

Management of Hypertension: Update 2020

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**...and I have no
disclosures**



Hot topics in hypertension, 2020

1. Whose guidelines are the most relevant to primary care practice? Should we change our target?
2. Should we aim for a "quiet room?"
3. What is the role of lifestyle changes?
4. What is the role of home monitoring?
5. One drug or two? Does it matter?
6. Should we treat older patients differently?
7. Should BP medications be given before bed?

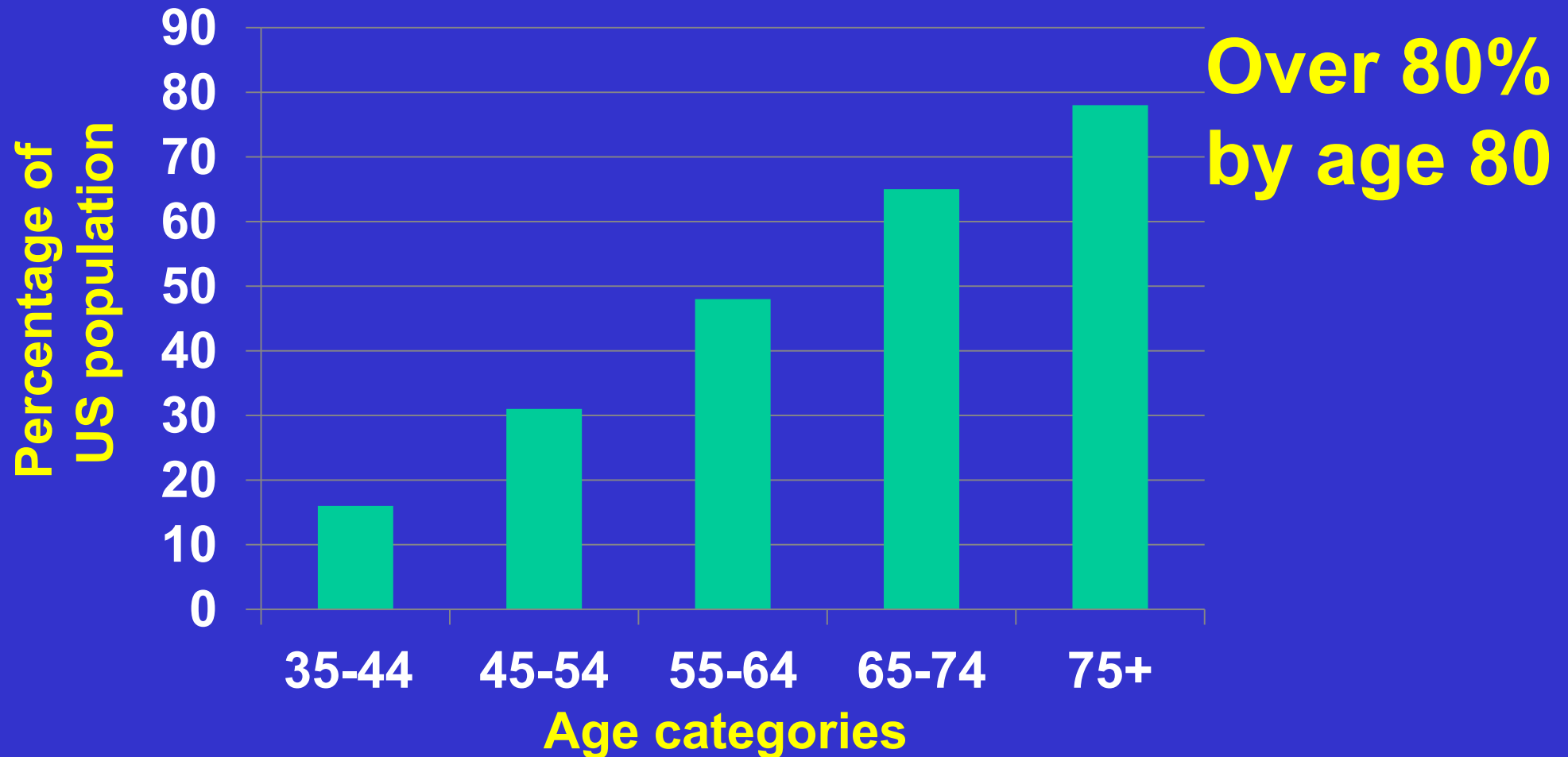


Hot topics in hypertension, 2020

1. Whose guidelines are the most relevant to primary care practice? Is lower better? Is it time to change our targets?
2. Should we redesign our offices to find a “quiet room?”
3. What is the role of 24 hour BP devices?
4. What is our “lifestyle” message?
5. One drug, two drugs...what drugs are best, or does it matter anyway?
6. Should we treat older patients differently?
7. Should BP medications be given before bed?

Are most of us are headed toward hypertension?

The prevalence of HTN (>140/90):



Whose guidelines are the most relevant to primary care practice?



Special Communication

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)

Paul A. James, MD; Suzanne Oparil, MD; Barry L. Carter, PharmD; William C.ushman, MD; Cheryl Dennison-Himmelfarb, RN, ANP, PhD; Joel Handler, MD; Daniel T. Lackland, DrPH; Michael L. LeFevre, MD, MSPH; Thomas D. MacKenzie, MD, MSPH; Olugbenga Ogedegbe, MD, MPH, MS; Sidney C. Smith Jr, MD; Laura P. Svetkey, MD, MHS; Sandra J. Taler, MD; Raymond R. Townsend, MD; Jackson T. Wright Jr, MD, PhD; Andrew S. Narva, MD; Eduardo Ortiz, MD, MPH

JNC 8 < 150/90

CLINICAL GUIDELINE



Pharmacologic Treatment of Hypertension in Adults Aged 60 Years or Older to Higher Versus Lower Blood Pressure Targets: A Clinical Practice Guideline From the American College of Physicians and the American Academy of Family Physicians

Amir Qaseem, MD, PhD, MHA; Timothy J. Wilt, MD, MPH; Robert Rich, MD; Linda L. Humphrey, MD, MPH; Jennifer Frost, MD; and Mary Ann Forciea, MD; for the Clinical Guidelines Committee of the American College of Physicians and the Commission on Health of the Public and Science of the American Academy of Family Physicians*

ACP/AAFP < 150/XX



Cochrane < 140/90

What is the target BP for your patients? The many opinions...

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VOL. 71, NO. 19, 2018

CLINICAL PRACTICE GUIDELINE

Systematic Review for the 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

A Report of the American College of Cardiology/American Heart Association
Task Force on Clinical Practice Guidelines

ACC/AHA < 130/80

American College of Cardiologists/ American Heart Association, 2018

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Task Force on Clinical Practice Guidelines

The competing guidelines: JNC 7/8, ACC/AHA, ESC/ESH

Systolic		Diastolic	JNC 7	ACC/AHA	ESC/ESH
<120	and	< 80	Normal	Normal	Optimal
120-129	and	<80	Pre HTN	Elevated	Normal
	and/or	80-84		Stage 1 HTN	
		85-89			High Normal
130-139	and/or	85-89	Stage 1 HTN	Stage 2 HTN	Grade 1 HTN
140-159	and/or	90-99			Grade 2 HTN
≥ 160-179	and/or	≥ 100-109			Grade 3 HTN
≥ 180	and/or	≥ 110			

ACC/AHA: 2018 guidelines

Table 23. BP Thresholds for and Goals of Pharmacological Therapy in Patients With Hypertension According to Clinical Conditions

Clinical Condition(s)	BP Threshold, mm Hg	BP Goal, mm Hg
General		
Clinical CVD or 10-year ASCVD risk $\geq 10\%$	$\geq 130/80$	$< 130/80$
No clinical CVD and 10-year ASCVD risk $< 10\%$	$\geq 140/90$	$< 130/80$
Older persons (≥ 65 years of age; noninstitutionalized, ambulatory, community-living adults)	≥ 130 (SBP)	< 130 (SBP)
Specific comorbidities		
Diabetes mellitus	$\geq 130/80$	$< 130/80$
Chronic kidney disease	$\geq 130/80$	$< 130/80$
Chronic kidney disease after renal transplantation	$\geq 130/80$	$< 130/80$
Heart failure	$\geq 130/80$	$< 130/80$
Stable ischemic heart disease	$\geq 130/80$	$< 130/80$
Secondary stroke prevention	$\geq 140/90$	$< 130/80$
Secondary stroke prevention (lacunar)	$\geq 130/80$	$< 130/80$
Peripheral arterial disease	$\geq 130/80$	$< 130/80$

ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.

ACC/AHA: 2018 guidelines

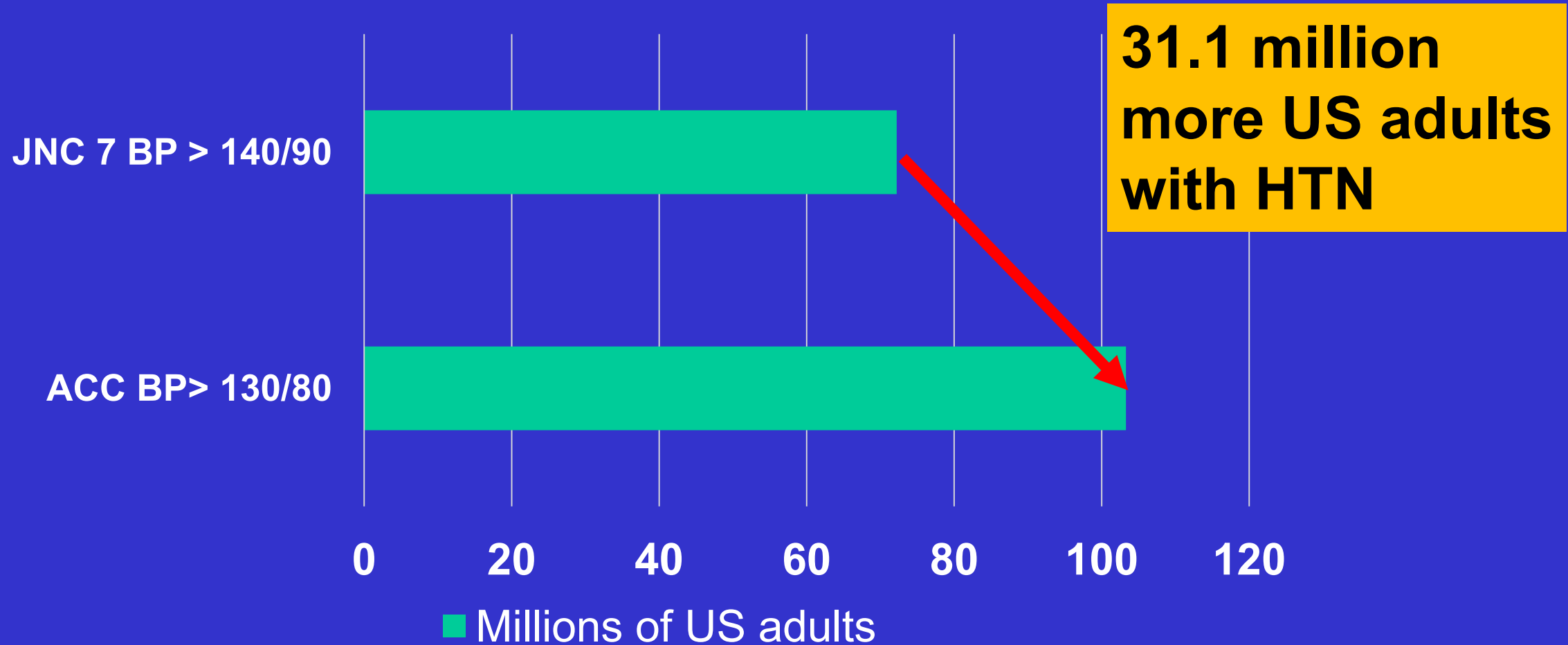
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General		
Clinical CVD or 10-year ASCVD risk $\geq 10\%$	$\geq 130/80$	$< 130/80$
No clinical CVD or 10-year ASCVD risk $< 10\%$	$\geq 140/90$	$< 130/80$
Older persons or persons with ambulatory hypertension	≥ 130 (SBP)	< 130 (SBP)
Specific comorbidities		
Diabetes	$\geq 130/80$	$< 130/80$
Chronic kidney disease	$\geq 130/80$	$< 130/80$
Chronic kidney disease with albuminuria	$\geq 130/80$	$< 130/80$
Heart failure	$\geq 130/80$	$< 130/80$
Stable ischemic heart disease	$\geq 130/80$	$< 130/80$
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ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.

