UWI

The 2017 AHA/ACC Guidelines for High Blood Pressure in Adults:

Big Targets for Small Islands?

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UWI BAMP CME Meeting November 2018





DISCLOSURES

1. Presenter is an independent paid Consultant to the US Centre for Disease Control and Prevention (CDC) on Global Hearts Programme

By the END of this session:

1. Identify key factors that contribute to HTN **guidelines development**

2. Develop a strategic working knowledge of the **ACC/AHA 2017 Guidelines**

3. Using case examples, justify the rationale behind the **therapeutic selection** of drugs for the management of HTN

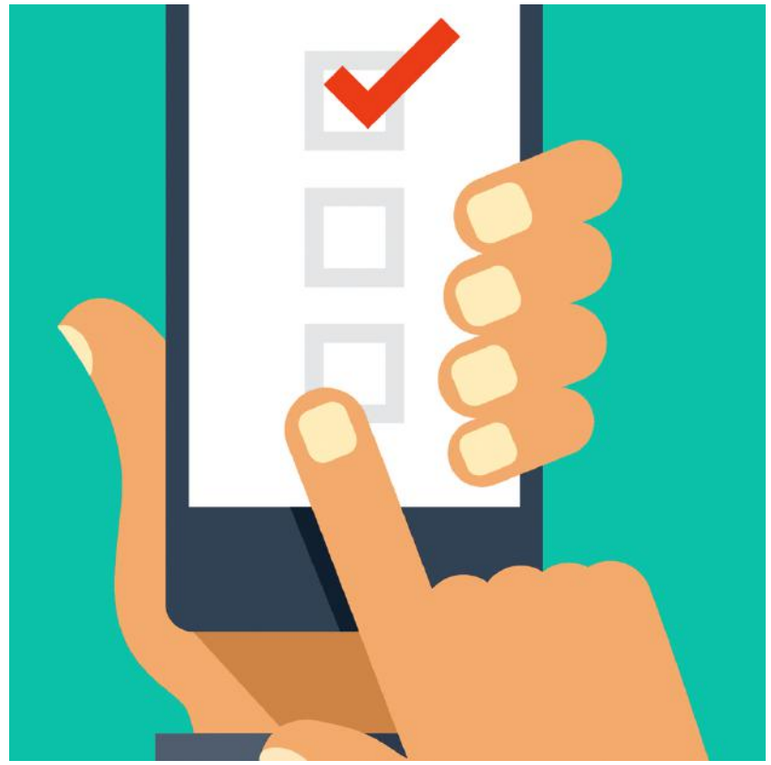
By the END of this session:

4. Appreciate the **barriers to the update** of guidelines

5. Incorporate the use of an **evidence based protocol** in next day practice.

Survey Says!

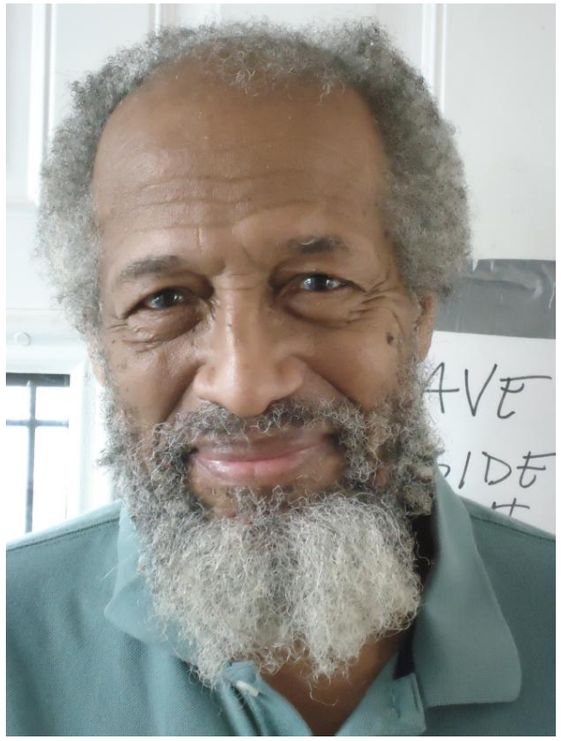
- **100** doctors polled on WhatsApp
- “Do you use a guideline? Which one?
- **77** responded
- **2/3** said yes - 60% Internists
- **80%** ACC/AHA
- 10% JNC “8”
- 10% - ESH, Canadian, NICE, ACOG



There are diagnostic challenges!

- Very mobile target
- White Coat Effect
- Physician Bias
- Patient factors
- Device challenges

Three Patients have just been referred with “High BP”



AC, 27

BW, 70

TB, 93

AC - 27 years - Case 1

- I HATE doctors!!
- “Fit! Just here for a tetox”
- PE teacher at a secondary school
- No medical illnesses known
- Panic attacks during UWI exams - “as expected”

AC - 27 years - Question 1

BP reading	Supine	Seated	Standing
1	168/112 (106)	160/108 (110)	164/107 (108)
2	165/108 (98)	167/105 (115)	152/96 (96)
3	162/94 (89)	161/74 (112)	160/75 (90)
Average			

AC - 27 years - Case 1

Which of the following is the NEXT BEST STEP in this patient's management?

A. Reassure and recommend cognitive behavioral therapy for his anxiety disorder

B. Perform a 12 lead ECG to rule out a hypertensive emergency

C. Commence amlodipine 5 mg once daily and calculate his CVD risk

D. Refer to the ER as possible HTN emergency

E. Perform an out of office BP assessment - ABPM or HBPM

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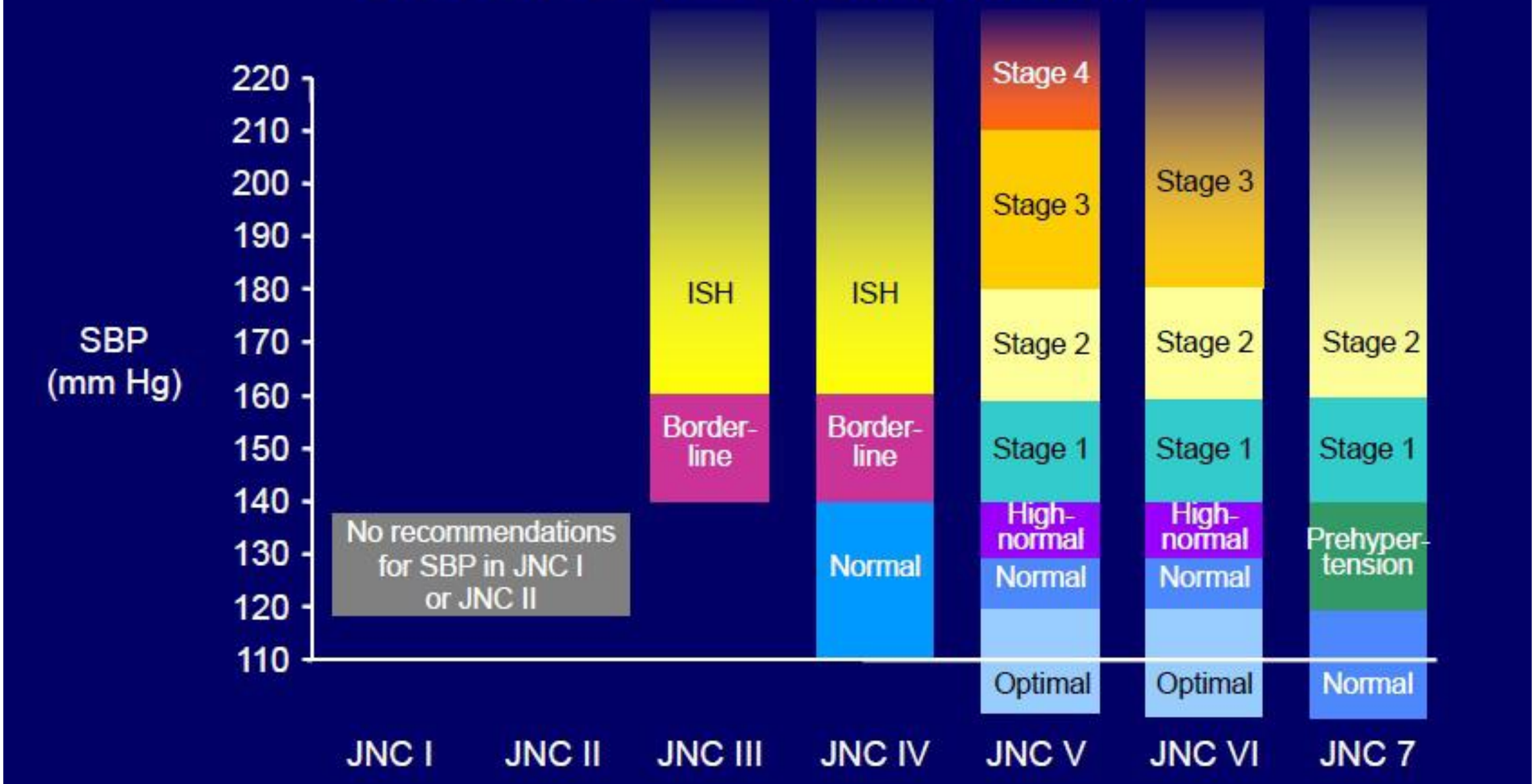
Where are we now and how did we get here?

