

# IMET 2000 PAL

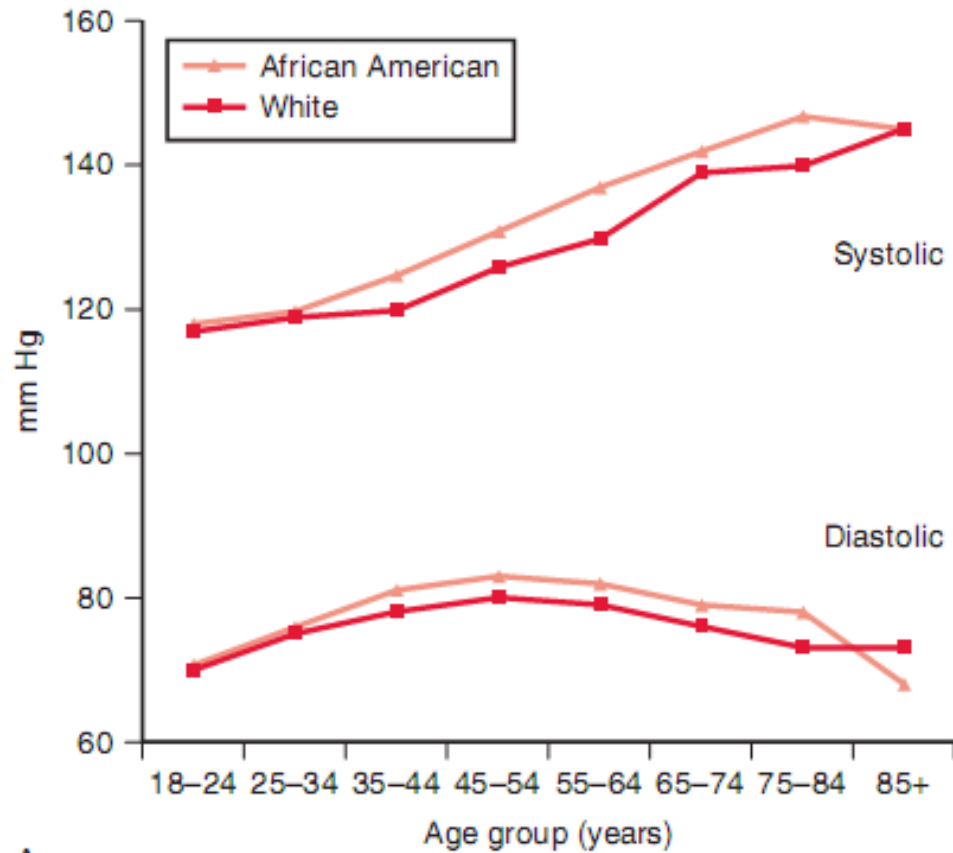
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## What the GP Should Know about Hypertension

Raed Abu Sham'a, M.D  
Internist and Cardiologist  
Cardiac Pacing and Electrophysiologist