**Target $< 130/80$
except for
low ASCVD risk**

What happens to the prevalence of HTN with the ACC definition?



SPRINT (Systolic Blood Pressure Intervention Trial), 2015

The NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

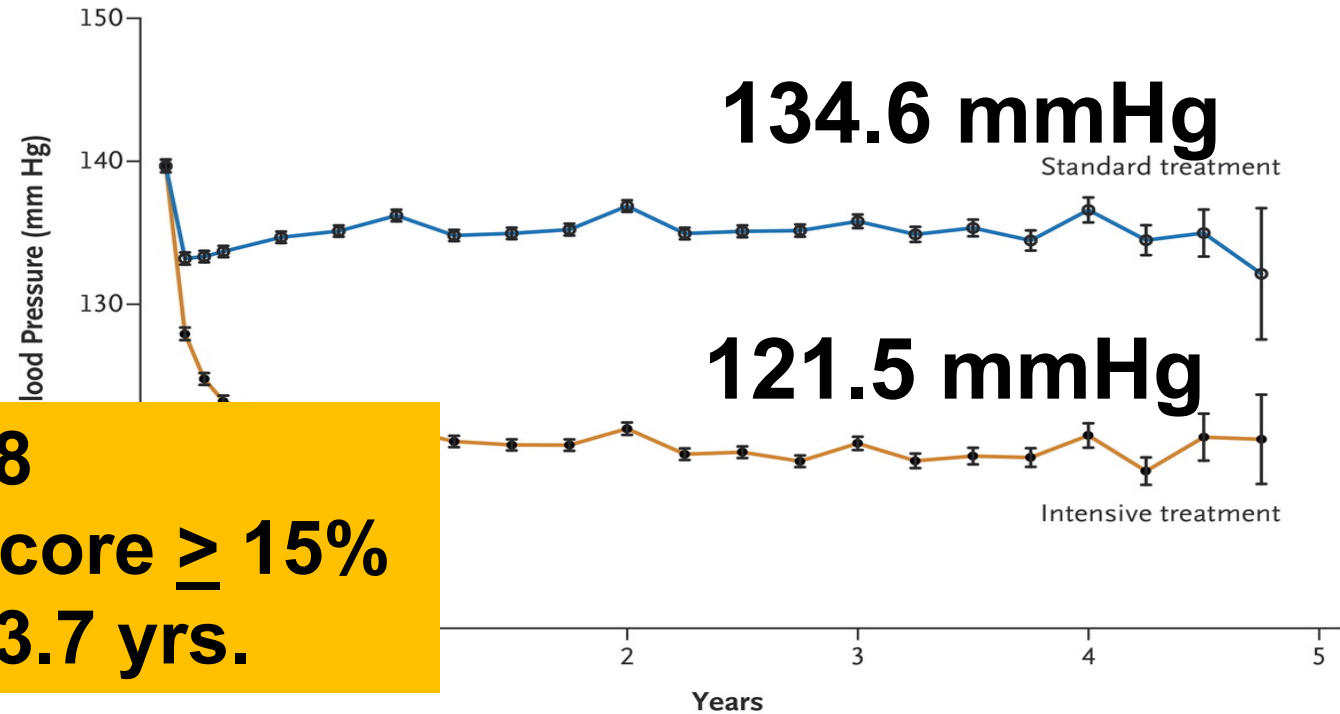
NOVEMBER 26, 2015

VOL. 373 NO. 22

A Randomized Trial of Intensive versus
Standard Blood-Pressure Control

The SPRINT Research Group*

Systolic Blood Pressure in the two treatment groups over the course of the SPRINT trial



Average age 68
Framingham score $\geq 15\%$
Terminated at 3.7 yrs.

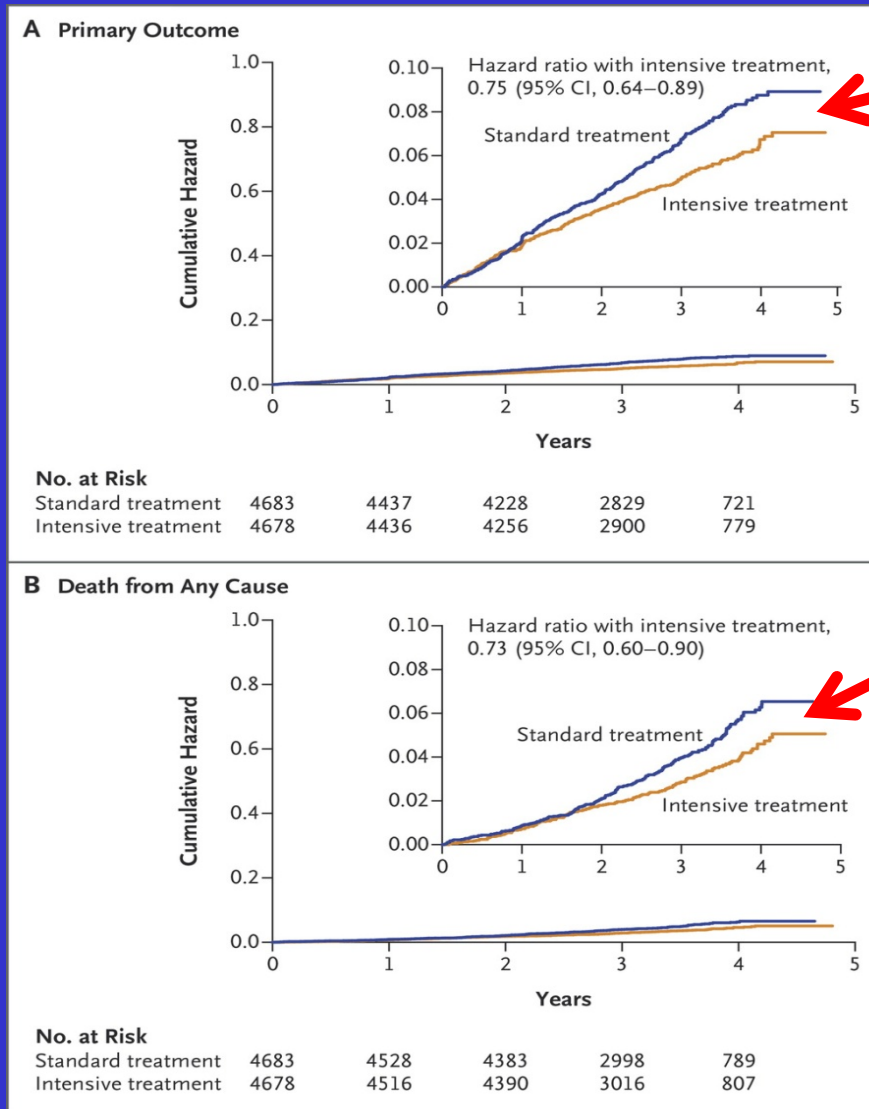
No. with Data

Standard treatment	4683	4345	4222	4092	3997	3904	3115	1974	1000	274
Intensive treatment	4678	4375	4231	4091	4029	3920	3204	2035	1048	286

Mean No. of Medications

Standard treatment	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Intensive treatment	2.3	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0

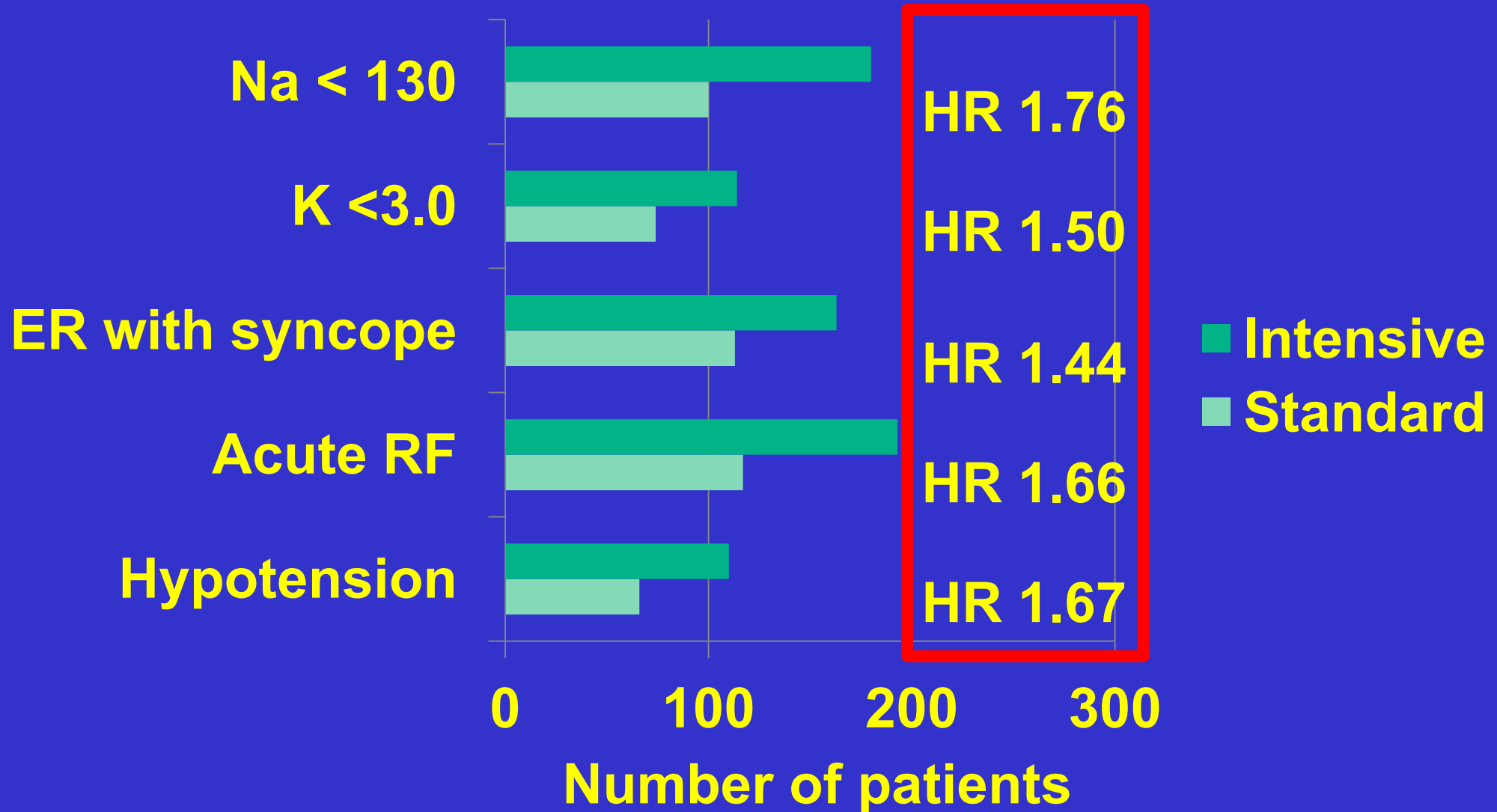
Primary Outcome from SPRINT Trial



25% reduction in composite outcome, MI, ACS, CVA, HF, mortality

27 % reduction in all cause mortality

What was the added patient burden of SPRINT?



