

Treatment of High Blood Pressure

1 Treatment of High Blood Pressure



Heart Health Now!
The North Carolina Cooperative for AHRQ's
EvidenceNOW
Advancing Heart Health in Primary Care

Treatment of High Blood Pressure

Funded by the Agency for Healthcare Research and Quality (AHRQ)
in the U.S. Department of Health & Human Services

 **UNC**
THE CECIL G. SHEPES CENTER
FOR HEALTH SERVICES RESEARCH

 **NCHQA**
North Carolina Healthcare Quality Alliance

 North Carolina
AHEC

 Community Care
of North Carolina

LENGTH: About 15 minutes

Updated on 12/15/2015

2 Welcome by Crystal Wiley Cené, MD, MPH




Welcome by Crystal Wiley Cené, MD, MPH

Assistant Professor in the Division of General Internal Medicine at the UNC School of Medicine

Hello. My name is Dr. Crystal Wiley Cené, and I'm a general internist at the UNC School of Medicine in the Division of General Internal Medicine. So, today I'm going to talk with you about the treatment of high blood pressure.

3 Objectives




- Review the importance of treating high BP
- Summarize current recommendations for treating BP (JNC8)
- Provide tips for overcoming clinical inertia
- Describe medication options and optimization for patients with high BP

Objectives

The objectives for our talk today are to review the importance of treating high blood pressure, to summarize the current recommendations based on the 8th Joint National Committee, to provide tips for overcoming clinical inertia, and to describe medication options and optimization for patients with high blood pressure.

4 Notes

Notes



- Builds on prior presentation about BP measurement
- Recommendations are predicated on good quality measurements of BP
- Recommendations are largely for **uncomplicated hypertension**, i.e., patients with **no co-morbidities**

So, this presentation will build on the prior presentation you heard about the blood pressure measurements. Recommendations are predicated on good quality measurements of blood pressure, and these recommendations apply largely to patients with uncomplicated hypertension; in other words, patients with no comorbidities.

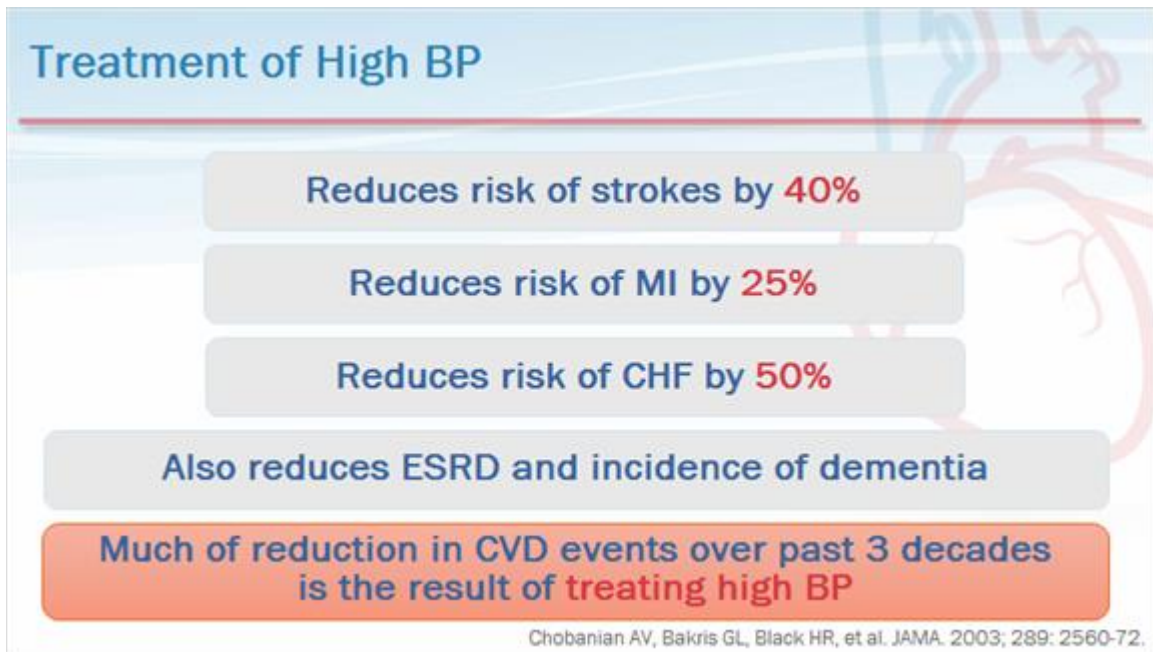
5 Patient J.M.

Patient J.M.

- 47 year-old African-American man with hypertension for past 6 years; initial BPs in the 160s/90s mmHg
- Has been on HCTZ 25-mg
- Office BP today 151/83 mmHg; repeated by MA near end of visit (using same device and good technique) 147/85 mmHg
- Tolerates HCTZ well and “takes it religiously”
- Normal kidney function; no other co-morbidities

So, let's start with a case. JM is a 47-year-old African American man with hypertension for the past six years. His initial blood pressures are in the 160s/90s range. He has been on hydrochlorothiazide 25 mg. His office blood pressure today was 151/83, and it was repeated by the medical assistant near the end of the visit using the same device and good technique, and it was 147/85. He's tolerating hydrochlorothiazide well, and he takes it religiously. He has normal kidney function and no other comorbidities.

6 Treatment of High BP



So, as we know, the treatment of high blood pressure reduces the risk of stroke by about 40 percent, the risk of myocardial infarction by 25 percent, the risk of congestive heart failure by 50 percent, and it also reduces end-stage renal disease, and the incidence of dementia. Overall, much of the reduction in cardiovascular disease events over the past three decades is the results of treating high blood pressure.