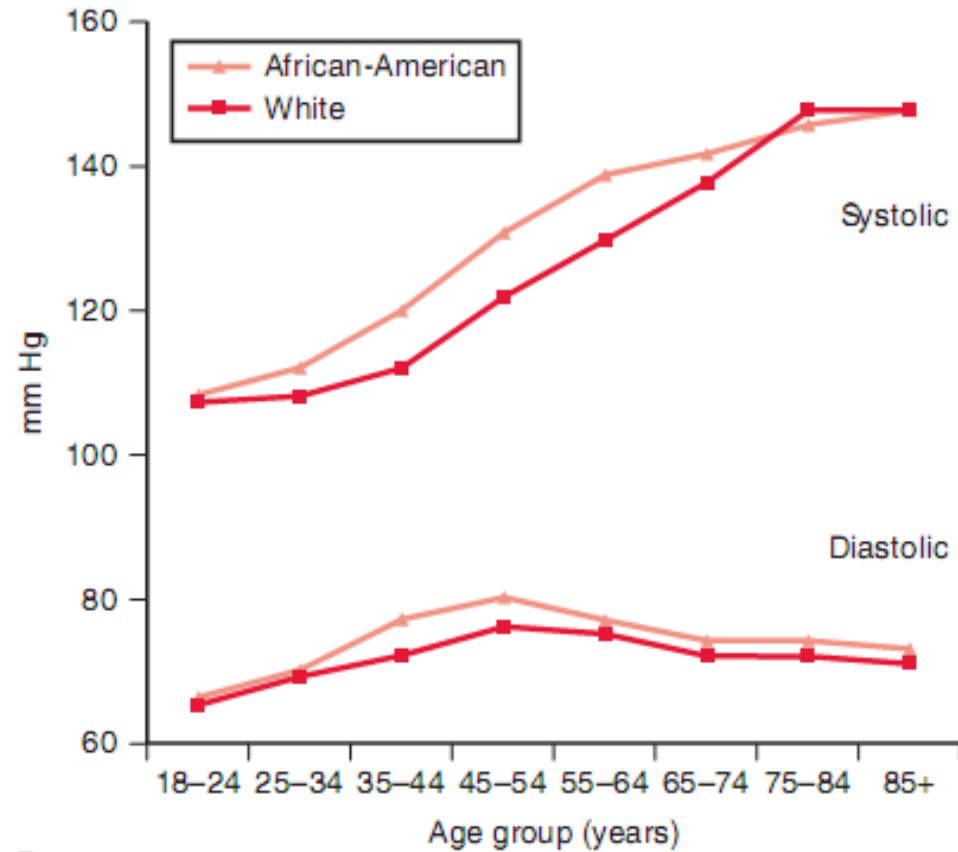
# Impact of Age on Blood Pressure

MALES



A

FEMALES



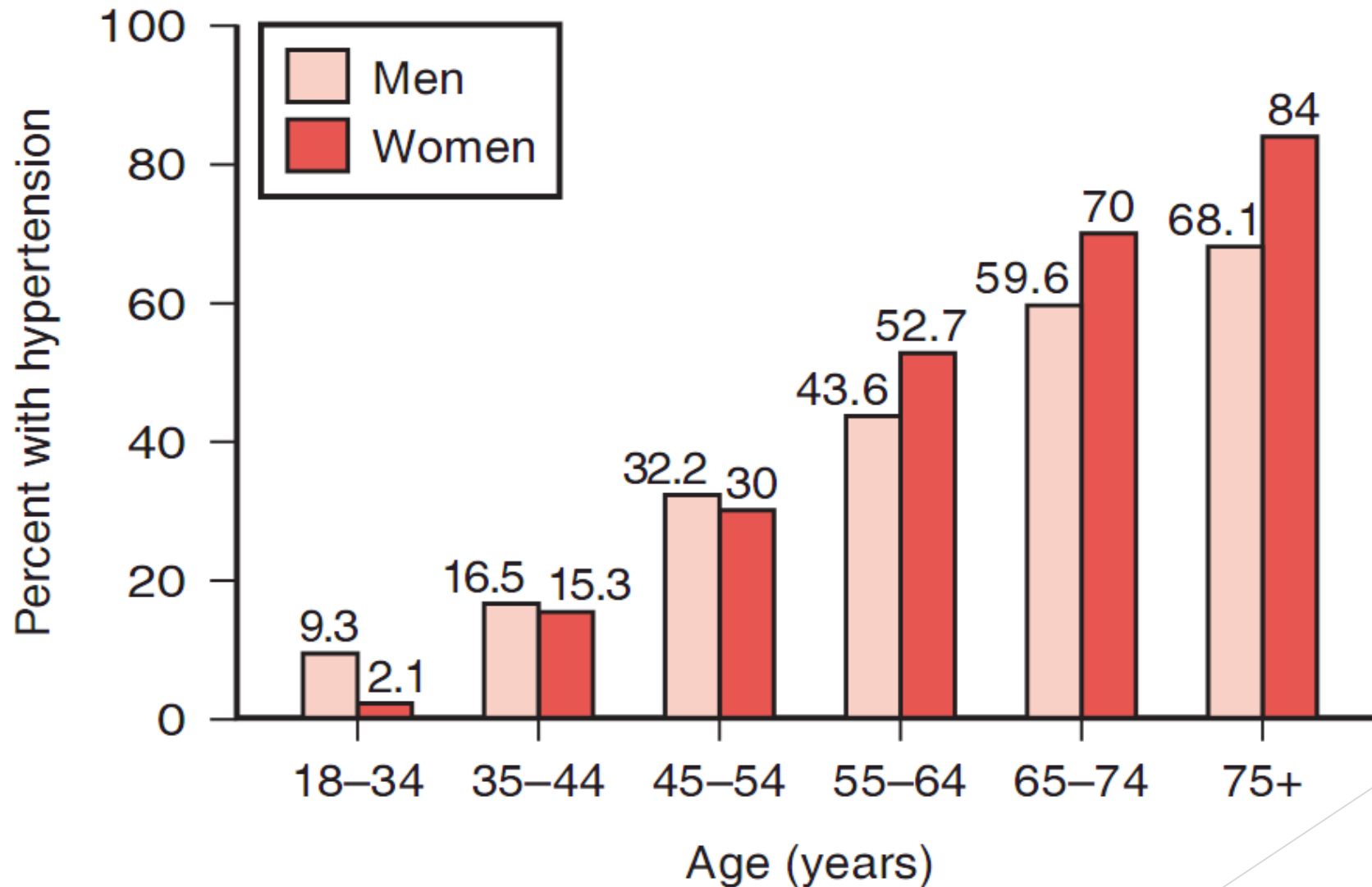
B