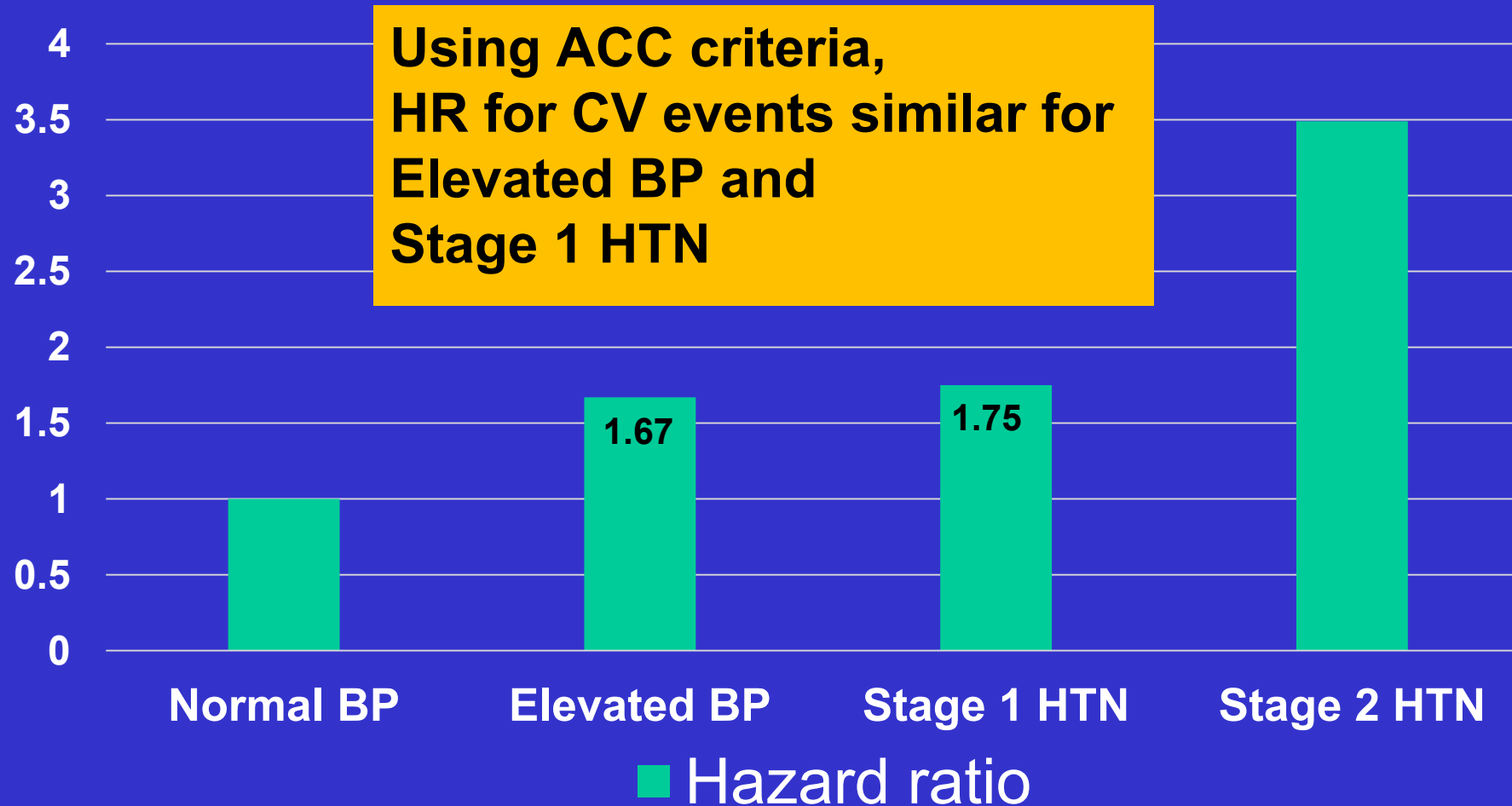
Intensive systolic BP control increased CKD but reduced the CV event/composite death

	CKD event	CV event or composite death
Standard blood pressure control	1.0%	7.1%
Intense blood pressure control	3.7%	4.9%

“...for patients thought to benefit in terms of CVD prevention, fear of AKI should not preclude an intensive BP-lowering strategy.”

There are long term consequences of early life high blood pressure

(CARDIA N = 4851, age 35.7, followed 18.8 years)



BP targets for Type 2 DM patients are higher

Study design (ACCORD, 2010):

US and Canada, 77 sites

RCT

4733 patients

Randomized to

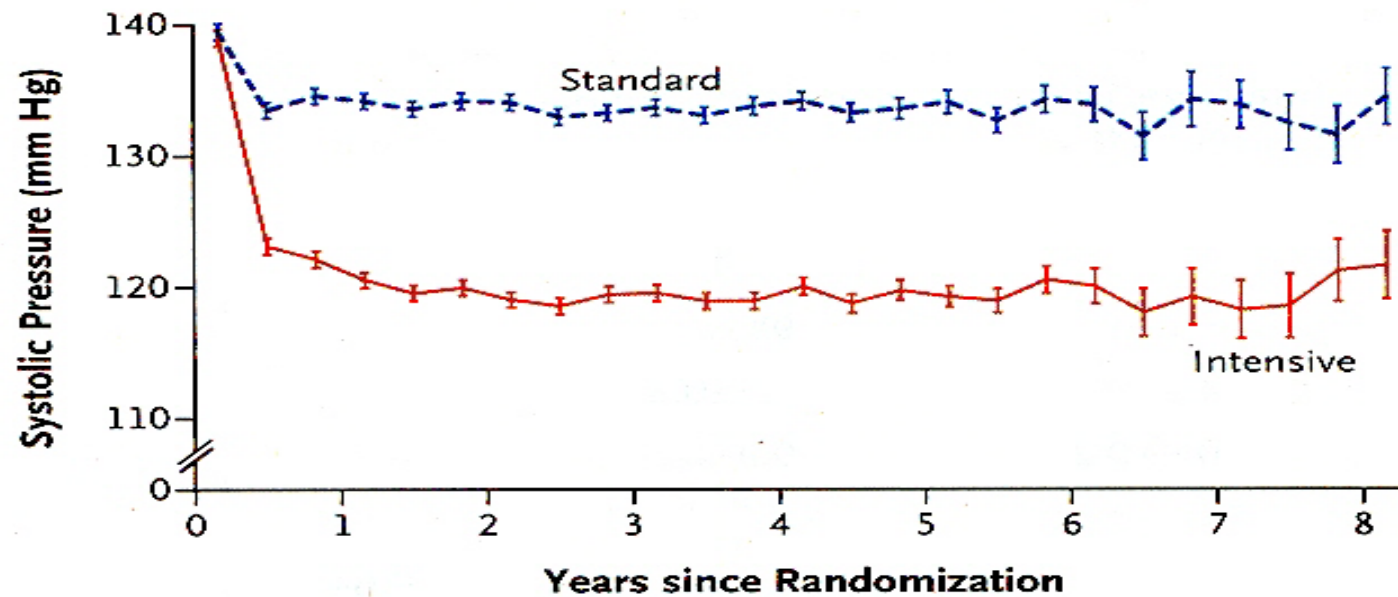
Intensive control, SBP < 120 mm Hg

Standard control, SBP < 140 mm Hg

4.7 year follow up

BP targets for Type 2 DM

ACCORD outcomes, SBPs



Mean No. of Medications Prescribed

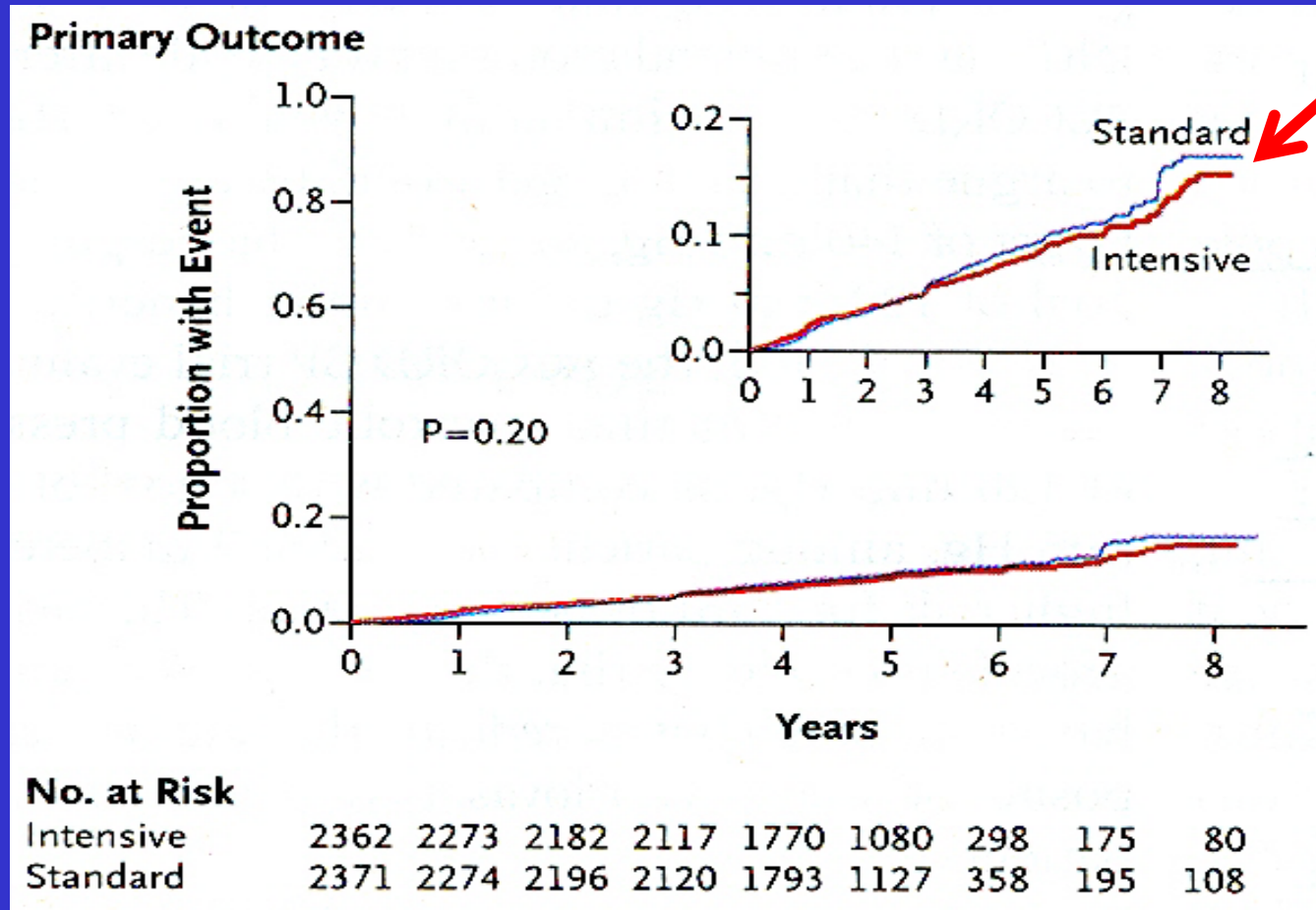
Intensive	3.2	3.4	3.4	3.5	3.5	3.5	3.4	3.4
Standard	1.9	2.1	2.1	2.2	2.2	2.3	2.3	2.3