7 Lack of BP Control

Lack of BP Control

- Important public health problem
- Considerable morbidity and mortality
- Hypertension leading cause of premature death in developed countries

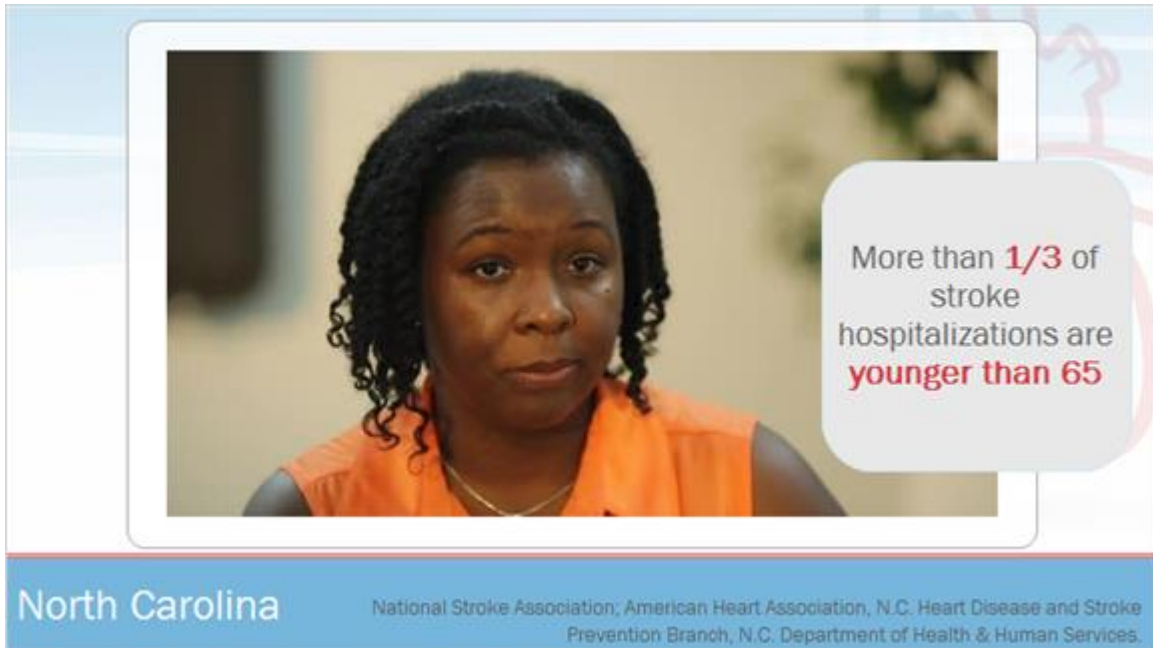


Lim SS, Vos T, Flaxman AD, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2013;380:2224-2260.

PROGRESS 25%

Lack of blood pressure control is an important health problem. It's associated with considerable morbidity and mortality, and hypertension is the leading cause of premature death in developed countries.

8 North Carolina

An infographic featuring a portrait of a Black woman with curly hair wearing an orange top. To her right is a grey callout box with text. Below the portrait is a blue banner with the text 'North Carolina' and a list of sources.

More than **1/3** of stroke hospitalizations are **younger than 65**

North Carolina National Stroke Association; American Heart Association, N.C. Heart Disease and Stroke Prevention Branch, N.C. Department of Health & Human Services.

In North Carolina, specifically, every 20 minutes someone is hospitalized with a stroke, and every two hours someone dies from a stroke. North Carolina has one of the highest stroke death rates in the nation. It's sixth-highest among the 50 states. The age-adjusted stroke rate in North Carolina is 57 per 100,000 which is 23 percent higher than the U.S. rate. More than one-third of all stroke hospitalizations in North Carolina occur in people who are younger than 65.

9 Even in Mild Hypertension, It Matters

And even in mild hypertension, it matters


- Systematic review of RCTs of 15,266 patients free from CVD with BPs 140-159/90-99 mmHg
- 5 years of follow-up:
 - OR 0.86 (95% CI 0.74-1.01) for total CVD events
 - OR 0.72 (95% CI 0.55-0.94) for strokes
 - OR 0.75 (95% CI 0.57-0.98) for CV deaths
 - OR 0.78 (95% CI 0.67-0.92) for total deaths
- **BP lowering therapy prevents stroke and deaths in patients with uncomplicated mild hypertension**

Sundstrom et al. Effects of blood pressure reduction in mild hypertension: a systematic review and meta-analysis. *Ann Intern Med* 2015;162:184-191.

And even in mild hypertension, treatment matters. A recent systematic review of randomized clinical trials of over 15,000 patients who were free from cardiovascular disease at baseline with blood pressures in the mild hypertension range evaluated the effects of blood pressure reduction on outcomes. Patients in these trials who were either started on treatment, or had a more intensive blood pressure regimen (i.e. active treatment group) were compared to a control group of patients who were either not on medications, or on less-intensive blood pressure regimens. And you can see here that for patients in the active treatment group, the risk of total cardiovascular events was reduced by 14 percent, the risk of strokes by 28 percent, cardiovascular deaths by 25 percent, and total deaths by 22 percent at five years of follow up. So, blood pressure lowering therapy prevents stroke and death in patients with uncomplicated mild hypertension.

10 Summarizing JNC8

Summarizing JNC8




1. Goal BP <140/90 mmHg
2. Thiazide, CCB, ACEI or ARB all acceptable first-line, with thiazide or CCB initially favored for Black population
 - Co-morbid CKD → ACEI or ARB

See the "Special Communication" PDF in the Attachments tab

James PA, Oparil S, Carter BL, et al; 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults. Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). JAMA. 2014;311(5):507-520.