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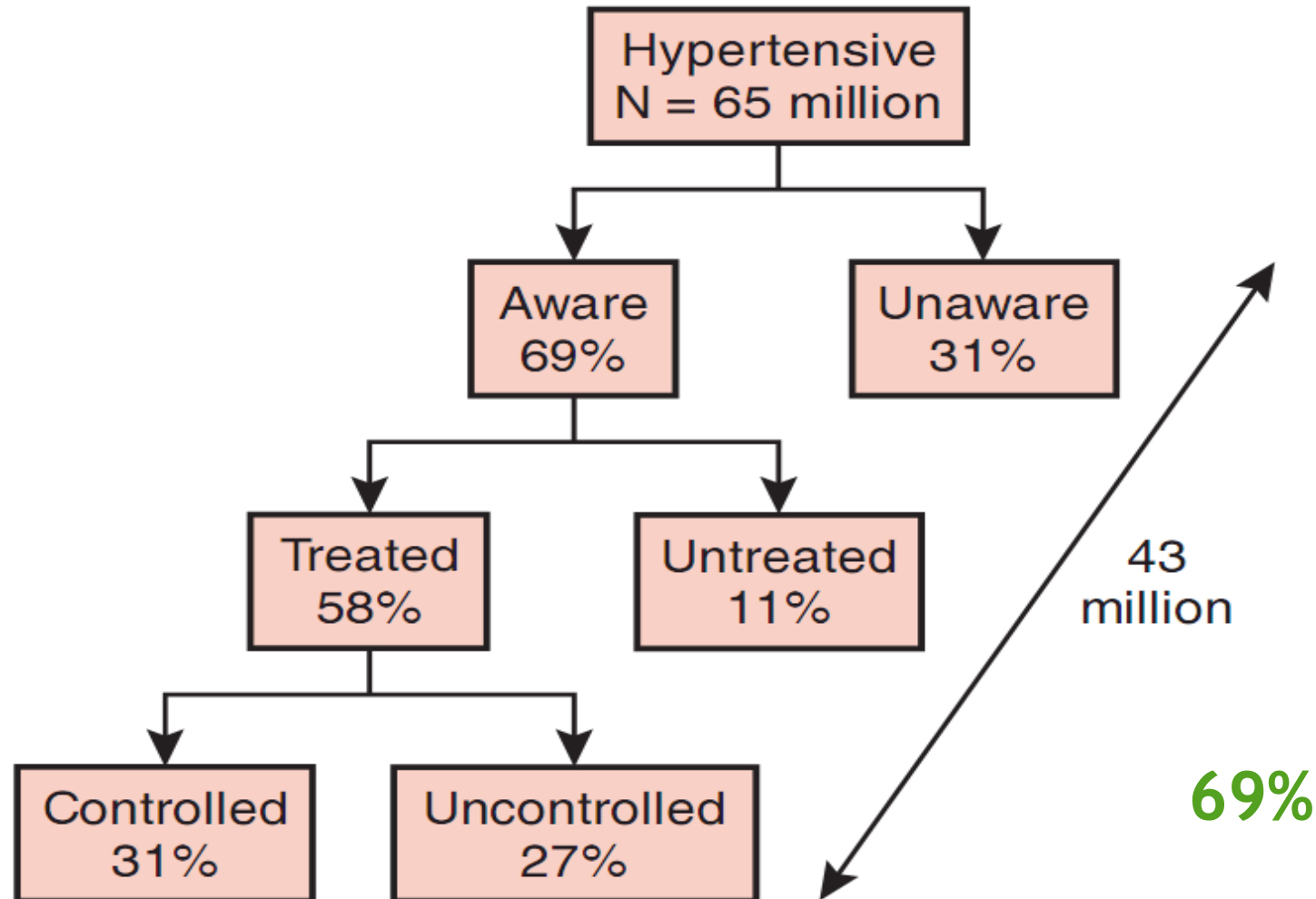
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# Prevalence of HTN according to Age