Hypertension: A Moving Target

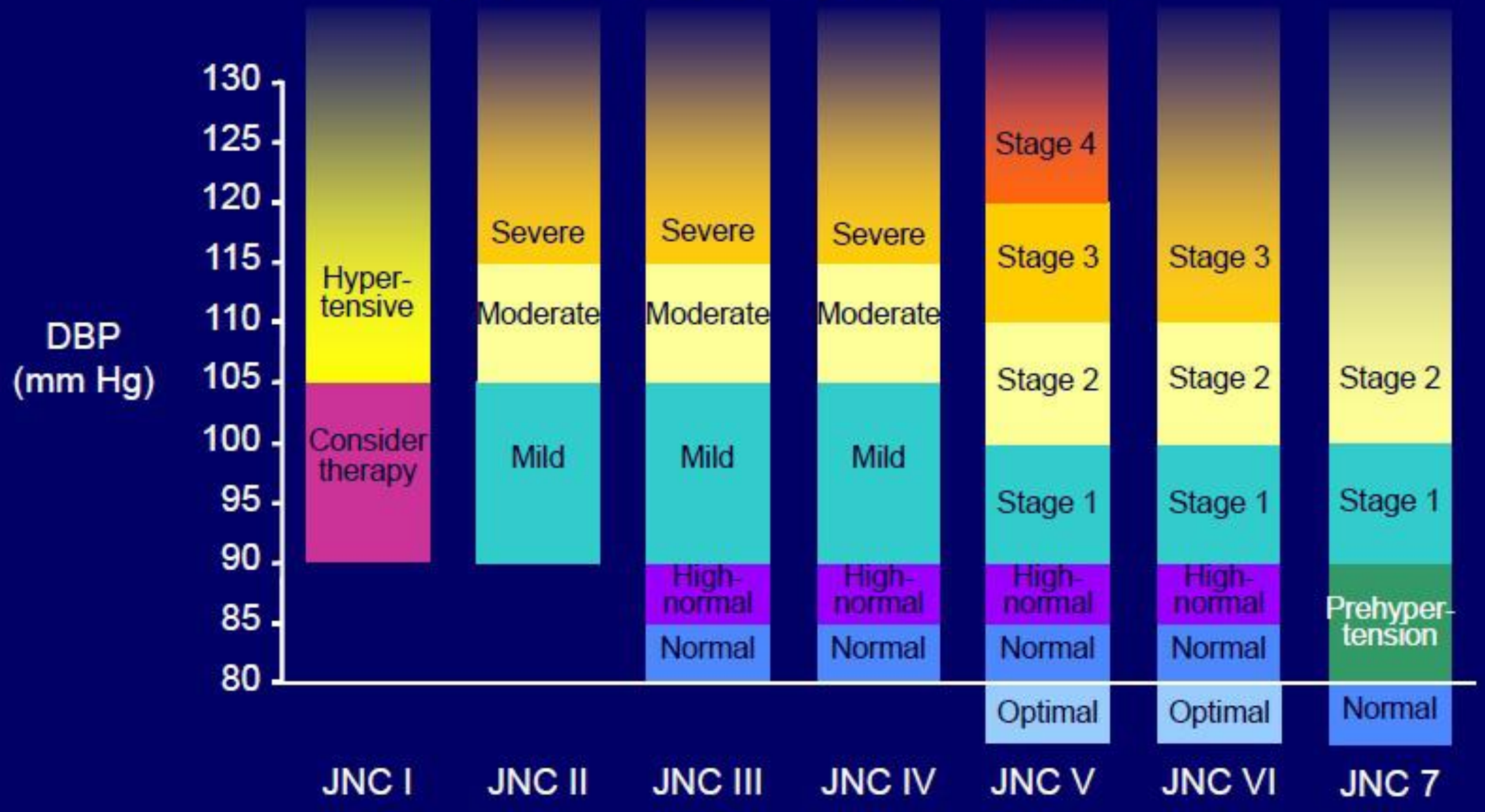
JNC BP Classifications: SBP



JNC I. *JAMA*. 1977;237:255-261.
JNC II. *Arch Intern Med*. 1980;140:1280-1285.
JNC III. *Arch Intern Med*. 1984;144:1045-1057.
JNC IV. *Arch Intern Med*. 1988;148:1023-1038.
JNC V. *Arch Intern Med*. 1993;153:154-183.
JNC VI. *Arch Intern Med*. 1997;157:2413-2446.
Chobanian AV et al. *JAMA*. 2003;289:2560-2572.

Hypertension: A Moving Target

JNC BP Classifications: DBP



JNC I. *JAMA*. 1977;237:255-261.
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JNC IV. *Arch Intern Med*. 1988;148:1023-1038.
JNC V. *Arch Intern Med*. 1993;153:154-183.
JNC VI. *Arch Intern Med*. 1997;157:2413-2446.
Chobanian AV et al. *JAMA*. 2003;289:2560-2572.

Question: What is the appropriate BP treatment threshold and target goal?

Consider two groups:

- The general population younger than 60-65 years of age.
- Those 60-65 years and older, at high cardiovascular risk, or with diabetes, or chronic kidney disease.

JNC-7 Report (2003): BP treatment threshold and target goal?

- In the general population at any age, the treatment threshold is 140/90 mmHg and the target is <140/90 mmHg.

- In those with diabetes or chronic kidney disease the treatment threshold is 140/90 mmHg and the target is <130/80. Cardiovascular risk not specifically addressed.

