count
- Lipid profile
- Serum creatinine with eGFR
- Serum sodium, potassium, calcium
- Thyroid-stimulating hormone
- Urinalysis
- Electrocardiogram

Hypertension. 2018 Jun;71(6):e13-e115.

Black Adults

- Thiazide diuretics
- Calcium channel blockers
- ACE-Is or ARBs IF patient has hypertension, diabetes, and nephropathy

JAMA. 2014 Feb 5;311(5):507-20.
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Pregnant Women

- Methyldopa
- Nifedipine
- Labetalol

- Avoid use of ACE-Is, ARBs, or direct renin inhibitors

ACOG. Hypertension in Pregnancy.

Older Adults

- Noninstitutionalized ambulatory community-dwelling adults (≥ 65 yo)
- SBP treatment goal < 130 mmHg

- Those with frequent falls, advanced cognitive impairment, multiple comorbidities, residing in nursing homes or assisting living facilities have not been represented in trials

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Resistant Hypertension

- Consider if patient is on ≥ 3 antihypertensive medications at optimal doses (including a diuretic)
- Discontinue interfering medications
  - NSAIDs, amphetamines, decongestants, stimulants, oral contraceptives
- Recommended to initiate spironolactone
- Consider the use of loop diuretics in patients with CKD

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Supporting the New Guideline

Organizations in **SUPPORT** of ACC/AHA 2017 HTN BP Targets

- American Academy of Physician Assistants
- American College of Preventive Medicine
- American Geriatrics Society
- American Pharmacists Association
- American Society of Hypertension
- American Society of Preventive Cardiology
- Association of Black Cardiologists
- National Medical Association
- Preventive Cardiovascular Nurses Association

Intensive vs. Standard BP Targets

Randomized Controlled Trials

SPRINT Trial

- RCT 9361 with SBP ≥ 130 mmHg but WITHOUT T2D
- Randomized to 120 mmHg vs 140 mmHg
- Trial stopped early at 3.26 years
- Intensive treatment was associated with a lower risk of the primary outcome [1.65% per yr vs. 2.19% per yr in the standard treatment arm (HR 0.75, 95% CI 0.64-0.89, p<0.001]
  - Primary outcome – MI, other ACS, stroke, HF, or CV death
- All cause mortality lower in intensive treatment group. HR 0.73; NNT 270
- Rates of adverse events not including injurious falls were higher in intensive treatment group

N Engl J Med 2015; 373:2103-2116.

SPRINT Trial - Exclusions

- Diabetes
- Past stroke
- Clinical diagnosis of dementia, and/or being on dementia medication
- People residing in a nursing home (Assisted-living was ok)
- Substance abuse (active or within the past 12 months)
- Symptomatic heart failure within the past 6 months or left ventricular ejection fraction (by any method) < 35%
- Polycystic kidney disease or eGFR < 20
- "Significant history of poor compliance with medications or attendance at clinic visits."

N Engl J Med 2015; 373:2103-2116.

SPRINT Trial - NNT

- During follow-up, 1.65% per year of people in the intensive-treatment group and 2.19% per year of people in the standard-treatment experienced a significant cardiovascular "outcome event": a heart attack, a stroke, acute decompensated heart failure, or death from cardiovascular causes.
- The study authors calculated that "The numbers needed to treat to prevent a primary outcome event, death from any cause, and death from cardiovascular causes during the median 3.26 years of the trial were 61, 90, and 172, respectively."

N Engl J Med 2015; 373:2103-2116.

SPRINT Trial - NNH

- Hypotension - 71
- Syncope - 91
- Electrolyte abnormalities - 100
- AKI or ARF - 56

N Engl J Med 2015; 373:2103-2116.

Intensive vs Standard BP Targets

Randomized Controlled Trials

Table 9.1—Randomized controlled trials of intensive versus standard hypertension treatment strategies

Clinical trial	Population	Intensive	Standard	Outcomes
ACCORD BP (16)	4,733 participants with T2D aged 40–79 years with prior evidence of CVD or multiple cardiovascular risk factors	Systolic blood pressure target: <120 mmHg Achieved (mean) systolic/diastolic: 119.3/64.4 mmHg	Systolic blood pressure target: 130–140 mmHg Achieved (mean) systolic/diastolic: 133.5/70.5 mmHg	• No benefit in primary end point: composite of nonfatal MI, nonfatal stroke, and CVD death • Stroke risk reduced 41% with intensive control, not sustained through follow-up beyond the period of active treatment • Adverse events more common in intensive group, particularly elevated serum creatinine and electrolyte abnormalities
ADVANCE BP (17)	11,140 participants with T2D aged 55 years and older with prior evidence of CVD or multiple cardiovascular risk factors	Intervention: a single-pill, fixed-dose combination of perindopril and indapamide Achieved (mean) systolic/diastolic: 136/73 mmHg	Control: placebo Achieved (mean) systolic/diastolic: 141.6/75.2 mmHg	• Intervention reduced risk of primary composite end point of major macrovascular and microvascular events (9%), death from any cause (14%), and death from CVD (18%) • 6-year observational follow-up found reduction in risk of death in intervention group attenuated but still significant (142)
HOT (143)	18,790 participants, including 1,501 with diabetes	Diastolic blood pressure target: ≤80 mmHg	Diastolic blood pressure target: ≤90 mmHg	• In the overall trial, there was no cardiovascular benefit with more intensive targets • In the subpopulation with diabetes, an intensive diastolic target was associated with a significantly reduced risk (52%) of CVD events