# Fast Facts about HTN in USA

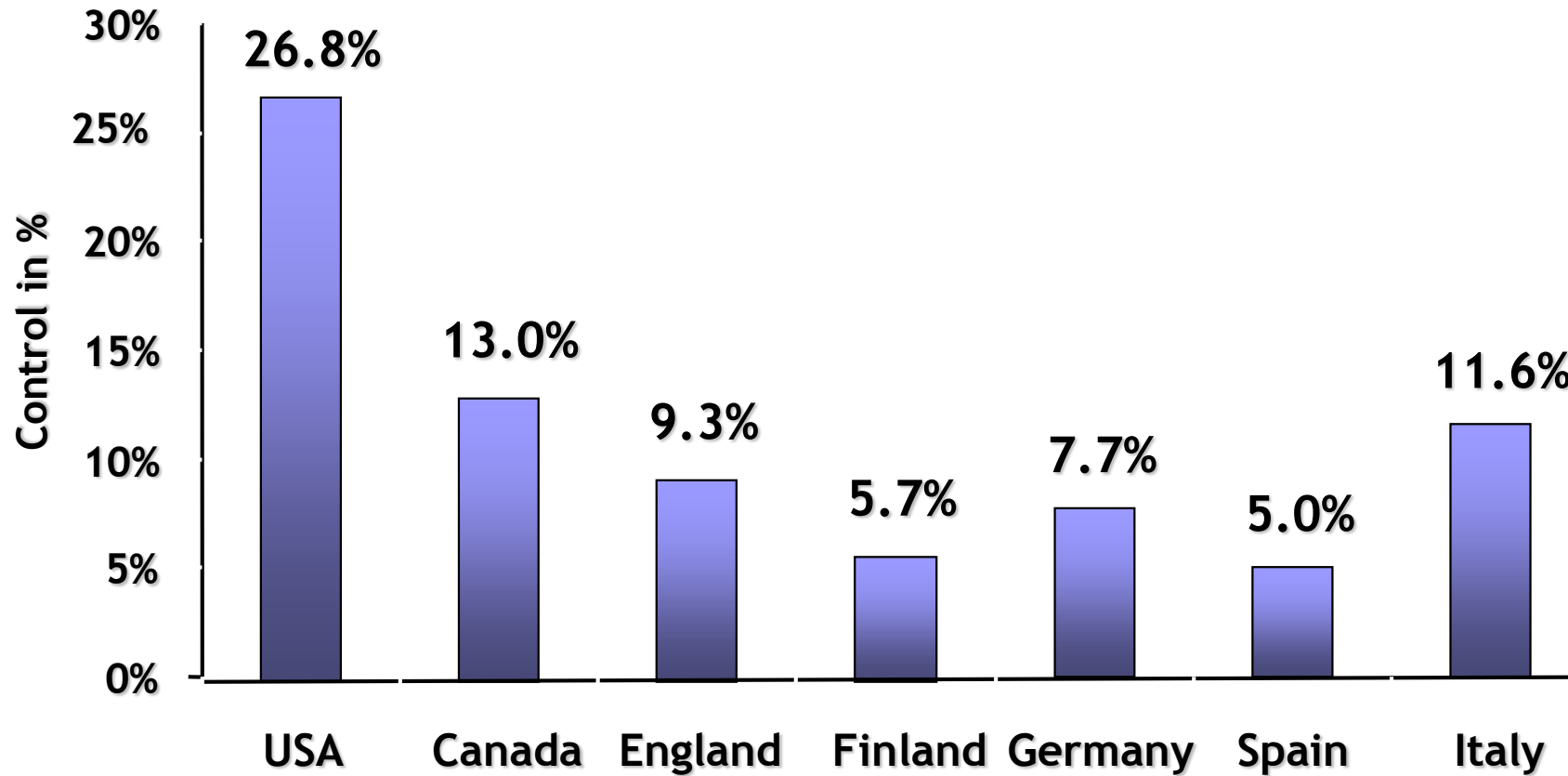


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# Hypertension Control in Europe and North America



Wolf-Maier K et al, *Hypertension* 2004;43:10-17

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# MetS and cardiovascular risk factors among Palestinians of East Jerusalem