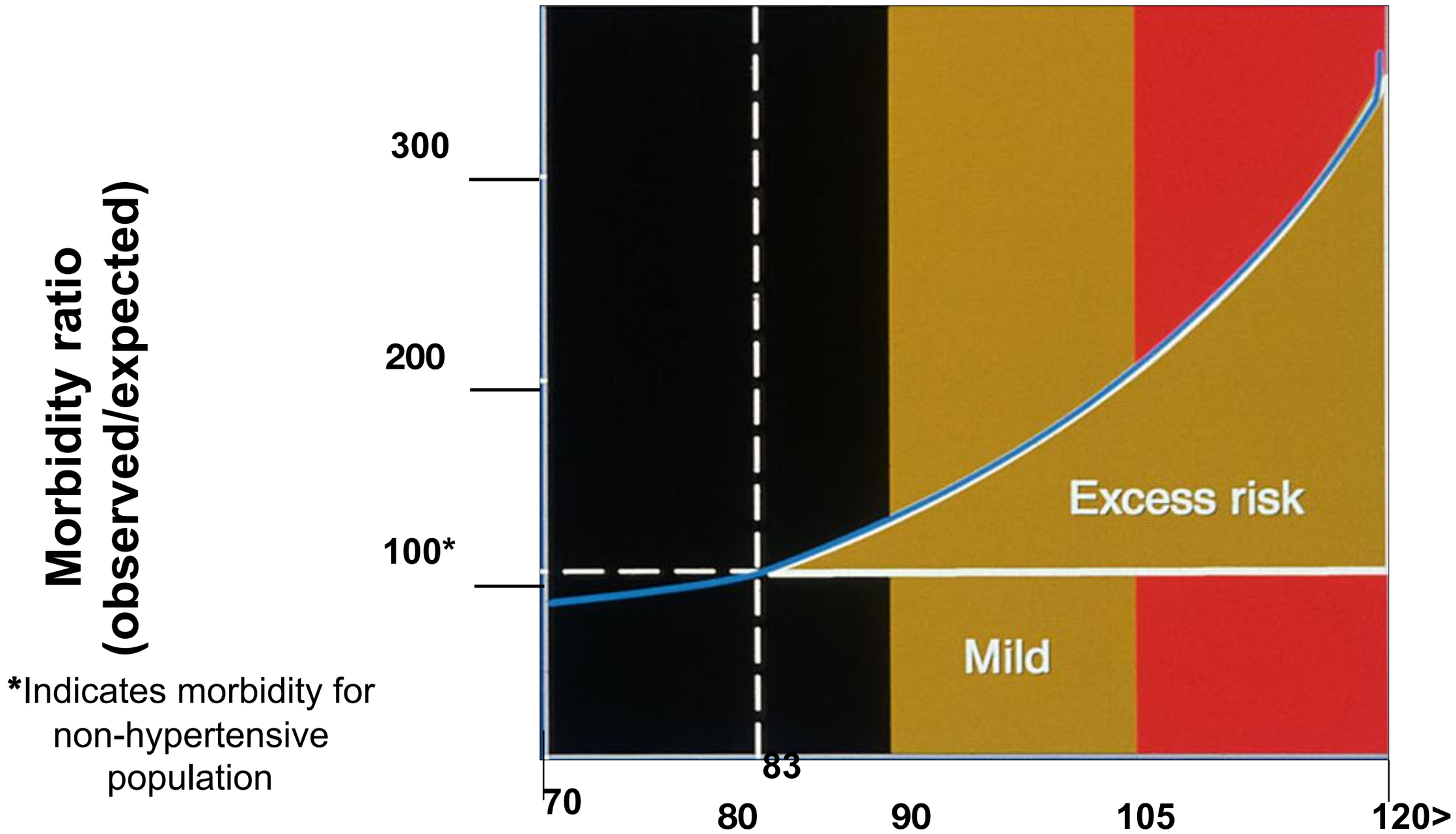
JNC-8 Committee (2013): BP treatment threshold and target goal?

- In the general population younger than 60 years of age, and those with diabetes or chronic kidney disease, the treatment threshold is 140/90 mmHg and the target is <140/90 mmHg.

- In those 60 years of age or older, the treatment threshold is 150/90 mmHg and the target is <150/80 mmHg. Cardiovascular risk not specifically addressed.

- What happened between JNC-7 and the JNC-8 report? Greater use of evidence-based medicine.

Relative Risk of Morbidity Compared to Non-Hypertensive Population

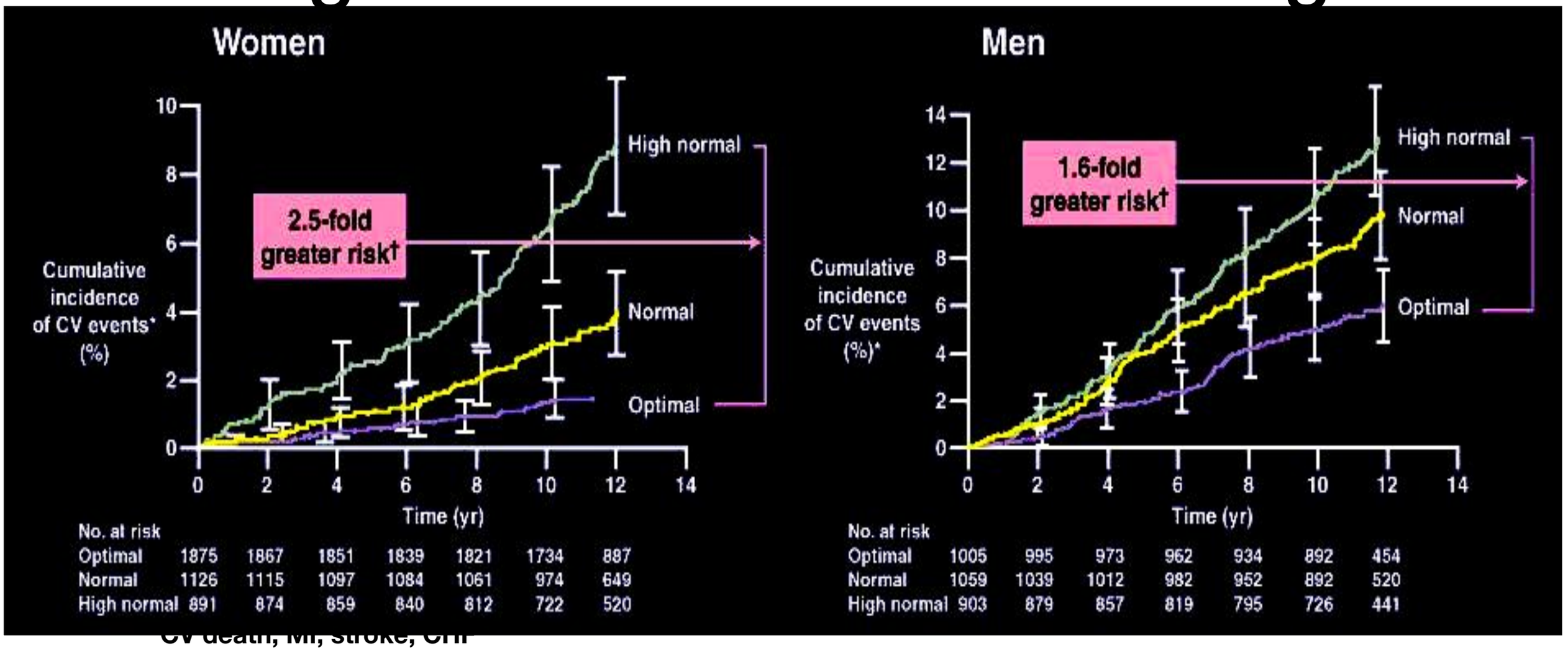


*Indicates morbidity for non-hypertensive population

Diastolic pressure (mm Hg)