So, now to summarize recommendations from the JNC8: for most patients, the goal blood pressure is less than 140/90. Thiazide diuretics, calcium channel blockers, ACE inhibitors, or angiotensin receptor blockers are all acceptable for first-line therapies, with thiazide or calcium channel blockers initially favored for black populations. For those with comorbid chronic kidney disease, ACE inhibitors, or angiotensin receptor blockers are acceptable first-line therapies.

11 Most Un-controlled BP




Clinical inertia =
clinicians not
initiating or
intensifying
antihypertensive
therapy despite
elevated BP levels

Most Un-controlled BP

And most patients have uncontrolled blood pressure that is in the range of 140-160 systolic. So, it's important to note that this is not among patients with poor access to care, but among those who have a usual source of care and who make regular clinic visits. In other words, these are our patients: my patients, and your patients. Suboptimal therapy is an important modifiable factor. Clinical inertia, which refers to clinicians either not initiating or intensifying antihypertensive therapy despite elevated blood pressure levels is an important contributor to uncontrolled blood pressure.

12 Reasons Clinicians Don't Intensify Rx



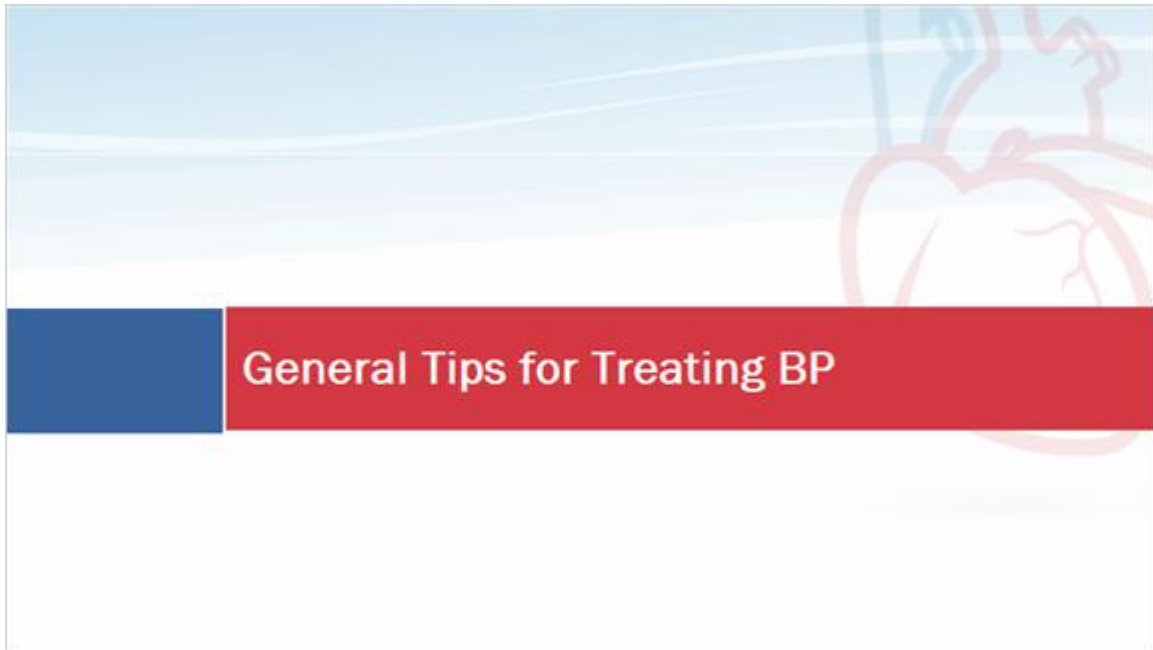
▪ BP goal has almost been reached

- Knowing there is variation, *"close enough"* is accepted

Reasons Clinicians Don't Intensify Rx

So, what are some of the reasons that clinicians don't intensify therapy? Well, they're uncertain about the patient's adherence. There are other pressing issues during the visit that need to be addressed. They're hesitant to want to add another medication. It's very tempting to explain the elevated blood pressure away, for example, patients come in and they're in pain, or they're under a lot of stress. White-coat phenomenon is very real even in patients with established hypertension we see this. And patients often say, "Well, my blood pressure was good when I checked it at Wal-Mart, or CVS, or even when I checked it at home." And blood pressure goal has almost been reached. So, knowing that there is variation, it's very tempting to accept close enough as a reason for not intensifying therapy.

13 General Tips for Treating BP



So, in the next few slides, I'm going to give some general tips for treating blood pressure.