No. of Patients

Intensive	2174	2071	1973	1792	1150	445	156	156
Standard	2208	2136	2077	1860	1241	504	203	201

BP targets for Type 2 DM

ACCORD primary outcomes



**No benefit
from
intensive
therapy**

BP targets for Type 2 DM

ACCORD patient outcomes, % per year

	Intensive	Standard	P value
Primary*	1.87	2.09	NS

Adverse events

<u>Attributable to tx**</u>	<u>3.3</u>	<u>1.27</u>	<u><0.001</u>
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*Non fatal MI, non fatal CVA, CV death

**Hypotension, syncope, bradycardia, hyperkalemia, angioedema, CKD

Setting goals for BP control:

A work in progress

- ☐ **For most adults, focus on office BP goal of $<135/85$ and**
 - If possible, work this down to $\leq 130/80$**
 - May need more medication...**
 - May be ideal for DM**
- ☐ **Consider a target of $<130/80$**
 - Younger**
 - May mean medications...**

Are your BP readings accurate?



ACC/AHA BP checklist for your office

Step 1: Proper position	-No caffeine, exercise, smoking for > 30 minutes -Bladder empty -Seated, relaxed, arm supported for > 5 minutes. No talking. -No clothing under the cuff
Step 2: Proper technique	-Cuff 80% -Cuff at mid sternum
Step 3: Proper measurements	-Check both arms, follow higher arm -Initially palpate systolic, inflate 20–30 mm Hg above, deflate 2 mm Hg per second
Step 4: Documentation	-Auscultatory: First and last Korotkoff sounds
Step 5: Averaging	-Average ≥ 2 readings obtained on ≥ 2 occasions -Note times
Step 6: Patient education	-Provide patient with readings

ACC/AHA BP checklist for your office

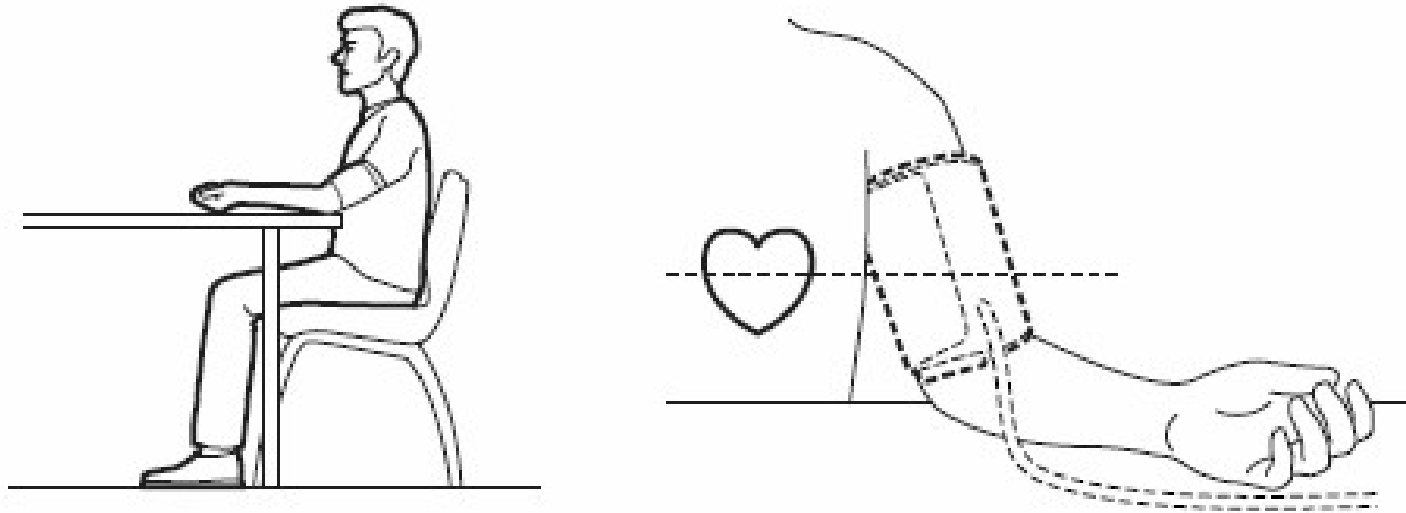
Step 1: Proper position

- No caffeine, exercise, smoking for > 30 minutes
- Bladder empty
- Seated, relaxed, arm supported for > 5 minutes. No talking.

Step 2: Proper technique

Step 3: Proper cuff measure

Step 4: Deflate



deflate 2

Step 5: Averaging

- Average ≥ 2 readings obtained on ≥ 2 occasions
- Note times

Step 6: Patient education

- Provide patient with readings

What is the role of 24 hour BP devices, will these become the new normal?



Ambulatory BP definitions

24-hour average BP

Normotension $< 130/80$ mmHg

Hypertension $\geq 135/85$ mmHg

Daytime (awake) BP

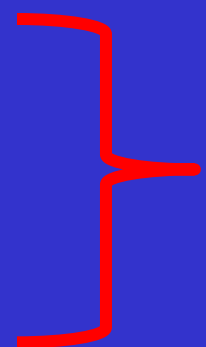
Normotension $< 135/85$ mmHg

Hypertension $\geq 140/90$ mmHg

Nighttime (asleep) BP

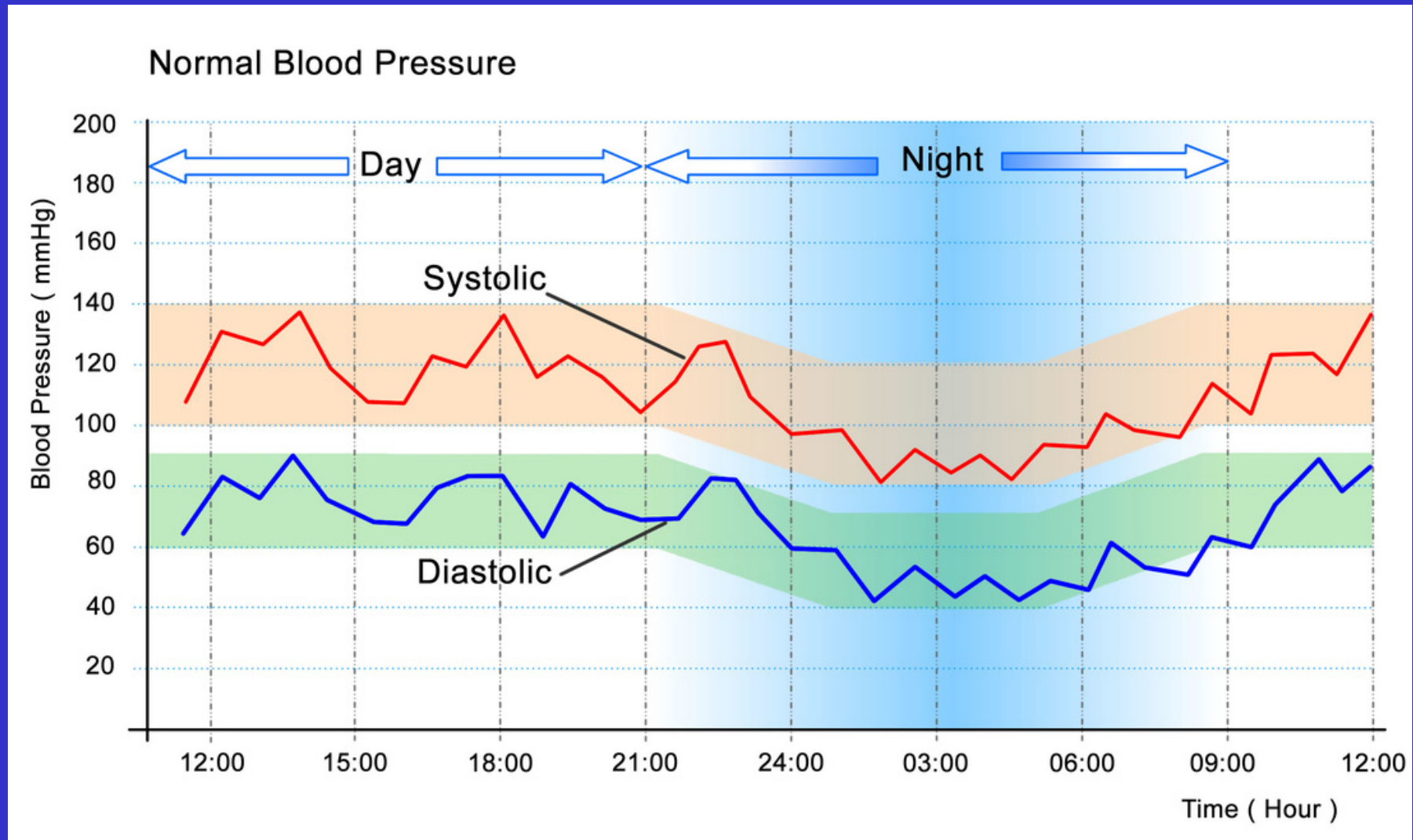
Normotension $< 120/70$ mmHg

Hypertension $\geq 125/75$ mmHg



**Nocturnal
dipping**

The BP should drop during sleep



Ambulatory BPs are the best predictor of mortality!

(N= 63,910 Spanish adults, average of 4.7 years follow-up, 3808 deaths)

	Mortality
Normal	2 %
Controlled HTN	5.3 %
White coat HTN	8.1%
White coat uncontrolled HTN	17.6%
Masked HTN	3 %
Masked uncontrolled HTN	6.2 %
Sustained HTN	15.6 %
Sustained uncontrolled HTN	42.2 %

Will ambulatory BP monitoring become the gold standard?