Risk of overall morbidity increases with elevation in blood pressure

Framingham Heart Study
"High-normal" BP Is Not Benign



CV death, MI, stroke, CHF

†Adjusted for concomitant CV risk factors

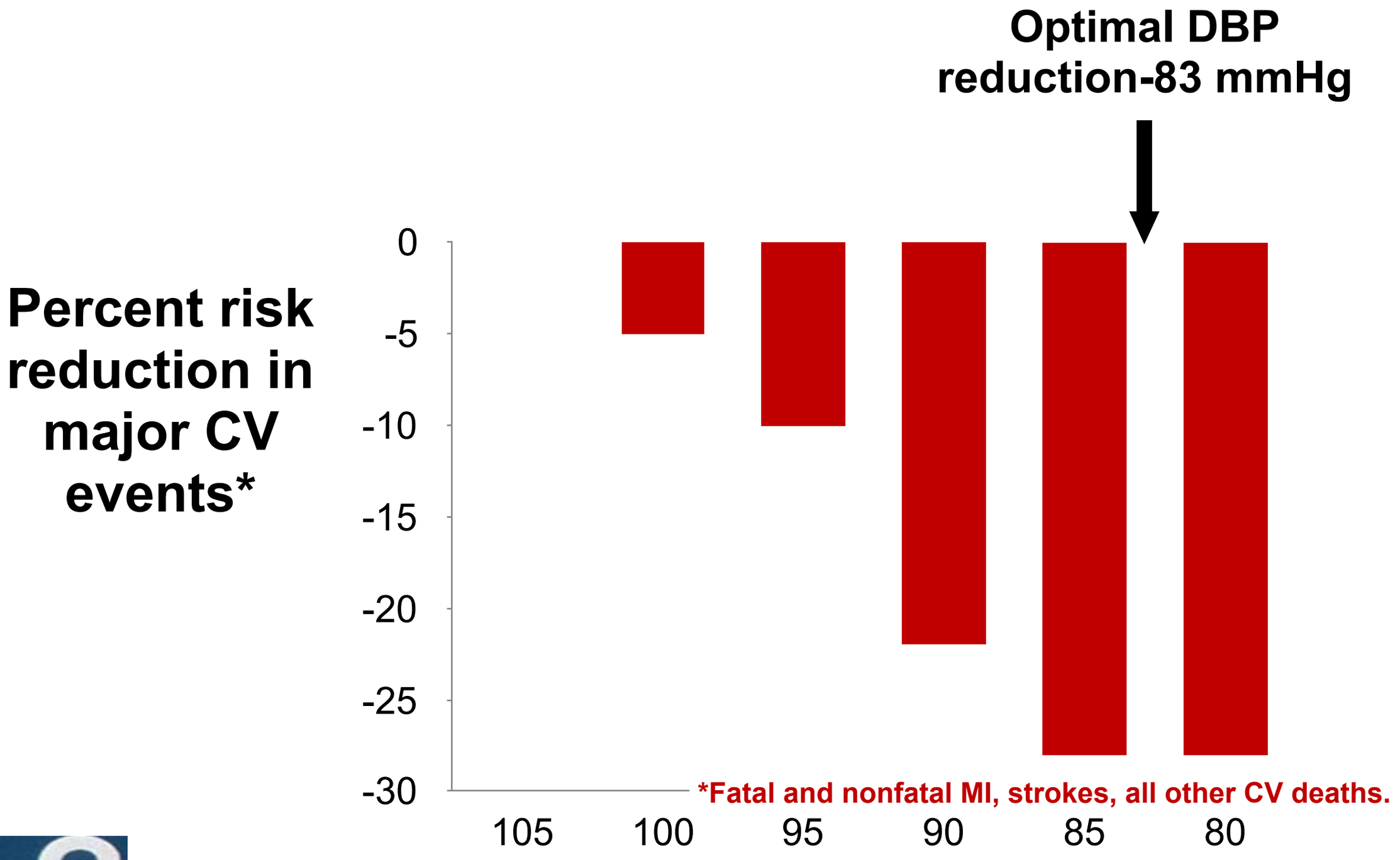
Optimal = <120/<80 mmHg

Normal = 120–129/80–84 mmHg

High normal = 130–139/84–89 mmHg

Vasan RS et al. *N Engl J Med*. 2001;345:1291–1297.

HOT Study: Risk of a Major CV Event Reduced by 30% (DBP)



Hansson L et al. *Lancet. 1998;351:1755-1762*

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Randomized Trial of Intensive versus Standard Blood-Pressure Control

The SPRINT Research Group*

SPRINT Research Question

Examine effect of more intensive high blood pressure treatment

than is currently recommended

Randomized Controlled Trial
Target Systolic BP

Intensive Treatment	*Standard Treatment*
Goal SBP < 120 mm Hg	*Goal SBP < 140 mm Hg*

SPRINT design details available at:

- *ClinicalTrials.gov (NCT01206062)*
- *Ambrosius WT et al. Clin. Trials. 2014;11:532-546.*

SPRINT
Systolic Blood Pressure Intervention Trial

Major Exclusion Criteria

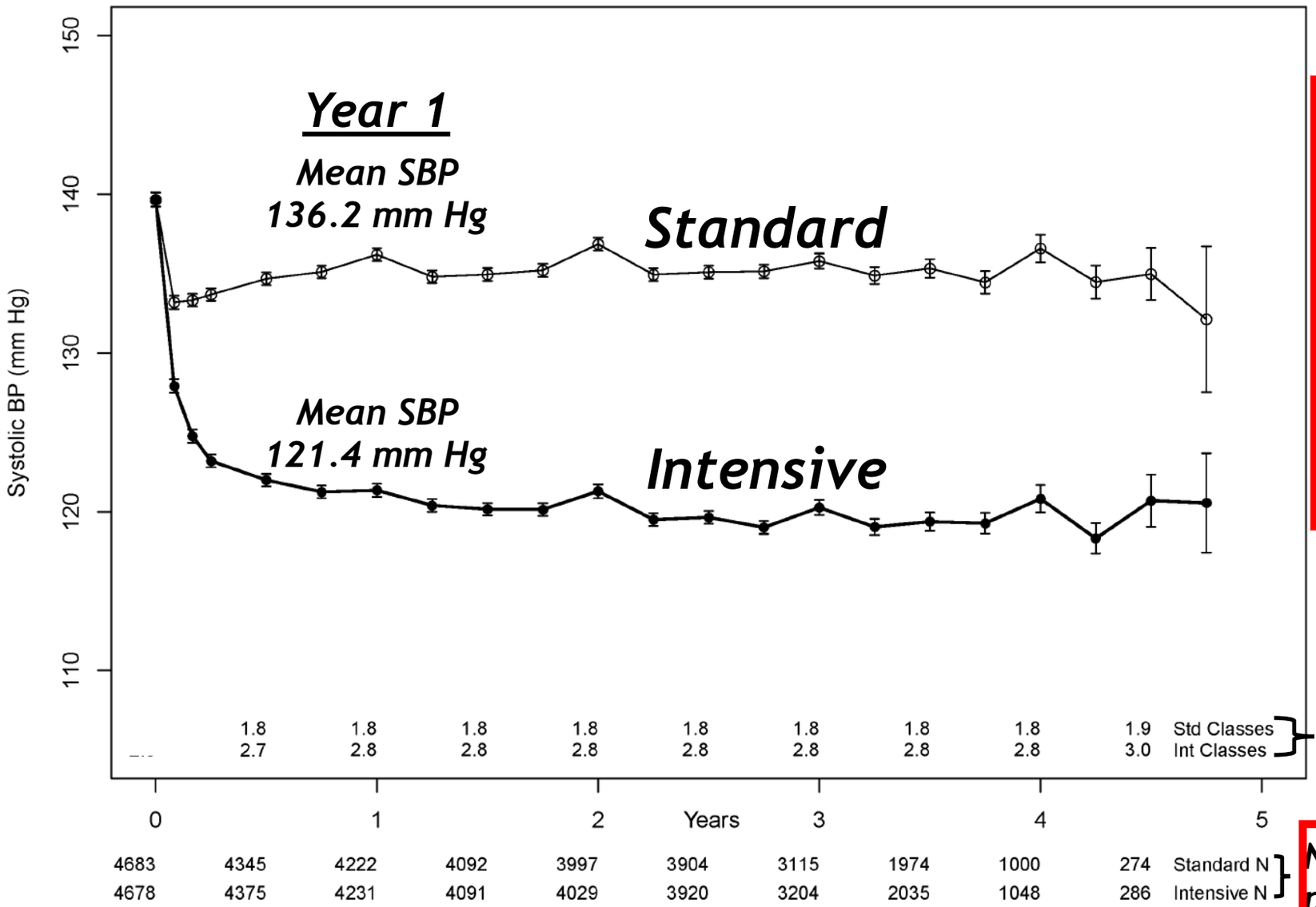
- *Stroke*
- *Diabetes mellitus*
- *Polycystic kidney disease*
- *Congestive heart failure (symptoms or EF < 35%)*
- *Proteinuria >1g/d*
- *CKD with eGFR < 20 mL/min/1.73m^2 (MDRD)*
- *Adherence concerns*