14 Medication-related

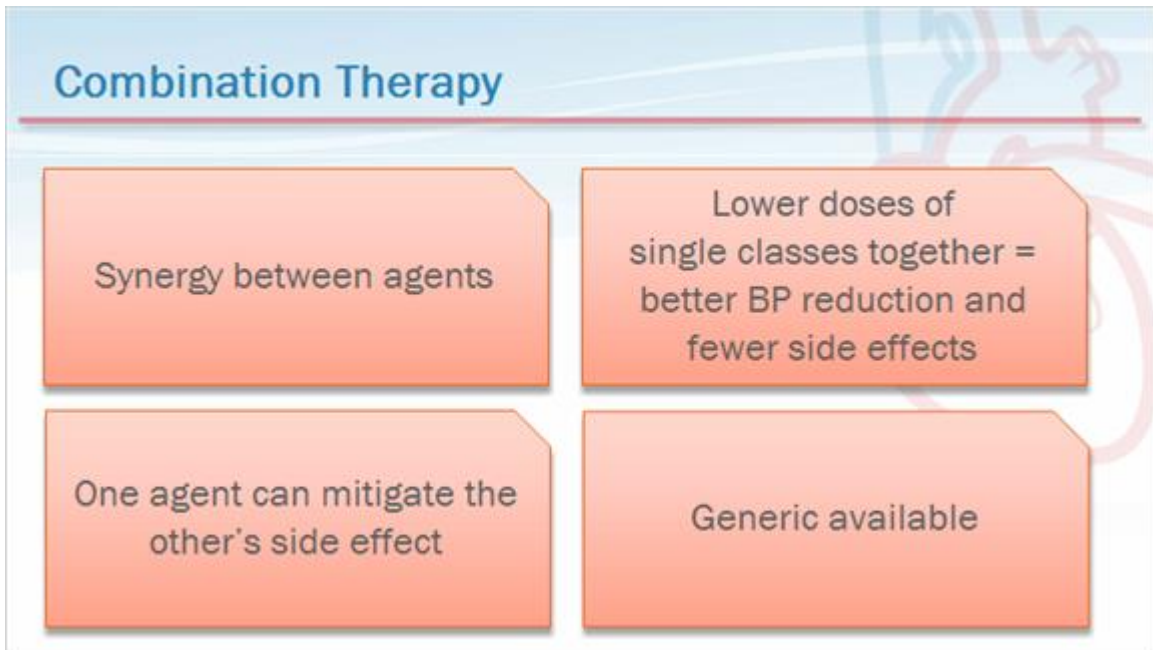
Medication-related

- Explain importance of medication
 - Prevent heart attacks and strokes, not just lower BP
- Explain potential or expected side effects
 - Many are transient
- Explain most patients need more than one medication
 - Work toward (or start out with) combination therapy
- Keep meds at lowest cost to patient

PROGRESS 50%

It's important to explain the importance of the medication, that it's not just for lowering blood pressure but, ultimately, that lowering blood pressure will prevent heart attacks and strokes. It's important to explain the potential and expected side effects many of which are transient. Explain to patients that most of them will need more than one medication; and work towards, or start out with, combination therapy, and keep medications at the lowest cost to the patient.

15 Combination Therapy



More on combination therapy. We know that there is synergy between agents. Lower doses of single classes taken together can result in better blood pressure reduction and fewer side effects. And one agent can mitigate the side effects of another. And there are generic combination medications available.

16 Competing Demands and Prioritization



Competing Demands and Prioritization

So, it's important to make blood pressure a priority. Highlight it, and address it. Bring patients back to the clinic for blood pressure checks and titration visits. And we know that you're busy, so this does not need to be a full clinic visit. But after you see the patient in the office for a blood pressure check, follow up with a phone call or an email.

17 Lifestyle Recommendations –

Lifestyle Recommendations – Think About Directing to Another Resource to Support

Recommendation	Approximate BP Lowering
Weight loss if overweight	5-20 mmHg
Dietary Approaches to Stop Hypertension (DASH) eating plan	8-14 mmHg
Low dietary sodium	2-8 mmHg
Alcohol moderation*	2-4 mmHg
Exercise	4-9 mmHg


*No more than one ounce or 30mL ethanol/day for women and no more than two ounces (60 mL)/day for men

It's also important to remember that lifestyle modifications can help to support lowering blood pressure. So, for example, weight loss if the patient is overweight, has been associated with a blood pressure lowering of about 5-20 millimeters of mercury, the DASH diet is associated with a blood pressure lowering of 8-14 millimeters of mercury, a low-sodium diet of 2-8 millimeters of mercury, alcohol in moderation is associated with the blood pressure lowering of 2-4 millimeters of mercury, and exercise can lower blood pressure by 4-9 millimeters of mercury.