(N= 63910 Spanish adults, average of 4.7 years follow-up, 3808 deaths)

	Hazzard ratio
HR for each adjusted daytime average SD BP increase vs. normal	1.55
HR for each adjusted nighttime average SD BP increase vs. normal	1.54
Masked HTN vs. normal	2.83
Sustained HTN vs. normal	1.80
White coat HTN vs. normal	1.79
Controlled HTN vs. normal	0.81 (NS)

Optimized* office BPs vs. 24 hr. Ambulatory BPs vs. Office BPs

(Meta-analysis N = 9279, 31 studies)

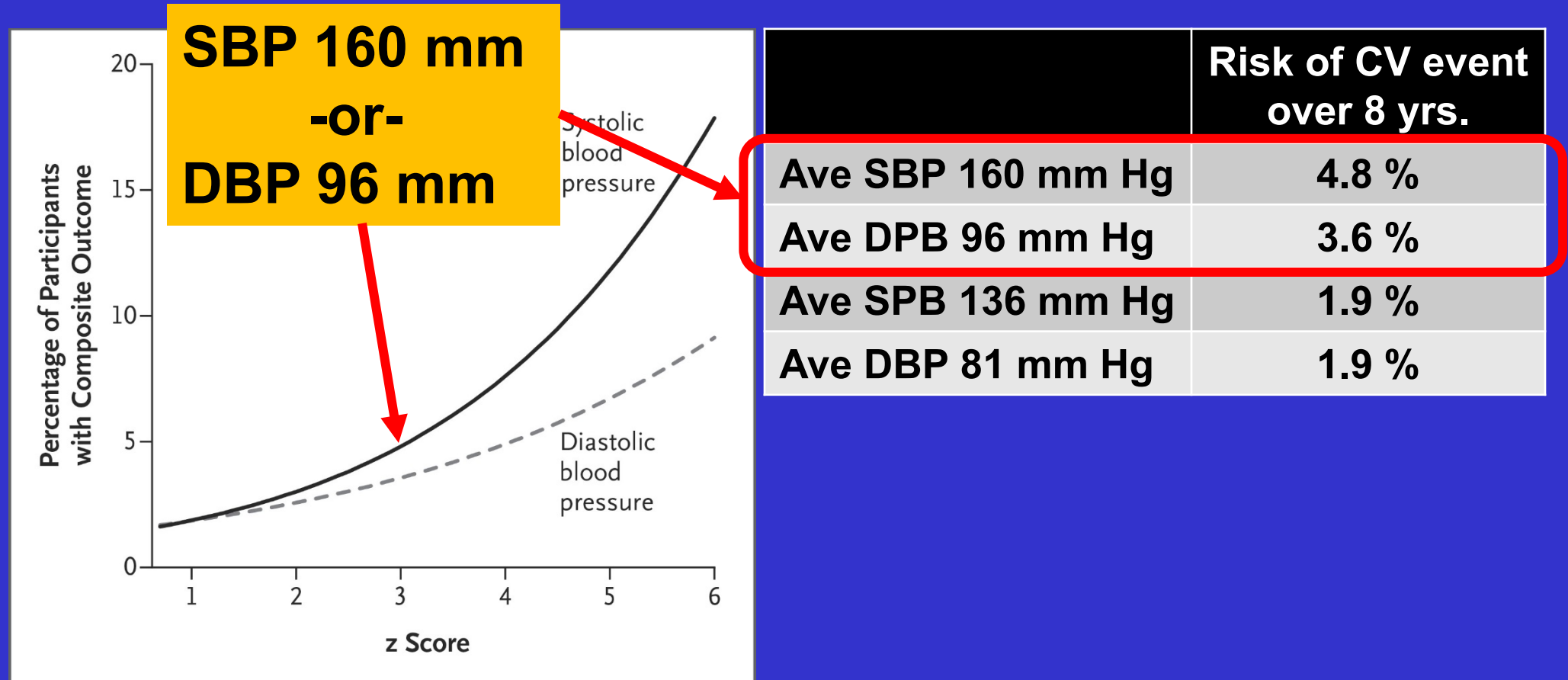
***5 minutes rest, quiet room, automated at 1-2 min intervals**

Optimized office vs. 24 hour ambulatory BPs	No difference	Equal
Optimized office vs. Research BPs	7 mm Hg.	Optimal office higher than structured research level BPs.
Optimized office vs. Routine office	14.5 mm Hg.	Routine office much higher than optimized office

“Automated office BP should now be the preferred method for recording BP in routine clinical practice...”

Don't forget about the diastolic BP?

(Kaiser cohort, N=1.3 million, 8 yrs. follow-up)





- ☐ **Auscultatory Gap:** For some patients, the sound will disappear and then reappear. Always pump up to > 200 mm Hg
- ☐ **Be sure you know which arm is higher and follow this arm**
- ☐ **BPs should be taken while sitting and relaxed and repeated**
- ☐ **Reduce meds when standing BP < 110 after one minute**

What are our core “lifestyle” messages?



ACC/AHA nonpharmacologic recommendations

Intervention	Goal	Expected benefit
Weight loss	1-5 kg	1 mm Hg/1 Kg
DASH diet	Fruits, vegetables, whole gr, low-fat dairy	11 mm Hg
Sodium restriction	Less than 1500 mg per day, minimum 1000 mg per day reduction	5–6 mm Hg
High potassium diet	3500–5000 milligrams per day	4 –5 mm Hg
Exercise	90–150 minutes per week	4–5 mm Hg
Moderate alcohol	Men: ≤ 2 drinks daily Women: ≤ 1 drink daily	4 mm Hg

DASH: Dietary content, servings per day

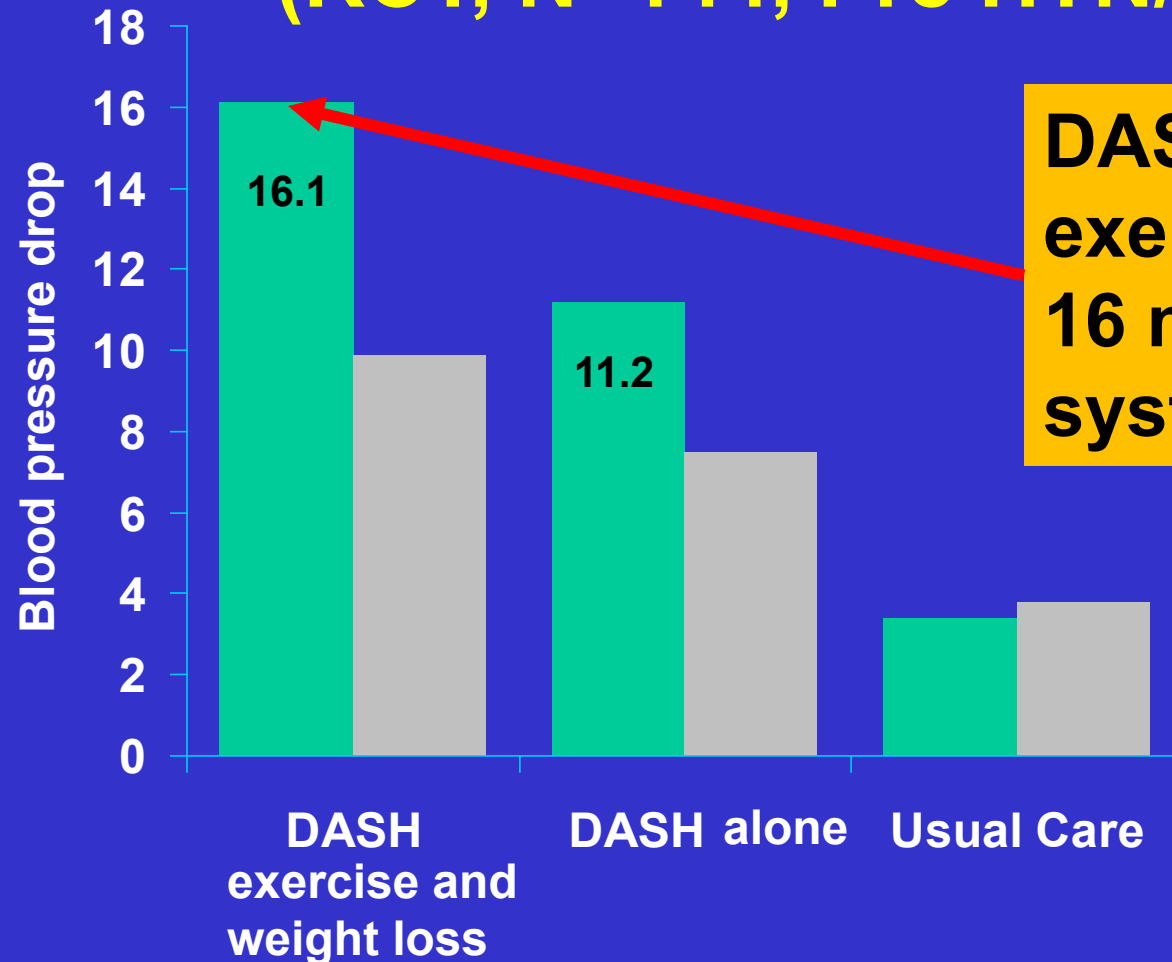
	Control Diet	Fruit/Vegetable Diet	Combination Diet
Fruits/juices	1.6	5.2	5.2
Vegetables	2	3.3	4.4
Grains	8.2	6.9	7.5
Low-fat dairy	0.1	0.0	2.0
Reg-fat dairy	0.4	0.3	0.7
Nuts/seeds/legumes	0.0	0.6	0.7
Beef/pork/ham	1.5	1.8	0.5
Poultry	0.8	0.4	0.6
Fish	0.2	0.3	0.5
Fats/oils/salad dress.	5.8	5.3	2.5
Snacks/sweets	4.1	1.4	0.7

DASH: Dietary content, servings per day

	Control Diet	Fruit/Vegetable Diet	Combination Diet
Fruits/juices	1.6	Cut snacks, oils, fats sweets! Replace with fruits and veggies!	5.2
Vegetables	2		4.4
Grains	8.2		7.5
Low-fat dairy	0.1		2.0
Reg-fat dairy	0.4		0.7
Nuts/seeds/legumes	0.0		0.7
Beef/pork/ham	1.5		0.5
Poultry	0.8		0.6
Fish	0.2		0.5
Fats/oils/salad dress.	5.8		2.5
Snacks/sweets	4.1	1.4	0.7

DASH works, DASH + weight Management (20 lb loss) works better

(RCT, N=144, Pre HTN/Stage 1, 5 years)



**DASH+ weight loss+
exercise =>
16 mm Hg
systolic BP drop**

Sodium content of common foods:

Classic potato chips (sm bag)	180 mg
White bread (one slice)	147 mg
Bagel	561 mg
Cheerios	280 mg
One pickle spear	380 mg
Tomato soup	450 mg
Nine pretzels	560 mg
1 Tbs. Soy sauce	870 mg
Big Mac	1100 mg
Ham Sandwich with mustard	2340 mg
Lo mein	3460 mg

Know where you want your patients to find the information they need

Nutrition Facts

8 servings per container

Serving size 2/3 cup (55g)

Amount per 2/3 cup

Calories 230

% DV*

12% **Total Fat** 8g

5% **Saturated Fat** 1g

Trans Fat 0g

0% **Cholesterol** 0mg

7% **Sodium** 160mg

12% **Total Carbs** 37g

14% **Dietary Fiber** 4g

Sugars 1g

Added Sugars 0g

Protein 3g

10% **Vitamin D** 2mcg

20% **Calcium** 260mg

45% **Iron** 8mg

5% **Potassium** 235mg

* Footnote on Daily Values (DV) and calories reference to be inserted here.