SPRINT
Systolic Blood Pressure Intervention Trial

	Total N=9361	Intensive N=4678	Standard N=4683
Mean (SD) age, years	67.9 (9.4)	67.9 (9.4)	67.9 (9.5)
% ≥75 years	28.2%	28.2%	28.2%
Female, %	35.6%	36.0%	35.2%
White, %	57.7%	57.7%	57.7%
African-American, %	29.9%	29.5%	30.4%
Hispanic, %	10.5%	10.8%	10.3%
Prior CVD, %	20.1%	20.1%	20.0%
Mean 10-year Framingham CVD	20.1%	20.1%	20.1%
Taking antihypertensive meds, %	90.6%	90.8%	90.4%
Mean (SD) number of	1.8 (1.0)	1.8 (1.0)	1.8 (1.0)
Mean (SD) Baseline BP, mm Hg			
Systolic	139.7 (15.6)	139.7	139.7
Diastolic	78.1 (11.9)	78.2	78.0 (12.0)

	Intensive		Standard			
	No. of Events	Rate, %/ year	No. of Events	Rate, %/ year	HR (95% CI)	P value
Primary Outcome	243	1.65	319	2.19	0.75 (0.64, 0.89)	<0.001
All MI	97	0.65	116	0.78	0.83 (0.64, 1.09)	0.19
Non-MI ACS	40	0.27	40	0.27	1.00 (0.64, 1.55)	0.99
All Stroke	62	0.41	70	0.47	0.89 (0.63, 1.25)	0.50
All HF	62	0.41	100	0.67	0.62 (0.45, 0.84)	0.002
CVD Death	37	0.25	65	0.43	0.57 (0.38, 0.85)	0.005

Systolic BP During Follow-up



Average SBP
(During Follow-up)

Standard: 134.6 mm Hg

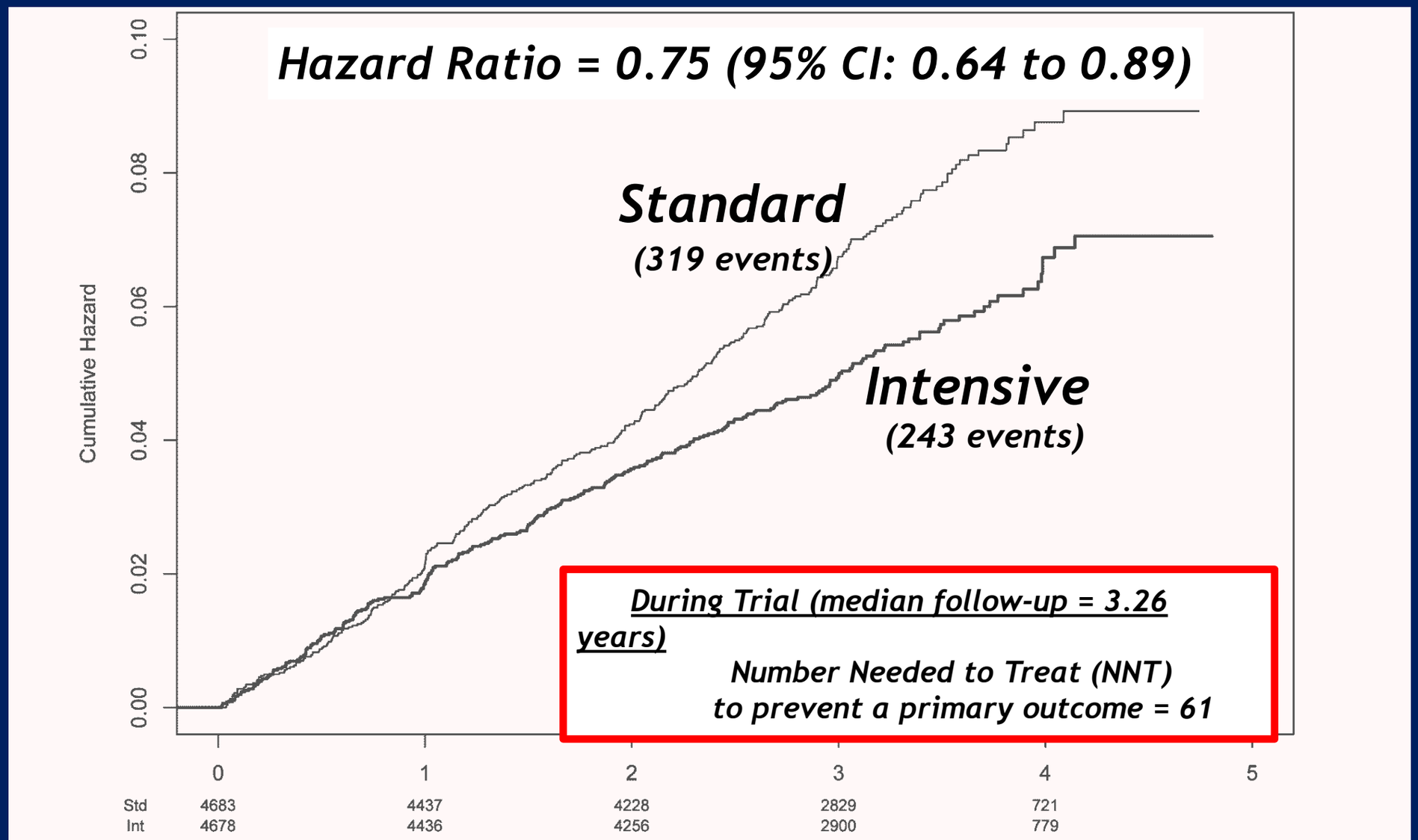
Intensive: 121.5 mm Hg

Average number of antihypertensive medications

Number of participants

SPRINT
Systolic Blood Pressure Intervention Trial

SPRINT Primary Outcome Cumulative Hazard



SPRINT
Systolic Blood Pressure Intervention Trial

Systematic Review Questions on High BP in Adults

Question Number	Question
1	Is there evidence that self-directed monitoring of BP and/or ambulatory BP monitoring are superior to office-based measurement of BP by a healthcare worker for 1) preventing adverse outcomes for which high BP is a risk factor and 2) achieving better BP control?
2	What is the optimal target for BP lowering during antihypertensive therapy in adults?
3	In adults with hypertension, do various antihypertensive drug classes differ in their comparative benefits and harms?
4	In adults with hypertension, does initiating treatment with antihypertensive pharmacological monotherapy versus initiating treatment with 2 drugs (including fixed-dose combination therapy), either of which may be followed by the addition of sequential drugs, differ in comparative benefits and/or harms on specific health outcomes?

BP indicates blood pressure.