*R.A.H. Abu Sham'a,<sup>1</sup> A.K. Darwazah,<sup>2</sup> F.H. Kufri,<sup>1</sup> I.H. Yassin<sup>1</sup> and N.I. Torok<sup>1</sup>*

المتلازمة الاستقلابية وعوامل الخطر القلبي الوعائي بين الفلسطينيين في القدس الشرقية  
رائد عبد الرحيم حسن أبو شمعة، أحمد خالد دروزة، فادي حسن الكفري، عز الدين حسين ياسين،  
نظام إبراهيم الترك

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**Table 1 Characteristics of the study sample by sex**

<b>Variable</b>	<b>Total (n = 342)</b>	<b>Women (n = 193)</b>	<b>Men (n = 149)</b>	<b>P-value</b>
Metabolic syndrome <sup>a</sup> [No. (%)]	115 (33.6)	71 (36.8)	44 (29.5)	0.159
Age [mean (SD)] (years)	38.0 (10.9)	37.7 (10.0)	38.4 (12.0)	0.594
Married (%)	88.0	90.7	84.6	0.08
Risk factors for CAD				
Diabetes (%)	12.6	11.9	13.4	0.677
Hypertension <sup>b</sup> (%)	13.2	11.4	15.4	0.273
Established CAD (%)	2.9	2.4	4.0	0.287
Dyslipidaemia (%)	8.2	9.3	6.7	0.382
Current smoker (%)	28.4	7.3	55.7	< 0.001
Family history of CAD (%)	38.0	40.4	34.9	0.297
Family history of diabetes (%)	57.6	56.5	59.1	0.632
Regular physical activity (%)	7.6	2.1	14.8	< 0.001
WC [mean (SD)] (cm)	91.2 (14.0)	89.4 (14.4)	93.5 (13.2)	0.007
Central obesity (%)	67.0	74.6	57.0	0.001
BMI [mean (SD)] (kg/m <sup>2</sup> )	29.3 (6.1)	30.4 (6.6)	27.9 (5.1)	< 0.001
Obesity (BMI ≥ 30 kg/m <sup>2</sup> ) (%)	45.0	51.3	36.9	0.008
Hypertension <sup>c</sup> (%)	23.4	22.8	24.2	0.768

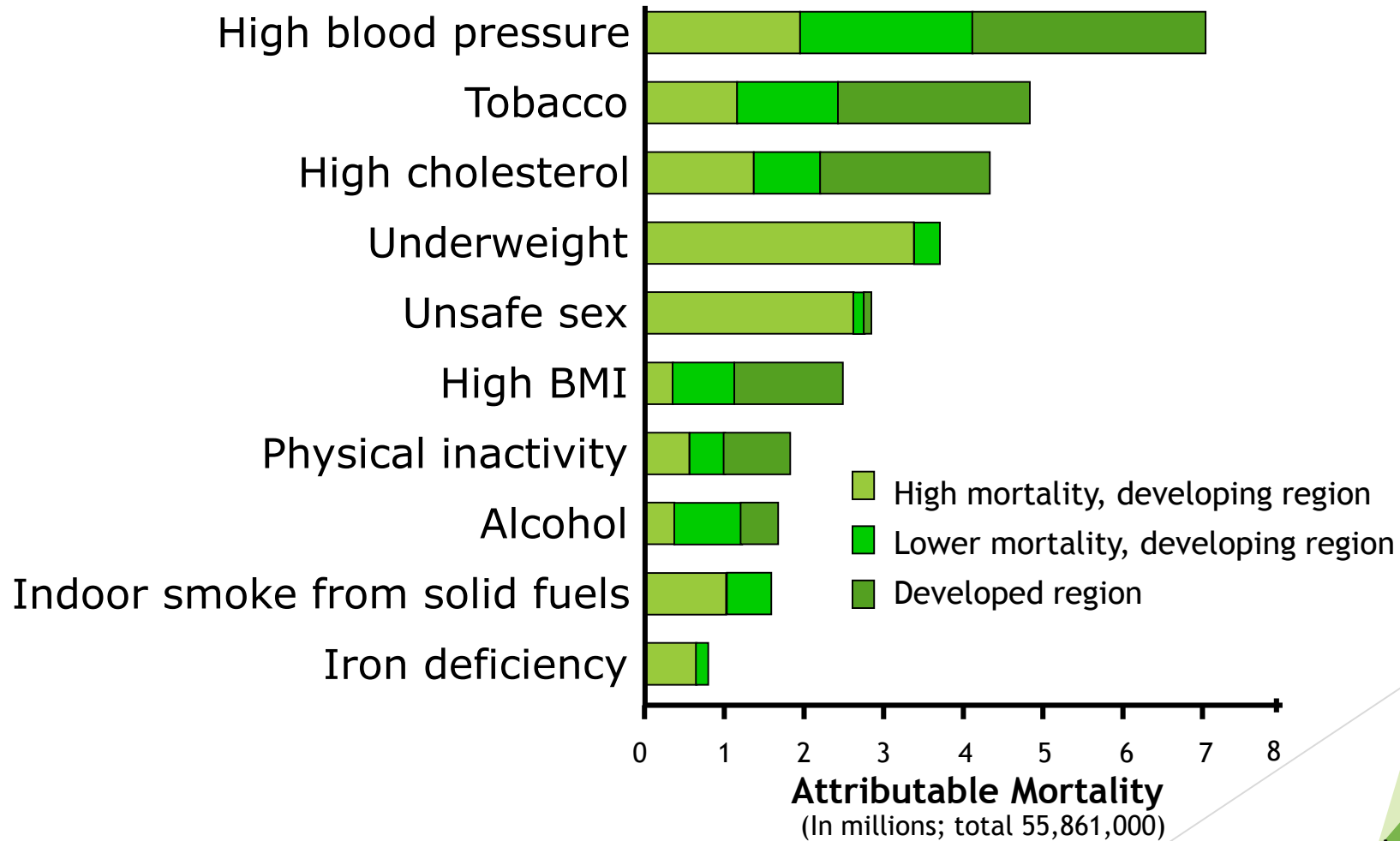
Table 3 Prevalence of metabolic syndrome components overall and in men and women