Serving
Calories
Fat
Sodium

**One drug, two drugs...what drugs
are best?**



ACC/AHA treatment recommendations

8.1.6. Choice of Initial Medication

Recommendation for Choice of Initial Medication

References that support the recommendation are summarized in Online Data Supplement 27 and Systematic Review Report.

COR	LOE	Recommendation
I	A ^{SR}	1. For initiation of antihypertensive drug therapy, first-line agents include thiazide diuretics, CCBs, and ACE inhibitors or ARBs. (1, 2)

SR indicates systematic review.

Thiazides
CCBs
ACEIs
ARBs

**Combination
Therapy if
Stage 2 and
> 20/10 over target**

8.1.6.1. Choice of Initial Monotherapy Versus Initial Combination Drug Therapy

Recommendations for Choice of Initial Monotherapy Versus Initial Combination Drug Therapy*		
COR	LOE	Recommendation
I	C-EO	1. Initiation of antihypertensive drug therapy with 2 first-line agents of different classes, either as separate agents or in a fixed-dose combination, is recommended in adults with stage 2 hypertension and an average BP more than 20/10 mm Hg above their BP target.
Ila	C-EO	2. Initiation of antihypertensive drug therapy with a single antihypertensive drug is reasonable in adults with stage 1 hypertension and BP goal <130/80 mm Hg with dosage titration and sequential addition of other agents to achieve the BP target.

*Fixed-dose combination antihypertensive medications are listed in Online Data Supplement D.

ACC comparison review:

All agents had higher risk ratios vs. thiazides

	All cause death	CV death	Heart Failure	Stroke	Major CV event
ACEIs	1.0	1.1	1.2	1.1	1.1
ARBs	0.99	1.1	1.1	1.1	1.0
Beta Blockers	1.1	1.2	1.3	1.3	1.2**
Ca Channel Blockers	0.97	1.0	1.3	0.96	1.1

**** statistically significant**

ASCOT: Initial HTN treatment with B-blocker increased risk in comparison to calcium channel blocker

Outcomes	Hazard risk:
	Amlodipine vs atenolol
Stroke	0.77 (0.66 – 0.89)
CV events	0.84 (0.78 – 0.90)
Mortality	0.89 (0.81 – 0.99)
Diabetes	0.70 (0.63 – 0.78)

ACC comparison review: Thiazides vs. other agents for Black Americans

	All cause death	Heart Failure
ACEIs	1.1	1.4
Beta Blockers	1.3	1.2
Ca Channel Blockers	0.98	1.4

No agent superior to thiazides

Is there a preferred thiazide?

	Protein binding	Half life, hours
HCTZ	40%	9-10
Chlorthalidone	99%	50-60
Metolazone	95%	8-14

No appreciable difference in cost but chlorthalidone can be tough to find and is rarely combined with other medications

What about the side effects with thiazides?

- Erectile dysfunction
- Hypokalemia
- Hyponatremia

TOMHS: Incidence of erectile dysfunction equal to placebo with thiazides

ACB		AML		CTH		DOXA		ENAL		PLBO	
N	%	N	%	N	%	N	%	N	%	N	%

48 Months

Problems obtain-
ing erection

8 10.5

8 13.3

12 10.9

6 8.3

7 10.9

15 11.9

Problems main-
taining erection

6 7.9

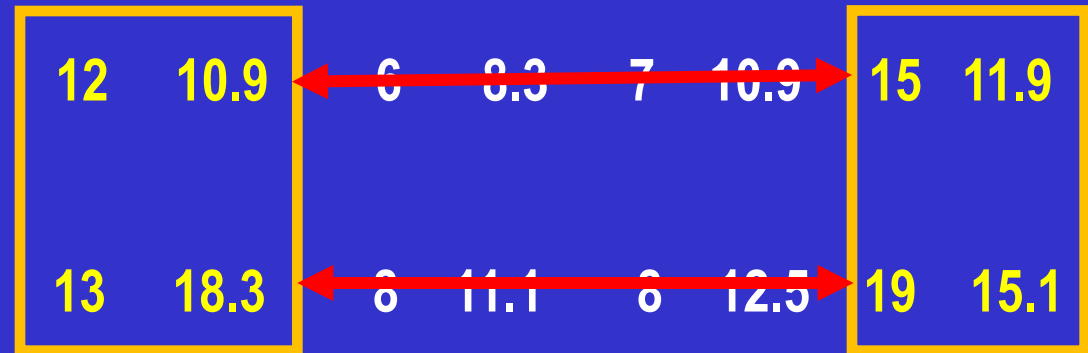
9 15.0

13 18.3

6 11.1

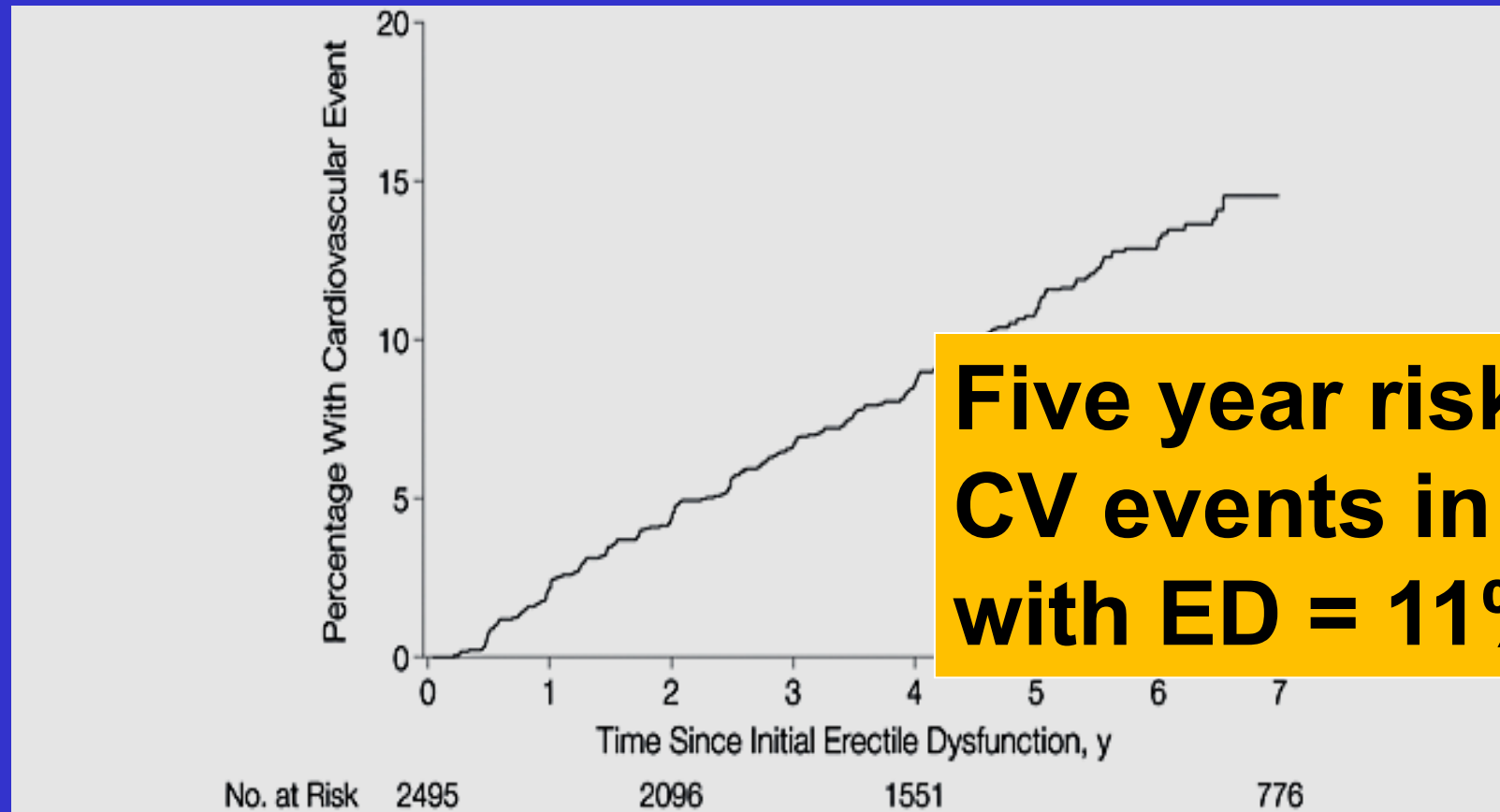
6 12.5

19 15.1



Erectile dysfunction is a predictor of CV disease

PCPT placebo cohort: Time to CV event among patients who developed ED, finasteride control group



**Five year risk of
CV events in Men
with ED = 11%**

SHEP: Benefit of HTN control attenuated by hypokalemia

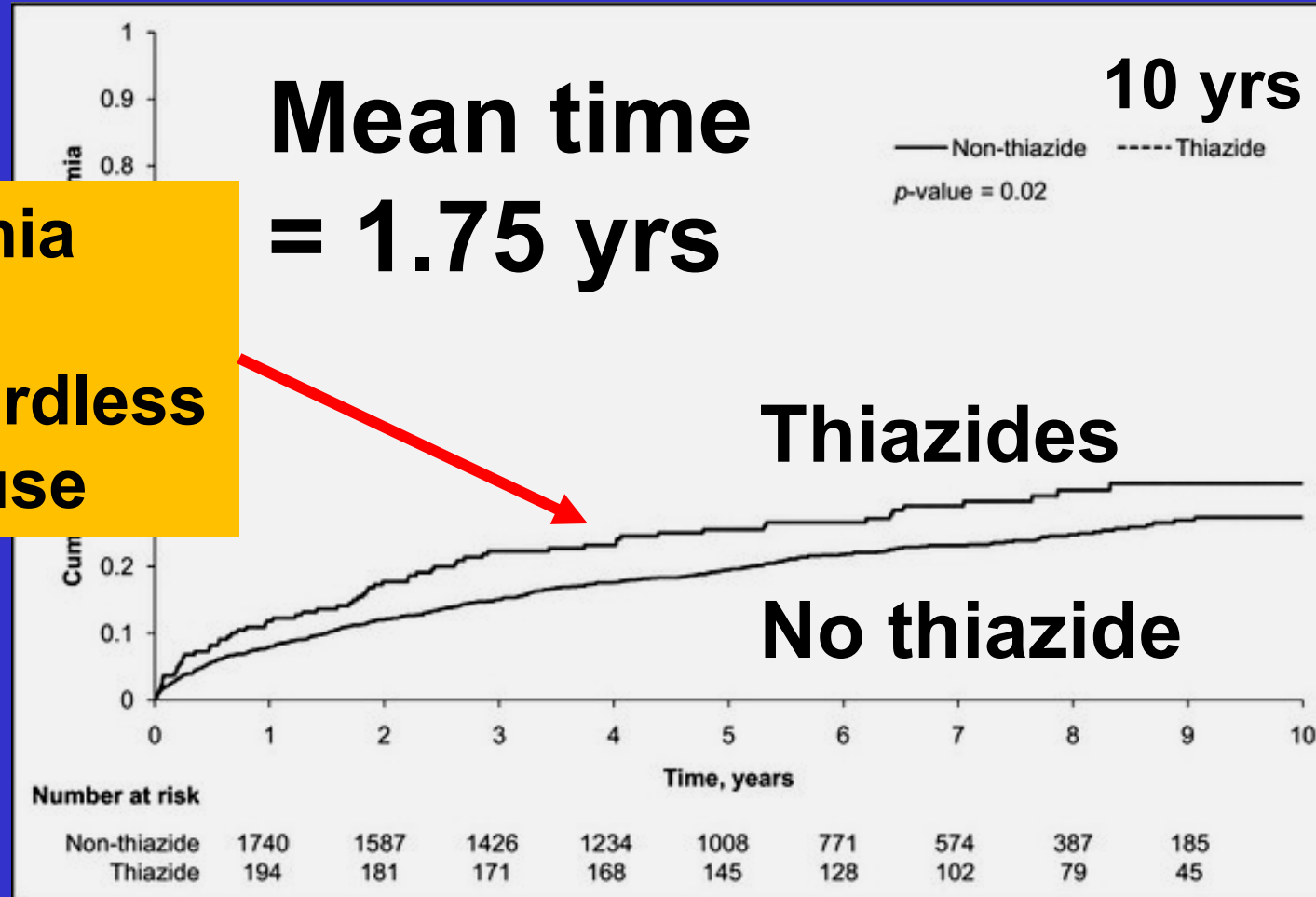
	CV Event	CHD	CVA
Placebo, K > 3.5	1.00	1.00	1.00
Active tx, K < 3.5	1.18 (NS)	1.46 (NS)	1.43 (NS)
<u>Active tx, K > 3.5</u>	<u>0.61 (0.50-0.75)</u>	<u>0.75 (0.50-1.01)</u>	<u>0.51 (0.36-0.71)</u>