CVD Risk Factors Common in Patients With Hypertension

Modifiable Risk Factors*	Relatively Fixed Risk Factors†
• Current cigarette smoking, secondhand smoking • Diabetes mellitus • Dyslipidemia/hypercholesterolemia • Overweight/obesity • Physical inactivity/low fitness • Unhealthy diet	• CKD • Family history • Increased age • Low socioeconomic/educational status • Male sex • Obstructive sleep apnea • Psychosocial stress

*Factors that can be changed and, if changed, may reduce CVD risk.
†Factors that are difficult to change (CKD, low socioeconomic/educational status, obstructive sleep apnea, cannot be changed (family history, increased age, male sex), or, if changed through the use of current intervention techniques, may not reduce CVD risk (psychosocial stress).
CKD indicates chronic kidney disease; and CVD, cardiovascular disease.

Categories of BP in Adults*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.
BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in DBP, diastolic blood pressure; and SBP systolic blood pressure.

Blood Pressure Categories

American Heart Association | American Stroke Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

Whelton PK, Carey RM, Aronow WS, et al. 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. J Am Coll Cardiol. 2018;71:e127-e248.

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Prevalence of Hypertension Based on 2 SBP/DBP Thresholds*†

	SBP/DBP ≥130/80 mm Hg or Self-Reported Antihypertensive Medication†		SBP/DBP ≥140/90 mm Hg or Self-Reported Antihypertensive Medication‡	
Overall, crude	46%		32%	
	Men (n=4717)	Women (n=4906)	Men (n=4717)	Women (n=4906)
Overall, age-sex adjusted	48%	43%	31%	32%
Age group, y				
20–44	30%	19%	11%	10%
45–54	50%	44%	33%	27%
55–64	70%	63%	53%	52%
65–74	77%	75%	64%	63%
75+	79%	85%	71%	78%
Race-ethnicity§				
Non-Hispanic White	47%	41%	31%	30%
Non-Hispanic Black	59%	56%	42%	46%
Non-Hispanic Asian	45%	36%	29%	27%
Hispanic	44%	42%	27%	32%

The prevalence estimates have been rounded to the nearest full percentage.
*130/80 and 140/90 mm Hg in 9623 participants (≥20 years of age) in NHANES 2011–2014.
†BP cutpoints for definition of hypertension in the present guideline.
‡BP cutpoints for definition of hypertension in JNC 7.
§Adjusted to the 2010 age-sex distribution of the U.S. adult population.
BP indicates blood pressure; DBP, diastolic blood pressure; NHANES, National Health and Nutrition Examination Survey; and SBP, systolic blood pressure.

Corresponding Values of SBP/DBP for Clinic, HBPM, Daytime, Nighttime, and 24-Hour ABPM Measurements

Clinic	HBPM	Daytime ABPM	Nighttime ABPM	24-Hour ABPM
120/80	120/80	120/80	100/65	115/75
130/80	130/80	130/80	110/65	125/75
140/90	135/85	135/85	120/70	130/80
160/100	145/90	145/90	140/85	145/90

ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; DBP diastolic blood pressure; HBPM, home blood pressure monitoring; and SBP, systolic blood pressure.

Unanswered questions. . .

1. How should BP be assessed/ reassessed?

2. What's the next step after Stage 1 at 3-6 months of lifestyle ?

3. Should BP be treated independent of CVD risk?

4. Is CVD calculation a possible barrier to early drug Rx?

5. How should other comibiditues be treated?

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What does this mean for us?

1. **PRIORITIES** - Is a new BP 🎯 likely to cause better control rates?

2. **AWARENESS** - more aggressive public health strategies?

3. **COST** - what's the additional cost of the guideline?

4. Do we need **protocols**, and not guidelines, for rapid uptake and use?

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life is why™

Global Hearts Initiative

to reduce heart attacks and strokes

The Evidence-based Treatment Protocols

HEARTS Technical Package

Strengthening cardiovascular disease management in primary care

Dr. Kenneth Connell DM PhD FACP FACC FRCP

US CDC GLOBAL HEARTS Consultant

Tuesday 28th August 2018

PAHO Headquarters

BARBADOS

More people die from cardiovascular disease (CVD) worldwide than any other cause.

Over 75% of heart disease and stroke-related death occurs in low- and middle-income countries (LMICs). A substantial proportion of these deaths (40%) are in people under the age of 70, during the more productive years of life. CVD is estimated to cost 2-4% of Gross National Income in low- and middle-income countries. The health care savings from effective management of blood pressure alone is estimated at US$100 billion per year.

TECHNICAL PACKAGE

HEARTS is part of the Global Hearts Initiative to reduce heart attacks and strokes, a strategic approach to improve cardiovascular health on a global scale.

HEARTS supports CVD management in primary care and aligns with WHO's Package of Essential NCD Interventions.

HEARTS includes:

MODULES

Healthy lifestyle
Counsel on tobacco cessation, diet, physical activity and self-care

Evidence-based treatment protocols
Simple and standardized protocols

Access to medicines and technologies
Access to a core set of affordable medicine and basic technology

Risk based management
Total cardiovascular risk assessment, treatment and referral

Team-based care and task sharing
Patient centered care through a team approach and community participation

Systems for monitoring
Patient registries and program evaluation

GUIDES

Communication
Key messages and templates

Costing
Tool to estimate cost of implementation

GLOBAL TARGETS

Sustainable Development Goal aims to reduce premature mortality from NCDs by one-third by 2030.

The Global Monitoring Framework aims to reduce premature mortality from NCDs by 25% by 2025.

IMPLEMENTATION

Participating countries, in collaboration with an international network of expert consultants, will strengthen and scale-up priority interventions within their health care delivery and policy systems at the national and subnational levels and ensure rigorous monitoring and evaluation.

PARTNERS

- National Governments
- World Health Organization and regional offices
- Pan American Health Organization
- Centers for Disease Control and Prevention
- Vital Strategies
- Professional Organizations
  - American Heart Association
  - International Diabetes Federation
  - International Society of Hypertension
  - International Society of Nephrology
  - World Heart Federation
  - World Hypertension League
  - World Stroke Organization
- Non-Governmental Organizations

Essential treatment components

1. Simple, detailed **protocols**
2. Operational procedures in place to enable **task-sharing**
3. Regular and uninterrupted supply of **medications**
4. **Patient-centered services** that reduce barriers to adherence
5. An **information system** that allows **real-time feedback** on adherence and blood pressure control of individual patients and of different treatment systems to facilitate continuous programme improvement

Available medications for treating hypertension

Main classes of common treatment medications:

1. Angiotensin Converting Enzyme inhibitors (ACE inhibitors) and Angiotensin Receptor Blockers (ARBs)
2. Calcium Channel Blockers (CCB)
3. Diuretics

Others (e.g. vasodilators, centrally acting agents, beta blockers) can be considered in specific cases.

(*Consider side effects when choosing a medication.*)

Drug selection and treatment targets

Drug selection

- Most people need two or more classes of BP meds to reach target
- Two medications of same class are not advisable
- Reach intensification dose of first agent before starting another class

Treatment targets

- General population, diabetes, CVD, and kidney disease: <140/90
- >60 years old: <150/90

HYPERTENSION PROTOCOL
CCB as first-line treatment

step 1 SCREEN ALL ADULTS

step 2 **If** BP ≥140 or ≥90* **PRESCRIBE starting dose of CCB****

After one month

step 3 **IF** still ≥140 or ≥90 **ADD starting dose of ACE-I or ARB*****

After one month

step 4† **IF** still ≥140 or ≥90 **INCREASE to full dose of ACE-I or ARB**

After one month

step 5 **IF** still ≥140 or ≥90 **INCREASE to full dose of CCB**

After one month

step 6 **IF** still ≥140 or ≥90 **ADD thiazide-like diuretic**

After one month

step 7 **IF** still ≥140 or ≥90¥ **CHECK that patient has been taking drugs regularly and correctly – IF** this is the case, **REFER patient to a specialist**

DRUGS AND DOSES‡

Class	Medication	Starting dose	Intensification dose
CCB (calcium channel blocker)	amlodipine	5 mg	10 mg
ACE inhibitor§ (angiotensin-converting-enzyme inhibitor)	lisinopril	20 mg	40 mg
	ramipril	5 mg	10 mg
	perindopril	4–5 mg	8–10 mg
ARB§	losartan	50 mg	100 mg
	telmisartan	40 mg	80 mg
diuretic§ thiazide-like	chlorthalidone¤ or indapamide SR¤	12.5 mg	25 mg
		1.5 mg	stay at 1.5 mg

PROVISION FOR SPECIFIC PATIENTS

- Manage diabetes as indicated by national protocol.
- Aim for BP <130/80 for people at high risk, such as individuals with diabetes, CAD, stroke, or CKD.