Variable	Total (n = 342) %	Women (n = 193) %	Men (n = 149) %	P-value
Central obesity	67.0	74.6	57.0	0.001
Hypertriglyceridaemia	34.5	27.5	43.6	0.002
Low HDL-C	45.0	45.1	45.0	1.000
Raised blood pressure <sup>a</sup>	35.9	37.8	32.9	0.364
Diabetes				
Dysglycaemia	25.4	29.5	20.1	0.048
Diabetes	12.6	11.9	13.4	0.743
New onset diabetes	1.8	2.1	1.3	0.700
IFG	11.1	15.5	5.4	0.003
Insulin resistance	27.2	26.4	28.2	0.715

<sup>a</sup>Blood pressure  $\geq$  130/85 mmHg or being treated for hypertension.



# Proportion of deaths attributable to leading risk factors worldwide (2000)



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# Hypertension as a Risk Factor

*Hypertension is a significant risk factor for:*

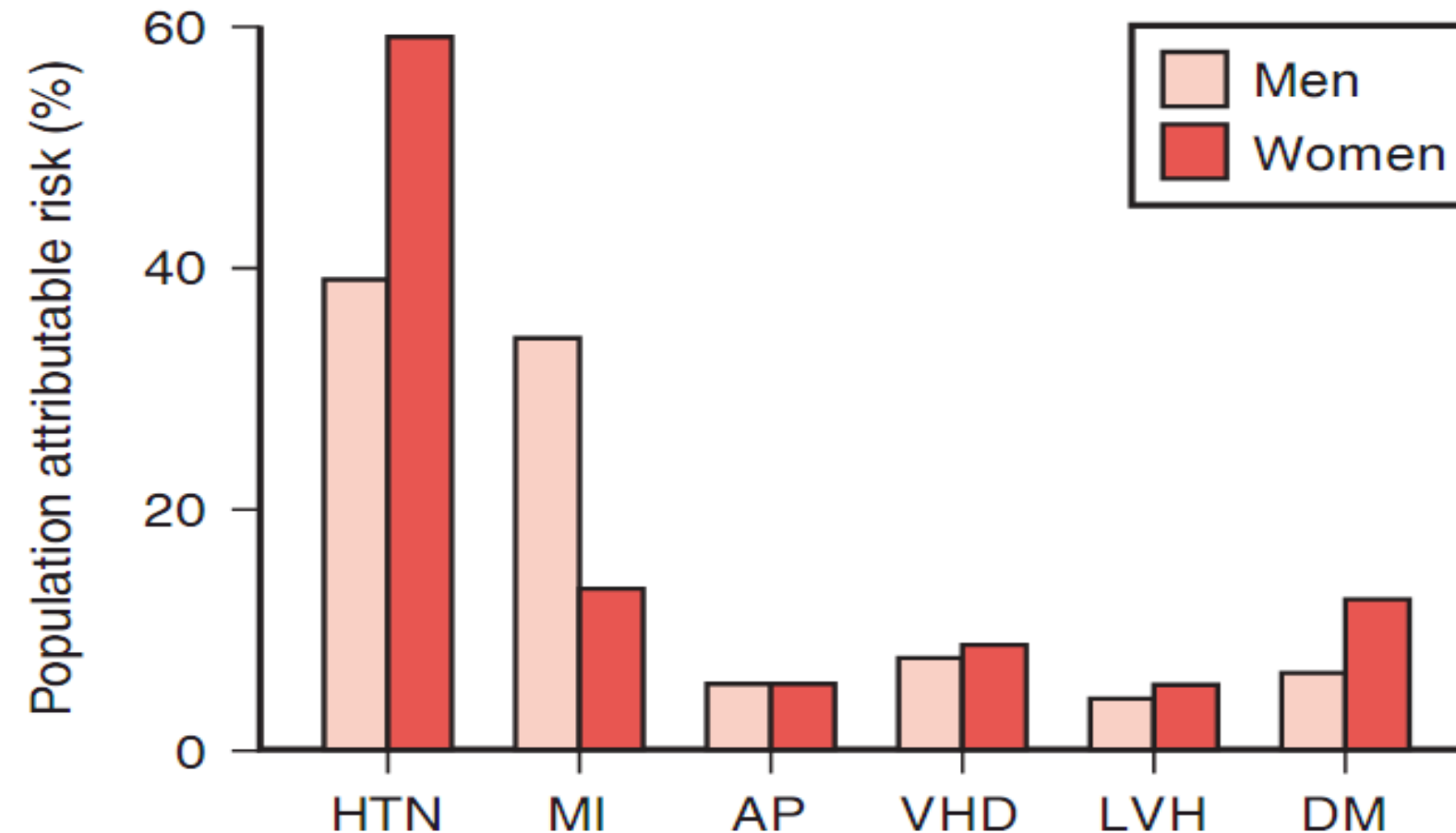
- ▶ Cerebrovascular disease
- ▶ Coronary artery disease
- ▶ Congestive heart failure
- ▶ Renal failure
- ▶ Peripheral vascular disease
- ▶ Dementia
- ▶ Atrial fibrillation

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# Hypertension and Heart Failure



Hazards ratio for HF

Men	2.07	6.34	1.43	2.47	2.19	1.82
Women	3.35	6.01	1.68	2.13	2.85	3.73

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# CVD Risk Factors

- ▶ HTN
- ▶ Diabetes
- ▶ Obesity
- ▶ Dyslipidemia
- ▶ Cigarette Smoking
- ▶ Inactivity
- ▶ Age:
  - >55 in men
  - >65 in women
- ▶ Family history of premature CVD

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# Classification of HTN in Adults

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# Classification of HTN in Adults