ADA position statement: Diabetes and Hypertension 2017

Summary of Trial Findings

Intensive vs. Standard BP Targets

- Mixed results with primary CV composite outcomes
  - ACCORD BP – No Benefit
  - ADVANCE BP – Benefit
  - HOT – No benefit with exception of T2D patients
  - SPRINT – Benefit
- SPRINT trial did not include patients with T2D

Erring on the Side of Caution

American Academy of Family Physicians (AAFP)

- AAFP does not endorse the ACC/AHA guideline
- AAFP continues to support the utilization of the JNC8 guideline
- AAFP/ACP published guidance on the treatment of hypertension in patients 60 years of age or older in March 2017
  - AAFP/ACP and AHA/ACC guidelines suggested a small benefit of lower blood pressure targets in decreasing cardiovascular events
  - Limited benefit in all-cause mortality, cardiovascular disease mortality, myocardial infarction or renal events
  - Increased risk of falls and pill burden
  - Lower blood pressure targets for some patients on an individualized basis

Ann Intern Med. 2017;166:430-7.
AAFP Press Release. December 12, 2017.

Reasons Not to Support

- ACC/AHA guideline was not based on a systematic evidence review
  - Systematic reviews were performed for only 4 of the 100 key questions
  - Recommendations were graded according to strength of evidence, however, assessments of the quality of individual studies were not provided
- Risks of treating a patient to a lower blood pressure were not assessed in the systematic review
- Strong recommendation to use the unvalidated ASCVD risk assessment tool to determine initiation of medication in patients with Stage 1 Hypertension
  - No evidence to support utilizing ASCVD risk for improving outcomes in patients with hypertension

AAFP Press Release. December 12, 2017.

SPRINT

- Significant weight was given to the Systolic Blood Pressure Intervention Trial (SPRINT), while other trials were minimized
- Repeated blood pressure measurements utilized automated blood pressure cuffs, often in the absence of a clinician
  - Mean of three blood-pressure measurements at an office visit while the patient was seated and at least 5 minutes of quiet rest
- Conflict of interest
  - Chair of the SPRINT trail steering committee was the chair of the ACC/AHA guideline

N Engl J Med 2015; 373:2103-2116.
AAFP Press Release. December 12, 2017.

Accuracy of Blood Pressure Measurements

- ACC/AHA guideline highlights the importance of accurate blood pressure measurements
  - Clinic workflows can make proper measurement extremely difficult
  - Blood pressure measurements often occur after patients hurry into the clinic without time to rest, sit in loud waiting areas, are rushed back to a vital sign station, and nursing staff ask questions to complete mandatory screenings
- The opportunity to check a quiet, accurate blood pressure measurement is rare

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Keep a Look Out!

Yet to Make a Stance

- US Preventative Services Task Force (USPSTF) has not made a statement regarding the new guideline
- Uniform Data System (UDS) and Healthcare Effectiveness Data and Information Set (HEDIS) measures still follow JNC8
- ADA Standards of Care in Diabetes still follows JNC8

In Summary

- ACC/AHA recommends new staging for hypertension
- ACC/AHA lowers blood pressure goal to < 130/80 mmHg
- Primary literature comparing standard versus intensive blood pressure lowering provides mixed results on cardiovascular outcomes
  - SPRINT trial showcased significant benefit in lower blood pressure targets
- AAFP does not endorse the ACC/AHA guideline at this time
- Several key stakeholders have yet to weigh in on their stance of the ACC/AHA hypertension guideline

Question 1

According to the new ACC/AHA 2017 Hypertension guidelines, Stage 1 Hypertension is classified by which of the following blood pressure readings?

a. 120-129 mmHg SBP and < 80 mmHg DBP
b. 130-139 mmHg SBP or 80-89 mmHg DBP
c. ≥ 140 mmHg SBP or ≥ 90 mmHg DBP
d. ≥ 160 mmHg SBP or ≥ 100 mmHg DBP

Question 2

Both ACC/AHA 2017 and JNC8 hypertension guidelines recommend which medication as a first-line treatment option?

a. Chlorthalidone
b. Labetalol
c. Metoprolol
d. Spironolactone

Question 3

All of the following intensive vs. standard blood pressure target trials included patients with T2D except

a. ACCORD BP
b. ADVANCE BP
c. HOT
d. SPRINT

Question 4

One caution to consider with implementation of the ACC/AHA 2017 hypertension guideline is:

a. Increased number of cardiovascular events
b. Decreased number of cardiovascular events
c. Increased falls risk in the elderly
d. Decreased falls risk in the elderly

Question 5

Given the information you have learned about WR (BP was 150/92 mmHg, h/o diabetes, UACR 30-300), what do you recommend to help manage her blood pressure?

a. Amlodipine 5 mg daily
b. Lisinopril 10 mg daily
c. Metoprolol succ 25 mg daily
d. Spironolactone 25 mg daily

Follow Up – WR

- After starting lisinopril 10 mg daily, WR's BP was 142/82
  - Lisinopril was increased to 20 mg daily
- WR's BP was 128/82
  - Lisinopril was increased to 40 mg daily
- WR's BP is now 122/78
  - Chlorthalidone 25 mg daily
  - Lisinopril 40 mg daily