LIFESTYLE MANAGEMENT ADVICE FOR ALL PATIENTS

- Stop all tobacco use, avoid secondhand tobacco smoke.
- Drink no more than two units of alcohol per day and do not drink on at least two days of the week.
- Increase physical activity to equivalent of brisk walk 150 minutes per week.
- If overweight, lose weight.
- Eat heart-healthy diet:
  - Eat a low-salt diet.
  - Eat ≥5 servings of vegetables/fruit per day.
  - Use healthy oils (e.g. olive, safflower).
  - Eat nuts, legumes, whole grains and foods rich in potassium.
  - Limit red meat to once or twice a week at most.
  - Eat fish or other food rich in omega 3 fatty acids (e.g., flax seeds) at least twice a week.
  - Avoid added sugar from cakes, cookies, sweets, fizzy drinks and juice.

* Or other BP target, as determined by clinical factors. If BP ≥160 or ≥100, start same day. If 140–159 or 90–100, check on a different day and if still elevated, start.

** Consider statin use. Consider increasing to intensification dose CCB before introducing ACE-I/ARB.

*** ACE-I or ARB according to local guidelines/costs/intolerance to ACE-I. ACE-Inhibitors cause chronic cough in approximately 10% of patients. Neither ACE-I nor ARBs should be given to pregnant women.

† Consider optional switch of steps 3 and 4 (ACE-I) with step 6 (thiazide-like diuretic).

¥ Consider increase to full dose diuretic. Hypokalaemia more common using full dose diuretic – consider increased lab monitoring.

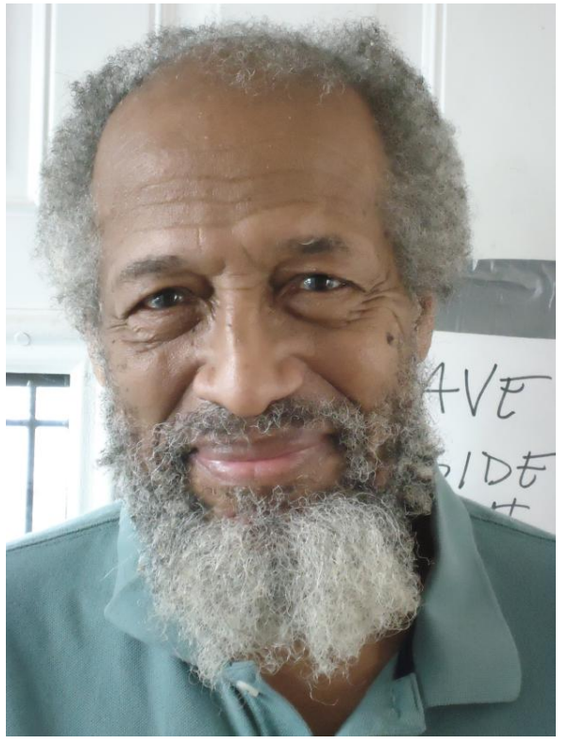
‡ These are suggested examples of medications based on scientific evidence, once-daily suitability, common usage, and availability.

§ Before initiating and several weeks after starting ACE-Is, ARBs or diuretics, consider checking serum creatinine and potassium.

¤ If neither diuretic agent is available, hydrochlorothiazide can be used (25 mg starting, 50 mg full) or indapamide (1.25 mg starting, 2.5 mg full) can be used.

9 February 2018

Three Patients have just been referred with “High BP”



AC, 27

BW, 70

TB, 93

BW - 70years - Case 2

- “You look like my grandson”
- Hx of palpitations
- Retired Housekeeper at Sandy Lane
- Type 2 DM, RA, “funny heart rhythm”
- Fully ~~compliant~~ adherent with meds - too many

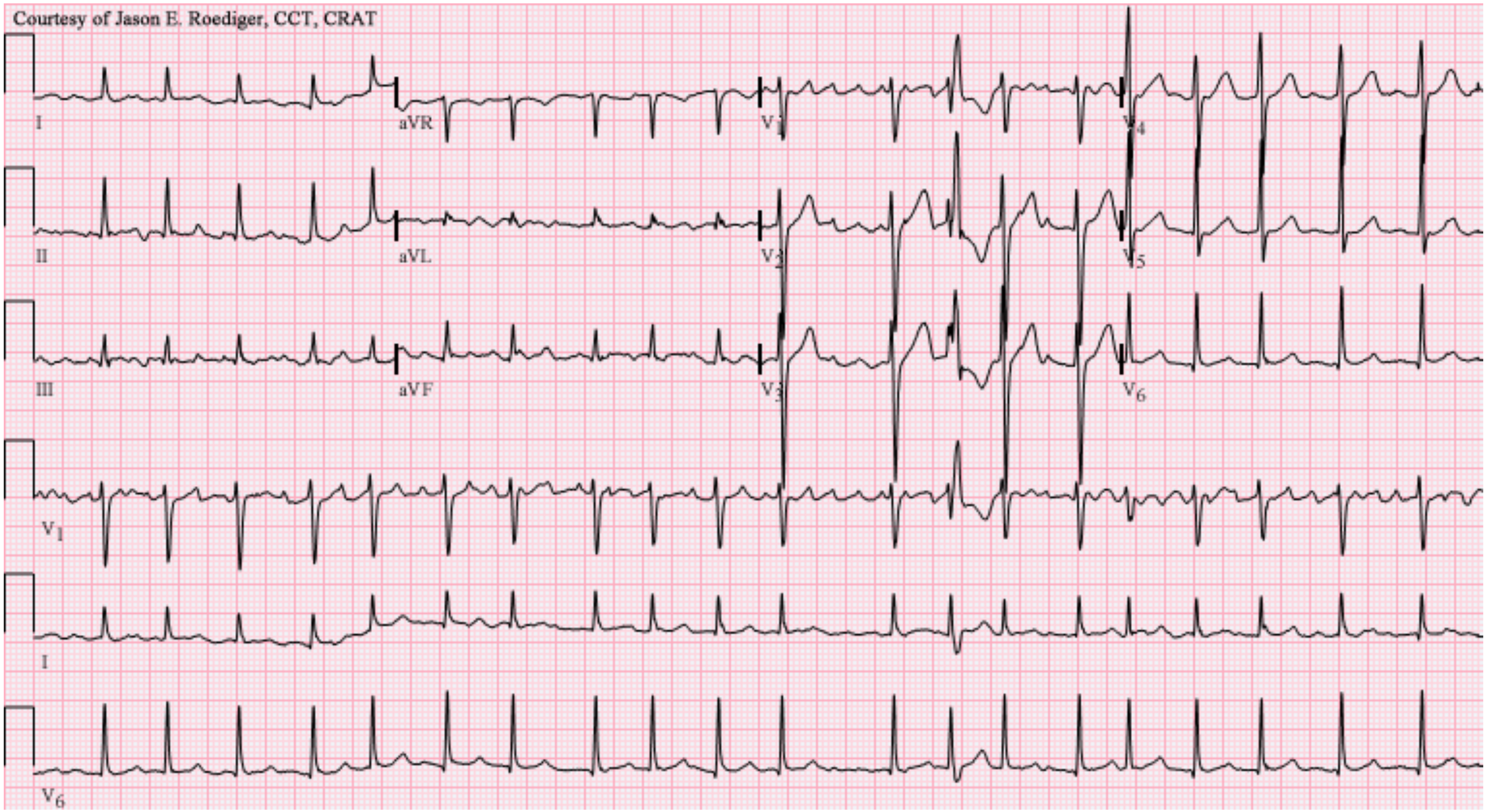
Drug Cocktail

- Indapamide SR 1.5 mg po od
- Enalapril 20mg po bd
- Amlodipine 10 mg po od
- Furosemide 20 mg po od
- Atenolol 100mg po od
- Minoxidil 5 mg po bd
- Warfarin 4mg at night