18 Prescribing Pearls

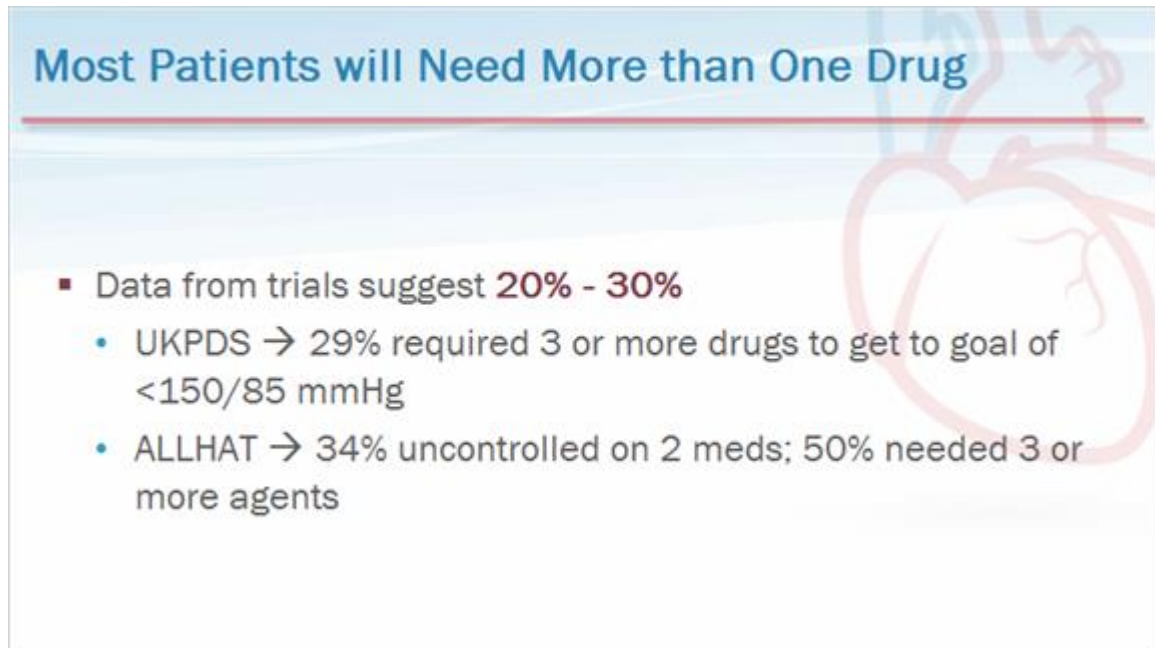
Prescribing Pearls

- sBP 140-160 mmHg → start with single agent
- sBP > 160 mmHg → start with two drugs, ideally planning to work toward single pill
 - Dihydropyridine CCB or thiazide-type diuretic + ACEI or ARB
- Do **NOT** use ACEI and ARB together
- Note that β -blockers are *not* a recommended agent among the first three medications for uncomplicated hypertension
- If not at goal after two to four weeks, increase dose or add another agent



So, here are a few prescribing pearls. When the systolic blood pressure is 140/160, start with a single agent. If it's greater than 160, start with two drugs, ideally, with a plan to move towards a single pill: dihydropyridine, calcium channel blockers, or a thiazide-type diuretic, plus an ACE inhibitor, or ARB. But do not use an ACE inhibitor or ARB together. And note that Beta blockers are not a recommended agent among the first three medications for uncomplicated hypertension. And if the patient is not at goal after two to four weeks, increase the dose, or add another medication.

19 Most Patients will Need More than One Drug

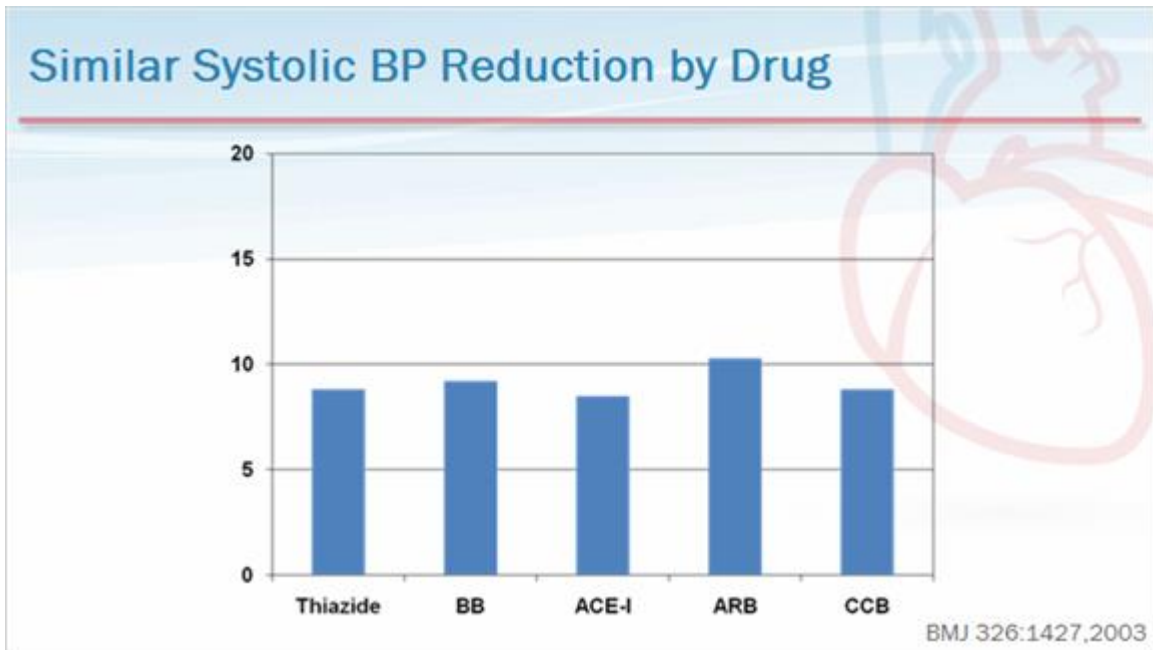


Most Patients will Need More than One Drug

- Data from trials suggest **20% - 30%**
 - UKPDS → 29% required 3 or more drugs to get to goal of <150/85 mmHg
 - ALLHAT → 34% uncontrolled on 2 meds; 50% needed 3 or more agents