<b>Classification</b>	<b>SBP (mmHg)</b>		<b>DBP (mmHg)</b>
<b>Normal</b>	<b>Less than 120</b>	<b>and</b>	<b>Less than 80</b>
<b>Prehypertension</b>	<b>120-139</b>	<b>or</b>	<b>80-89</b>
<b>Stage 1 hypertension</b>	<b>140-159</b>	<b>or</b>	<b>90-99</b>
<b>Stage 2 hypertension</b>	<b><math>\geq 160</math></b>	<b>or</b>	<b><math>\geq 100</math></b>

# Classification of Hypertension

Category	Systolic		Diastolic
<b>Optimal</b>	<120	and / or	<80
<b>Normal</b>	<130	and / or	<85
<b>High-Normal</b>	130-139	and / or	85-89
<b>Grade 1</b> (mild hypertension )	140-159	and / or	90-99
<b>Grade 2</b> (moderate HTN)	160-179	and / or	100-109
<b>Grade 3</b> (severe HTN)	≥ 180	and / or	≥ 110
<b>Isolated Systolic HTN (ISH)</b>	≥ 140	and / or	< 90

The category pertains to the highest risk blood pressure

\*ISH=Isolated Systolic Hypertension. *J Hypertens* 2007;25:1105-87

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# Classification for Adults

- ▶ Classification based on average of > 2 properly measured seated BP measurements from > 2 clinical encounters
- ▶ If systolic & diastolic blood pressure values give different classifications, classify by highest category
- ▶ > 130/80 mmHg: above goal for patients with diabetes or chronic kidney disease

A landscape photograph showing a vast green field with several dark, winding tracks or paths. In the upper left, a large, bright yellow sun is partially visible against a clear sky. The overall scene is peaceful and open.