39% lower CV event rate
In HTN patients when K kept > 3.5

Risk of hyponatremia (Na <130) continues over time but no mortality effect

MGH and BWH cohort

Hyponatremia incidence similar regardless of diuretic use



Why not start with ACEIs?

ACEIs themselves have a high incidence of cough.

Thiazides combine well with ACEIs, ARBs, BB, CCBs.

But the debate continues...

Are ACEIs and ARBs Equal?

2011 meta-analysis of 97 published studies
comparing ACEIs and ARBs
showed no difference
(JGIM 2011; 27: 716-729)

Cough with ACEIs = 9%

Cough with ARBs = 2%

ACEIs remain the drugs of first choice...for
now because there is more data

But...ARB dose responses are flat and losartan underperforms

BP reductions (mm Hg)
at different levels of dosage maximums

	25%	50%	100%
All ARBs SBP	10.3	11.7	13.0
DBP	6.7	7.7	8.3

ARB
response
flattens
with dosage
increases

All other ARBs vs. Losartan

SBP drop	- 2.5	- 3.9
DBP drop	- 1.8	- 2.2

Other ARBs
outperform
losartan

***In summary, the first choice is either
a thiazide, an ACEI/ARB or a CCB***

Thiazides remain well supported

Inexpensive

Tolerated

Less variance

Easily combined

ACEIs and ARBs

Inexpensive

Higher SE

CCBs for African Americans

Have a tendency toward fluid retention



- ❑ **Avoid alpha blockers as single agents**
 - ALLHAT stopped alpha blocker treatment due to higher rates of HF
- ❑ **Avoid ACEIs and ARBs if pregnancy possible**
- ❑ ***Beta blocker indications***
 - Recent ACS (acute coronary syndrome)
 - Risk for an alcohol withdrawal syndrome
 - Associated arrhythmias

Increased risk for fetal abnormalities from ACEI exposure in the first trimester (95% C.I.)

Overall increased risk	2.71 (1.72-4.27)
CV malformation risk	3.72 (1.89-7.30)
CNS malformation risk	4.39 (1.37-14.02)

The currently acceptable agents for use in pregnancy are:

BB blockers (labetalol)*, nifedipine, methyl dopa

**Possibly, if or prior to pregnancy:
HCTZ, chlorthalidone, chlorothiazide**

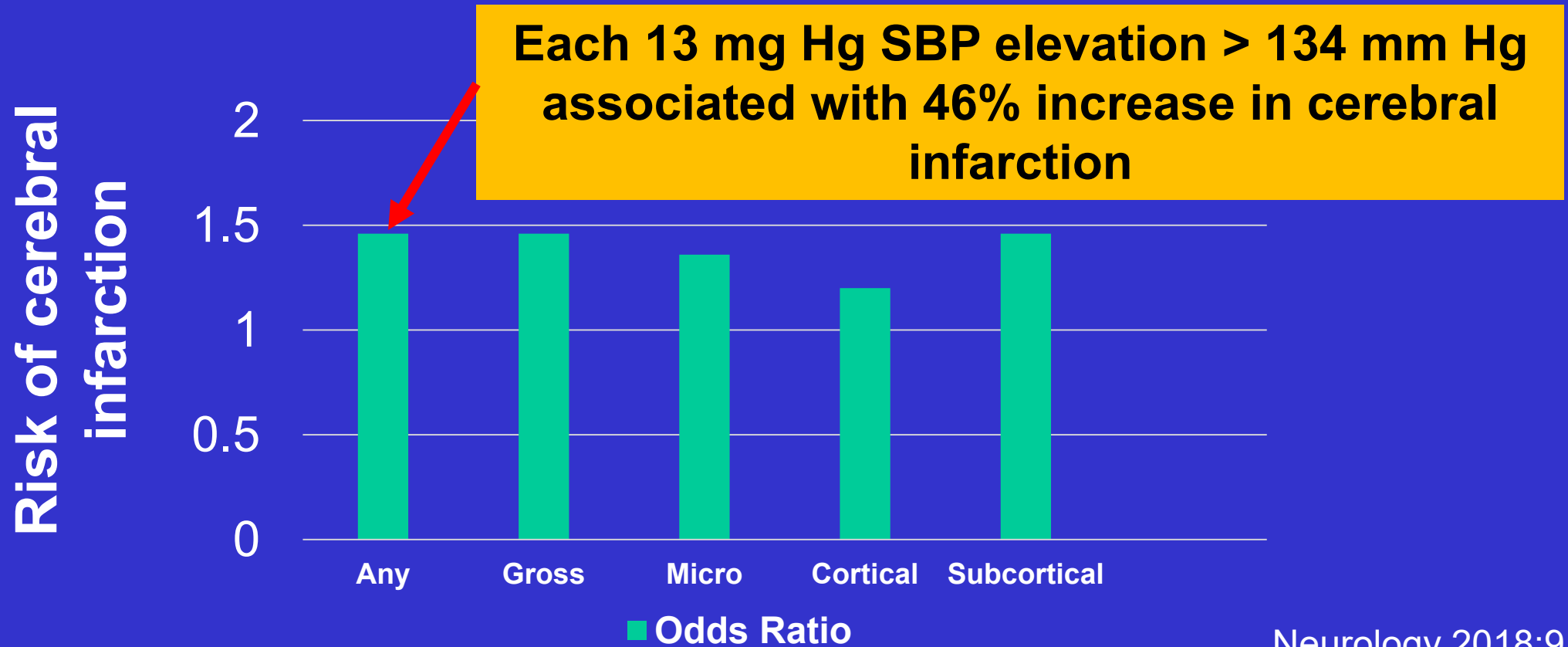
**Drugs that must not be used: ACEIs, ARBs
And direct renin inhibitors**

Why wait to get BPs lower for older patients?



The brains of hypertensive octogenarians show more microinfarction

N = 2188 community dwelling, followed for an average of 8 years prior to death. Average age at death, 88.6 yrs. 65% women



Original Investigation

Intensive vs Standard Blood Pressure Control and Cardiovascular Disease Outcomes in Adults Aged ≥ 75 Years A Randomized Clinical Trial

Jeff D. Williamson, MD, MHS; Mark A. Supiano, MD; William B. Applegate, MD, MPH; Dan R. Berlowitz, MD; Ruth C. Campbell, MD, MSPH; Glenn M. Chertow, MD; Larry J. Fine, MD; William E. Haley, MD; Amret T. Hawfield, MD; Joachim H. Ix, MD, MAS; Dalane W. Kitzman, MD; John B. Kostis, MD; Marie A. Krousel-Wood, MD; Lenore J. Launer, PhD; Suzanne Oparil, MD; Carlos J. Rodriguez, MD, MPH; Christianne L. Roumie, MD, MPH; Ronald I. Shorr, MD, MS; Kaycee M. Sink, MD, MAS; Virginia G. Wadley, PhD; Paul K. Whelton, MD; Jeffrey Whittle, MD; Nancy F. Woolard; Jackson T. Wright Jr, MD, PhD; Nicholas M. Pajewski, PhD; for the SPRINT Research Group

JAMA 2016; 315:2673-2682

EDITORIAL

SPRINT Results in Older Patients How Low to Go?

Aram V. Chobanian, MD

SPRINT data: Patients ≥ 75 yrs. Fit, less fit and frail all did better!

	Intensive N= 1317	Standard N =1319
Sys BP, mm Hg	123.4	134.8
Dias BP, mm Hg	62.0	67.2
<u>MI</u>	<u>2.8</u>	<u>4.0</u>
<u>Heart failure,%</u>	<u>2.6</u>	<u>4.2</u>
<u>All cause mortality, %</u>	<u>5.5</u>	<u>8.1</u>
Fit	3.1	3.6 (NS)
<u>Less Fit</u>	<u>3.7</u>	<u>7.0</u>
<u>Frail</u>	<u>9.1</u>	<u>13.1</u>
<u>Secondary CKD outcome**</u>	<u>5.1</u>	<u>1.8</u>