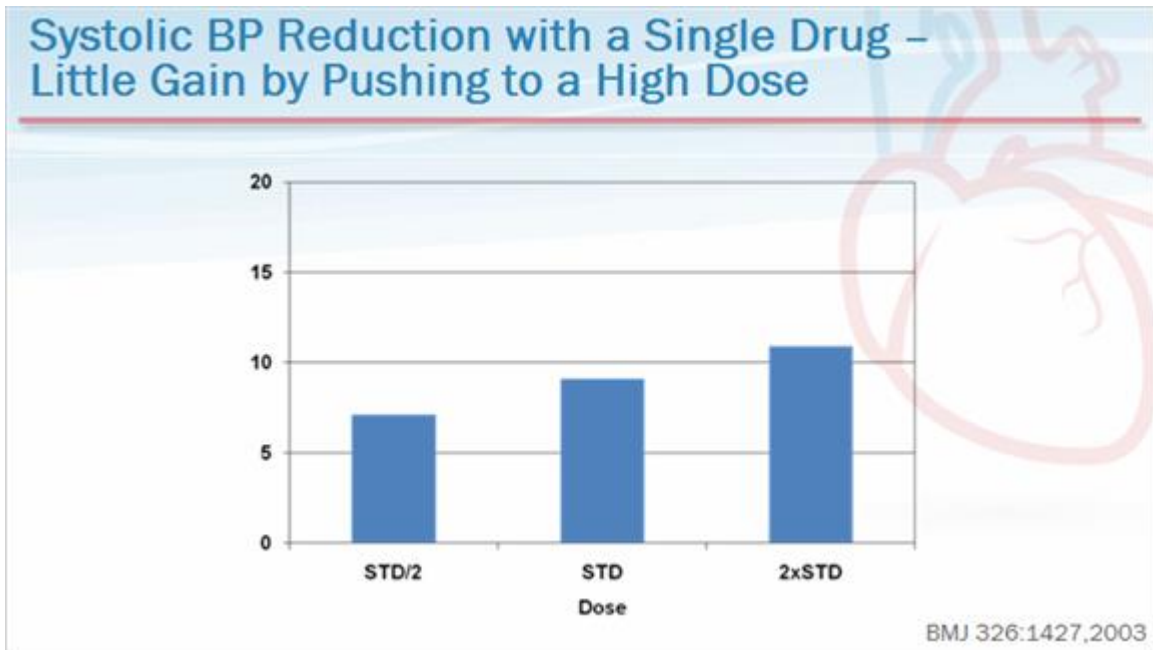
Because most patients will need more than one drug. Data from clinical trials suggest that 20-30 percent of patients will need more than one drug. The U.K. PDS study found that 29-percent of patients require three or more drugs to get to a goal blood pressure of less than 150/85 mmHg, and the ALLHAT study showed that 34 percent of uncontrolled patients were on two drugs, and 50 percent needed three or more agents.

20 Similar Systolic BP Reduction by Drug



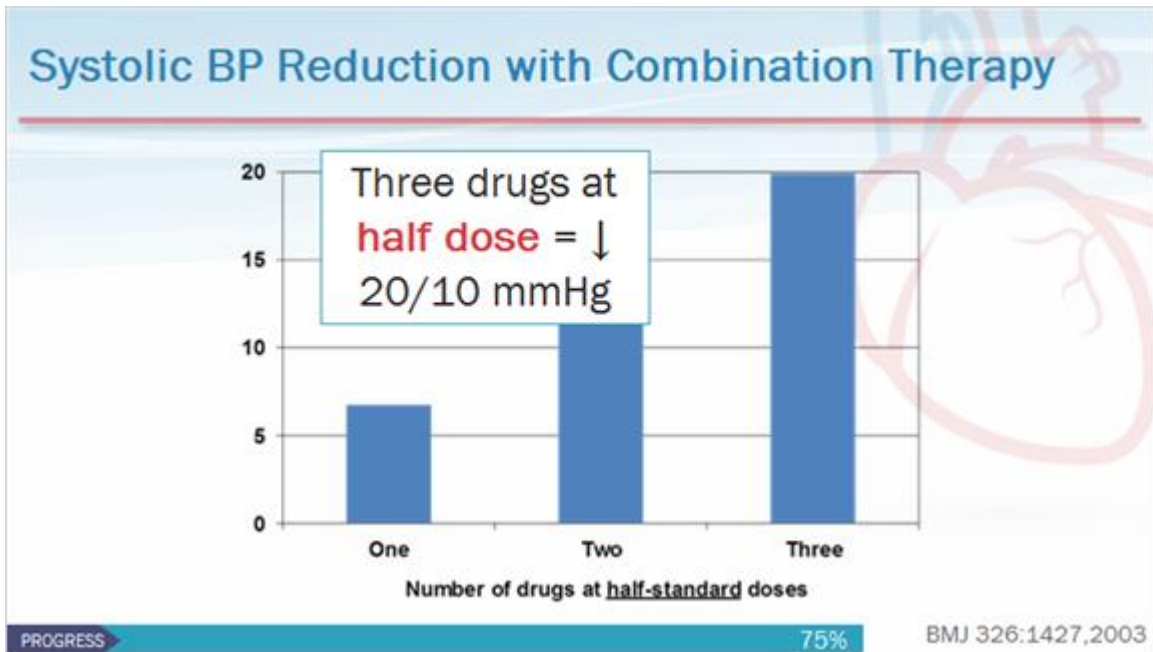
And we see similar systolic blood pressure reduction by the different blood pressure drug classes including thiazides, Beta blockers, ACE inhibitors, angiotensin receptor blockers, and calcium channel blockers.