BW - 70years - Case 2

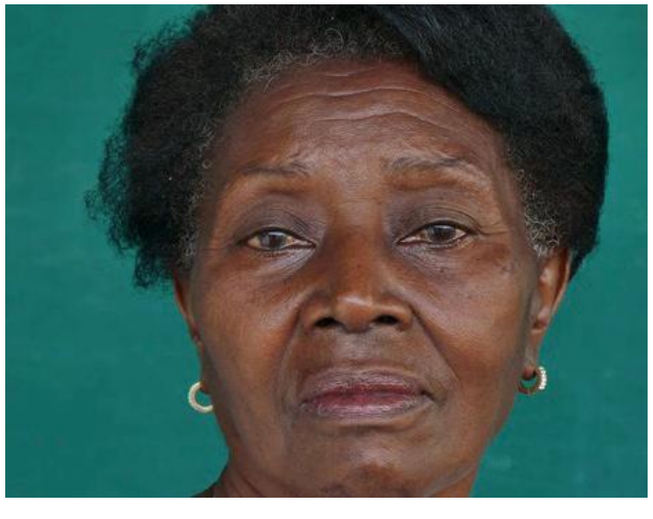
- RA changes
- Pulse irregularly irregular
- Apex displaced 6LICS MCL
- HS 1, HS 2, HS 4
- Eyes - KWB stage 3

BW - 70years - Case 2



AP 53 - Case 2

BP reading	Supine	Seated	Standing
1	168/74 (45)	81/56 (99)	164/81 (54)
2	94/34 (118)	205/110 (34)	172/80 (32)
3	165/72 (57)	161/74 (58)	160/75 (50)
Average			



BW - 70years - Case 2

Which of the following is the NEXT BEST STEP in this patient's management?

A. Switch atenolol to carvedilol, stop anticoagulation based on age

B. Switch atenolol to bisoprolol, stop anticoagulation based on age

C. Switch atenolol to carvedilol, continue anticoagulation at target INR

D. Switch indapamide to Chlorthalidone, stop anticoagulation based on age

E. Switch indapamide to Chlorthalidone, continue anticoagulation at target INR

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QUESTIONS?

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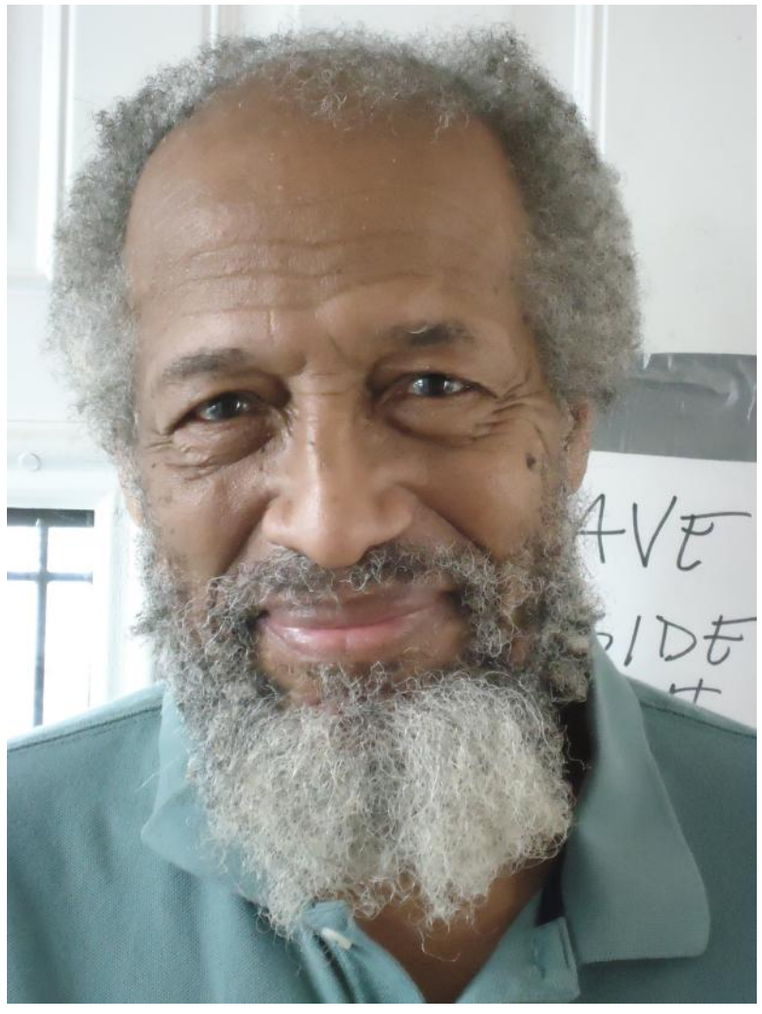
TB - 98 years - Case 3

- “Retired, but I work”
- Still participates in the Senior Games at QRC
- BPH, glaucoma, pacemaker
- PE - KWB 2, S4
- “I just can’t get the top number down” . . .



Cocktail as below

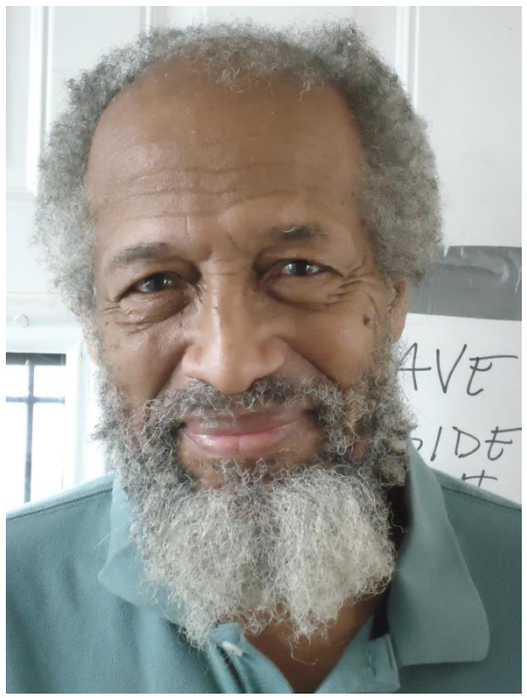
- Chlorthalidone 25 mg po od
- Amlodipine 10 mg po od
- Carvedilol 25mg bd
- Warfarin 4mg at night

Selected Labs

- UA 545
- Na 135
- K 2.8
- U 4.8
- Creat 125

TB - 98 years - Case 3

BP reading	Supine	Seated	Standing
1	168/74 (50)	160/78 (50)	164/81 (50)
2	174/69 (50)	165/75 (50)	172/80
3	165/72 (50)	161/74 (50)	160/75 (50)
Average			



TB - 98 years - Case 3

Which of the following is the NEXT BEST STEP in this patient's management?

A. Given his age, his BP in on target. Reassure only.

B. Given the wide pulse pressure, he has arterial stiffness. Reassure only.

C. Switch his carvedilol to bisoprolol

D. Add spironolactone 25mg od

E. Increase his chlorthalidone to 50mg od

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