****30% reduction in GFR to GFR under 60, dialysis or transplant**

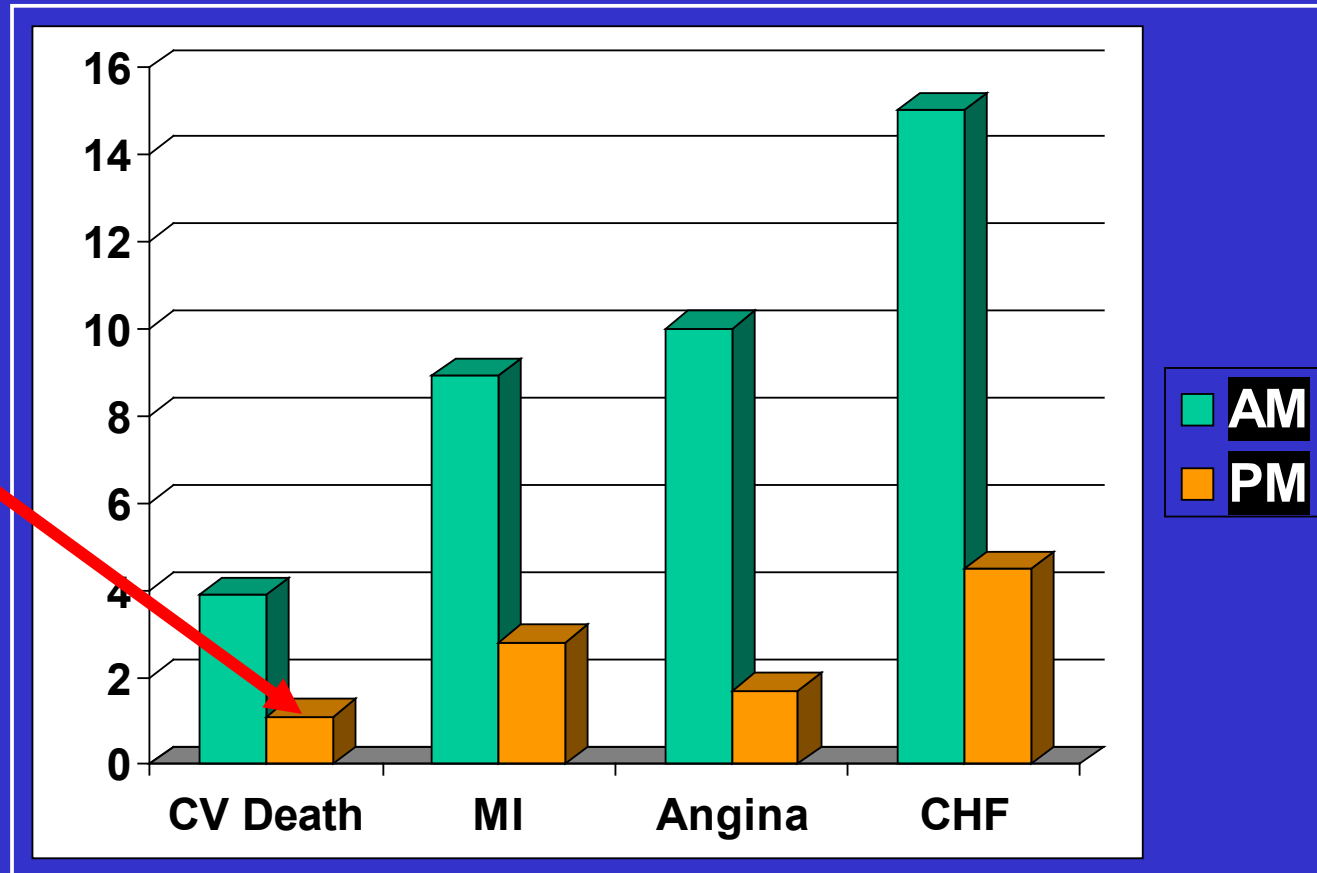
Should BP medications be taken before bed?



Giving one HTN medication HS cut CV risk in CKD 3-4 patients

Spanish RCT of 661 patients followed over 5.4 years, 1 or more HTN medications, all taken in AM vs. at least one HS

Composite rate (death, MI, new angina, CABG, CHF, PVD occlusion, CVA) was 69% lower!



Hygia Trial: BP medications night vs. morning

(Hygia, “the divinity whose force fosters agreement among contrary qualities”)

Hygia Chronotherapy Trial. 2019

40 Spanish PC Centers. N = 19,084

Age 60.5 yrs. +/- 13.7 yrs.

6.3 yr. follow-up

RCT: All medications in the morning vs. all at bedtime

Open label, PC medication choice

Office BPs and 48 hour Ambulatory BP (ABP)

The Hygia Trial

40 Spanish PC Centers. N = 19,084; age 60.5 yrs. +/- 13.7 yrs. 6.3 yr. FU

	Awaking	Bedtime	P value
# medications	1.8	1.7	<0.001
ARB	53.1%	53.1%	NS
ACEI	25.3%	23.4%	0.002
CCB	32.7%	36.8%	<0.002
BB	22%	17.5%	<0.002
Diuretic	46.5%	39.5%	<0.002

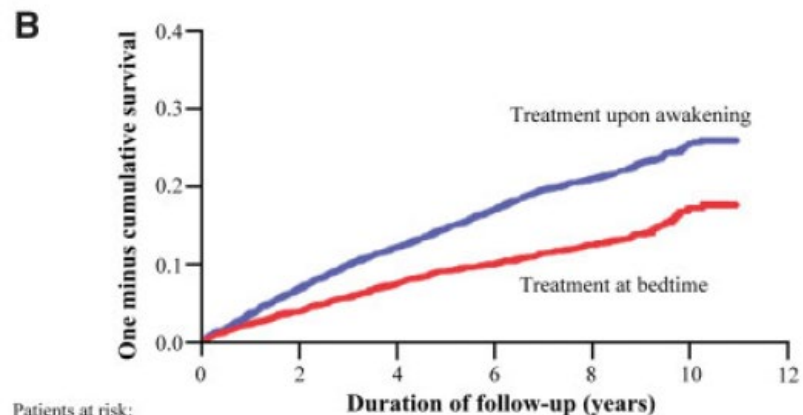
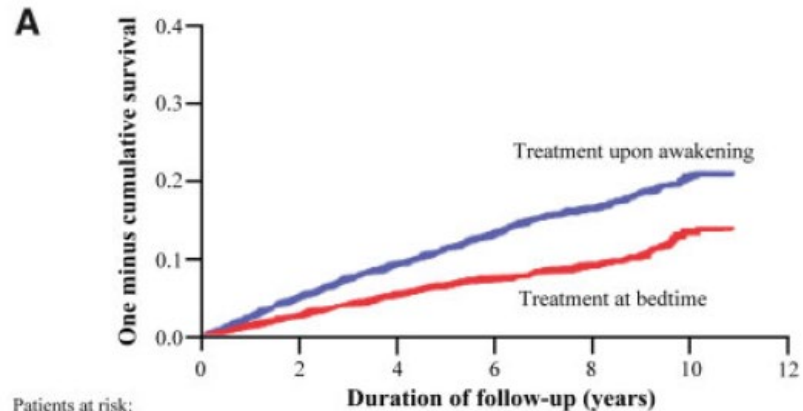
Hygia Trial BP outcomes

	Awaking	Bedtime	P value
Office SBP	143.2	140.0	<0.001
Awake SBP	129.5	129.2	0.294
Asleep BP	118.0	114.7	<0.001
Sleep SBP drop	8.5	12.2	<0.001
Sleep DBP drop	13.3	15.3	<0.001
Dipping	49.7%	63.5%	<0.001

Hygia study BP outcomes

Bedtime HTN medications had risk reductions of

- 43% lower CVD events
- 42% lower HF
- 42% fewer events
- 49% fewer strokes
- 45% lower death rate



What if the BP is not responding?



**PLEASE USE
ALTERNATIVE
ROUTE**

Return to basics

- Sodium
- Alcohol
- NSAIDS

Improve diuretic therapy

- Add thiazide
- Change HCTZ to chlorthalidone 12.5-25 mg/d
- Change to furosemide if CKD Stage 3-4

Add aldosterone antagonist

- Spironolactone 25 mg
- Amiloride 5-10 mg

Add a central alpha agonist

- Clonidine (Catapres)
Oral 0.1-0.3 mg; QD-BID
Patch 0.1-0.3 mg/wk

Add a peripheral alpha blocker

- Doxazocin (Cardura) 1-4 mg; QD-BID
- Terazosin (Hytrin) 1-5 mg; QD-BID

Switch to a mixed alpha/beta blocker

- Labetalol 100-600 mg BID

Direct renin inhibitor (DRIs)

- Aliskerin (Tekturna) 150-300 mg QD

Select uncommon causes of hypertension

Cause	Prevalence	Screening test	Confirmatory test
Pheochromocytoma	0.1%–0.6%	24-hour fractionated metanephrine or plasma metanephrine	Abdominal CT/MR
Cushing's syndrome	<0.1%	Overnight 1 mg dexamethasone suppression	24-hour urine free cortisol
Renal artery stenosis	5–34 %	Ultrasound/MRA/CTA	Renal arteriogram
Primary aldosteronism	8–20%	Plasma aldosterone/renin ratio	Adrenal CT Sodium loading test

Hot topics in hypertension, 2020

1. Whose guidelines are the most relevant to primary care practice? Should we change our target?
2. Should we aim for a "quiet room?"
3. What is the role of lifestyle changes?
4. What is the role of home blood pressure monitoring?
5. One drug or two? Does it matter?
6. Should we treat older patients differently?
7. Should BP medications be given before bed?



Hot topics in hypertension, 2020

1. Whose guidelines are the most relevant to primary care practice? Is lower better? Is it time to change our targets?

Yes, we should be moving our targets down to 130-135/80-85 or lower

2. Should we redesign our offices to find a “quiet room?”

Consider the placement of your devices, chairs, etc.

3. What is the role of 24 hour BP devices?

24 hour readings and optimized office readings are equivalent, 24 hour readings allow more nuanced approach.*

4. What is our “lifestyle” message?

Exercise (150 min per week), Na < 1500 mg, DASH (no condiments, dressings, etc.)

5. One drug, two drugs...what drugs are best, or does it matter anyway?

Start with a thiazide and then add an ACE/ARB and/or a CCB

6. Should we treat older patients differently?

Lower target confer added benefit with low risk...but beware of orthostasis!!

7. Should BP medications be given before bed?

Consider for all patients, recommend for a patient on multiple (>3) medications.

Take home points:

1. SBP >120 is a call to action
2. Thiazides remain the cornerstone HTN therapy.
3. Consider 24 hour BP monitoring

Next steps:

1. Consider increasing therapies if SBP > 130-135, DBP >85
2. Consider active therapy in younger patients (< 40 years) with SBP > 130

Thank you!

Questions?

Summary

1. Low sodium (under 1500 mg) low fat diet (DASH) works
2. Exercise (30 minutes, 3-4 days a week, 150 minutes per week)
3. Initial therapy equivalent options:
 - HCTZ (12.5-25 mg/d) or
chlorthalidone (12.5-25 mg/d)
 - ACEI/ARB
 - CCB
4. Combine as needed

5. Treat hypokalemia

a. sodium restriction

b. potassium chloride

c. triamterene, spironolactone (25-50 mg/d), amiloride (5-10 mg/d), or eplerenone (25-100 mg/d)

6. Monitor sodium levels

7. Furosemide (CKD 3-4)

8. Add spironolactone or amiloride

8. Consider shifting one or more medications to bedtime in patients with CKD 3+
9. Avoid β blockers with exceptions
10. Avoid peripheral alpha adrenergic blockers as single agents
11. BP targets are evolving
Most patients: $\leq 135/XX$ becomes $\leq 130/XX$
 $\leq 130/XX$ becomes $<130/XX$
Older, DM patients: $\leq 140/XX$

	Agent	Initial dose	Max dose	Freq
ACEI	Captopril	50	150-200	BID
	Enalapril	5	20	BID
	Lisinopril	10	40	QD
ARB	Candesartan	4	12-32	QD
	Losartan	50	160-320	BID
	Valsartan	40-80	160-320	QD
	Irbesartan	75	300	QD
Beta Blocker	Atenolol	25-50	100	QD
	Metoprolol/ER	50	100-200	BID/QD
CCB	Amlodipine	2.5	10	QD
	Diltiazem ER	120-180	360	QD
	Nitrendipine	10	20	BID
Thiazide	Benroflumethiazide	5	10	QD
	Chlorthalidone	12.5	25	QD
	HCTZ	12.5	50	QD
	Indapamide	1.25	2.5	QD