21 Systolic BP Reduction with a Single Drug –



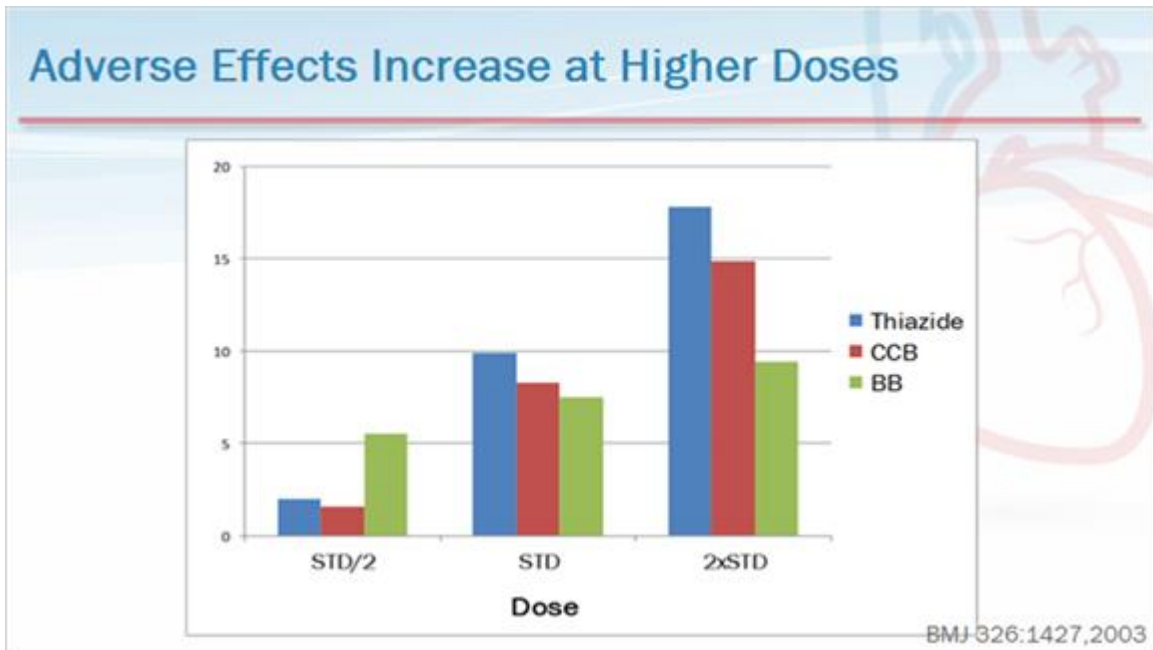
This slide depicts that there is little additional benefit in systolic blood pressure reduction by using twice the standard dose of a single medication compared to using the standard dose.

22 Systolic BP Reduction with Combination Therapy



However, combination therapy with three drugs at half the dose can result in a decrease in blood pressure by about 20/10mmHg.

23 Adverse Effects Increase at Higher Doses



And it's important to note that there are higher percentage of adverse events as we increase the dose of medications for each of these classes: Thiazides, calcium channel blockers, and Beta blockers.

24 Favor Chlorthalidone Over HCTZ



- Generic and low-cost
- Downside is lack of availability in good combo pill
- If doing well on HCTZ, no need to change

Favor Chlorthalidone Over HCTZ

See [References](#).

So, why do we favor chlorthalidone over hydrochlorothiazide? Well, chlorthalidone is the agent that has been used in most of the major clinical trials. It's about twice as potent and longer lasting than HCTZ. For example, 25 mg of chlorthalidone is equivalent to about 50 mg of hydrochlorothiazide. It's generic, and a low cost to the patient. The downside, however, is that it's not available in good combination pills. And if the patient is doing well on hydrochlorothiazide, there's no need to change.

25 References

ALLHAT. JAMA. 2002;288:2981-2997.

SHEP. JAMA. 1991;265:3255-3264.

Ernst ME, Carter BL, Goerd CJ, et al. Comparative antihypertensive effects of hydrochlorothiazide and chlorthalidone on ambulatory and office blood pressure. Hypertension. 2006;47:352-358.

Carter BL, Ernst ME, Cohen JD. Hydrochlorothiazide versus chlorthalidone: evidence supporting their interchangeability. Hypertension. 2004;43(1):4-9.

Ernst ME, Neaton JD, Grimm RH, et al. Long-term effects of chlorthalidone versus hydrochlorothiazide on electrocardiographic left ventricular hypertrophy in the Multiple Risk Factor Intervention Trial. Hypertension. 2011;58:1001-1007.

Dorsch MP, Gillespie BW, Erickson SR, Bleske BE, Weder AB. Chlorthalidone reduces cardiovascular events compared with hydrochlorothiazide: a retrospective cohort analysis. Hypertension. 2011;57:689-694.

26 Fourth (and fifth) Agents

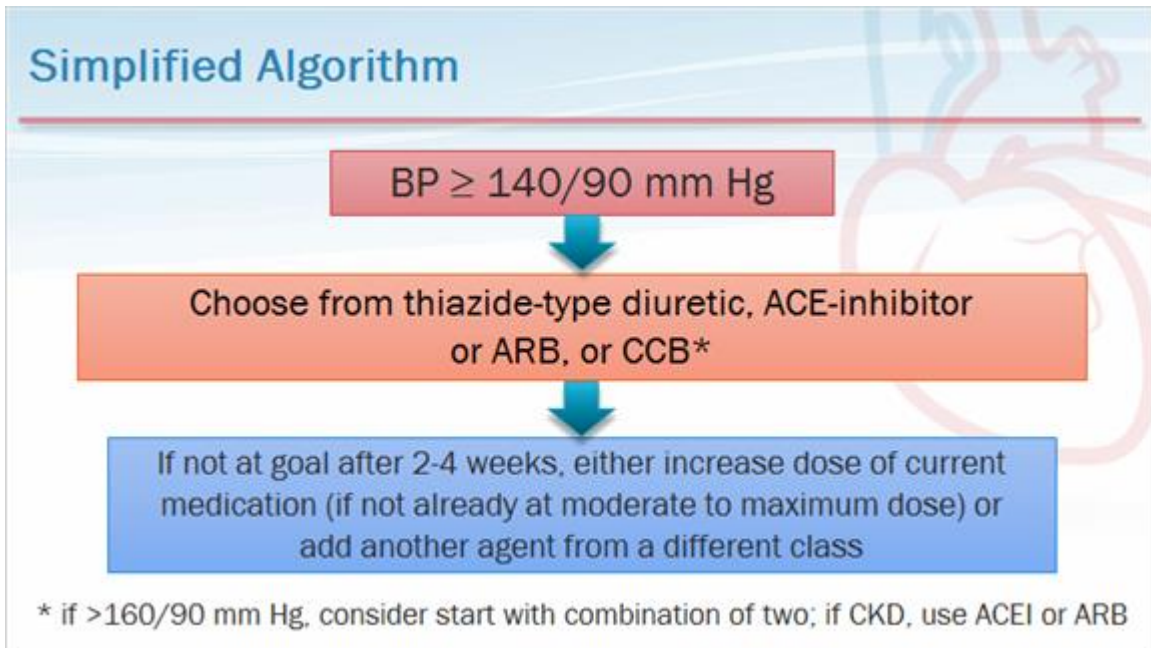
Fourth (and Fifth) Agents

- β -blocker
- Spironolactone
- Hydralazine



Beta blockers, spironolactone, and hydralazine are typically fourth- and fifth-line agents.

27 Simplified Algorithm



So, here's our algorithm that we suggest. Blood pressure, if it's greater than 140/90, choose from a thiazide-type diuretic, an ACE inhibitor, or an ARB, or a calcium channel blocker. And if the patient is not at goal after two-to-four weeks, either increase the dose of the current medication if they're not already at the moderate or maximum dose, or add another agent from a different class.

28 Patient J.M.

Patient J.M.

- 47 year-old African-American man with hypertension for past 6 years; initial BPs in the 160s/90s mmHg
- Has been on HCTZ 25-mg
- Office BP today 151/83 mmHg; repeated by MA near end of visit (using same device and good technique) 147/85 mmHg
- Tolerates HCTZ well and *“takes it religiously”*
- Normal kidney function; no other co-morbidities

So, now, let's revisit our case. As you recall, JM was a 47-year-old African American man with hypertension for the past six years. His initial blood pressure was in the 160s/90s range. He'd been on HCTZ 25 mg. His office blood pressure today was 151/83, and it was 147/85 after it was repeated using good technique. He tolerates hydrochlorothiazide well, and he takes it religiously. He has normal kidney function, and no other comorbidity.

29 Patient J.M.: One Way to Approach

Patient J.M.: One Way to Approach

- Explain that he is not at goal BP and it is important to get his BP down to reduce chances of heart attack and stroke
- Add ACEI (e.g., lisinopril) starting at 10mg
- Follow-up in clinic in two weeks for BP check and labs
- Once lisinopril at dose that has BP at goal, can change to single combination pill HCTZ/lisinopril to help with adherence

So, one approach to addressing his elevated blood pressure is to explain that he's not at goal and that it is important to get his blood pressure down to reduce the chances of heart attack and stroke. You could add an ACE inhibitor, for example, lisinopril, starting at 10 mg, follow him up in clinic in two weeks for blood pressure check and lab. Once the lisinopril is at a dose that has his blood pressure at goal, you can change to a single combination pill of HCTZ-Lisinopril to help with adherence.

30 Getting your Patient's BP Down is a Success

Getting your Patient's BP Down is a Success



- Even if not necessarily below 140/90 mmHg
- For every 500 patients treated:

7 strokes prevented
5 heart attacks prevented
4 premature deaths prevented

And it's important to remember that getting your patient's blood pressure down is a success even if it's not necessarily below 140/90. For every 500 patients treated, we can prevent seven strokes, five heart attacks, and four premature deaths.

31 Summary



- First three medications for most: thiazide-type diuretic, ACEI or ARB, and CCB

Summary

So, in summary, getting the patient's blood pressure under control is one of the most important clinical services we can provide. The goal blood pressure for most is less than 140/90. Most patients need more than one medication, so, be aggressive and avoid clinical inertia. And the first three medications for most patients are going to be a thiazide diuretic, an ACE inhibitor, or an angiotensin receptor blocker and a calcium channel blocker. So, we are here to partner with you, and we know that together we can lower your patients' blood pressure, and reduce their risk of hypertension-related mortality and morbidity. So, thank you very much for viewing this Webinar.

32 Congratulations

Congratulations on Completing the Module

Click *Exit* at top right of screen

Please review the attachments and begin the next course.

33 The Evidence Team

The Evidence Team

Weeranun Bode, MD

Assistant Professor, Division of Cardiology, UNC – Chapel Hill

Crystal Wiley Cené, MD, MPH

Assistant Professor, Division of General Internal Medicine, UNC – Chapel Hill

Sam Cykert, MD

Professor, Division of General Internal Medicine and Director, Program on Health and Clinical Informatics, UNC – Chapel Hill; Associate Director for Medical Education, NC AHEC Program

Adam Goldstein, MD, MPH

Professor, Department of Family Medicine and Director of Tobacco Intervention Programs, UNC - Chapel Hill

34 The Evidence Team

The Evidence Team

Jacque Halladay, MD, MPH

Associate Professor, Department of Family Medicine, UNC – Chapel Hill

Michael Pignone, MD, MPH

*Professor of Medicine and Chief, UNC Division of General Internal Medicine
Director, UNC Institute for Healthcare Quality Improvement*

Carol Ripley-Moffitt, MDiv, CTTS

Director, Nicotine Dependence Program, UNC Department of Family Medicine

Stacey Sheridan, MD, MPH

Associate Professor, Division of General Internal Medicine, UNC – Chapel Hill

Anthony Viera, MD, MPH

*Associate Professor, Department of Family Medicine
Director, Hypertension Research Program, UNC – Chapel Hill*