# How We Measure BP Appropriately?

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# Tips for Blood Pressure Measurement

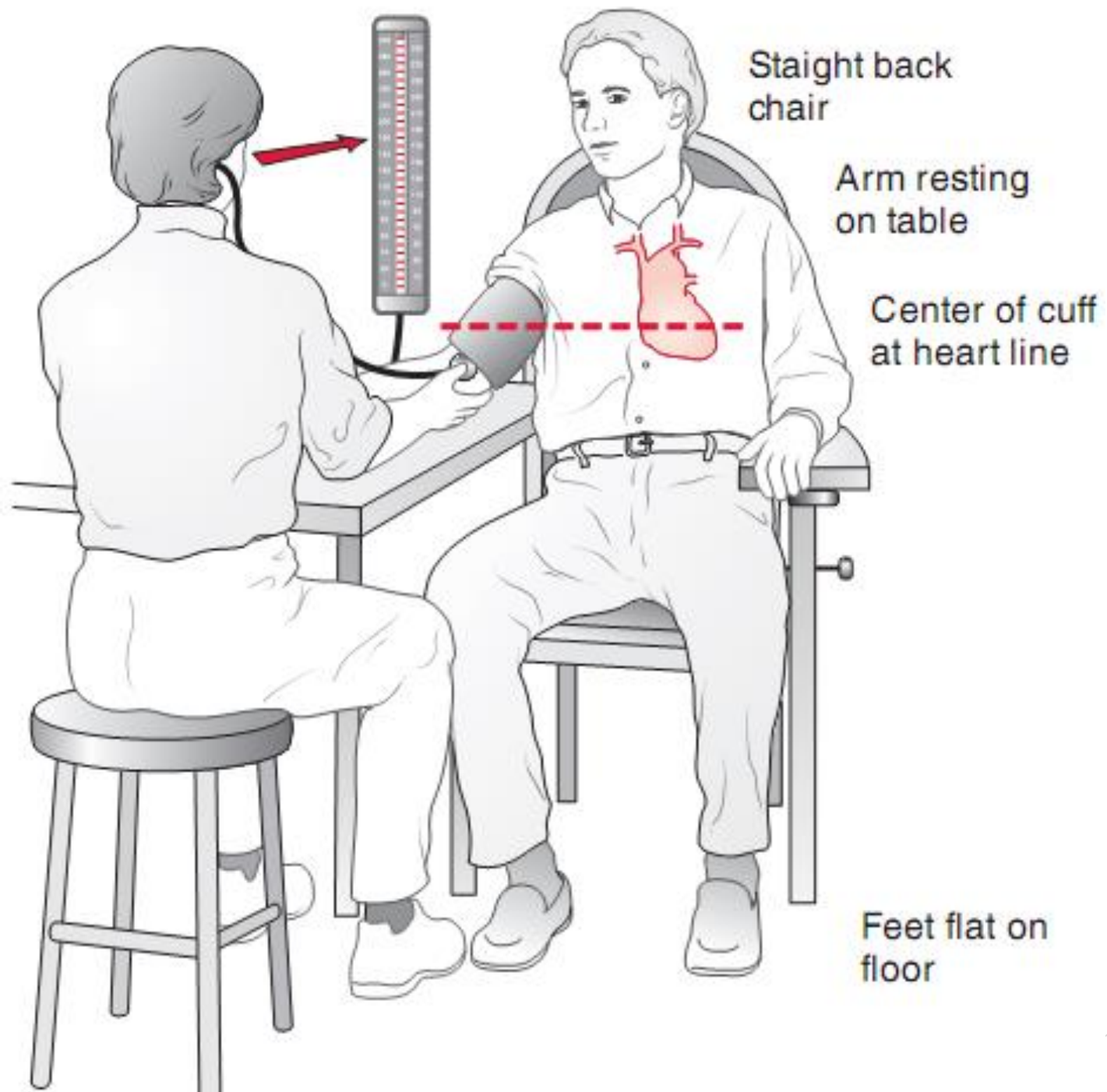
- ▶ **NO** coffee or cigarette smoking for 30 minutes before the measurement.
- ▶ The patient should sit down for five minutes before test.
- ▶ The measurement should be done in a seating position.
- ▶ Set the patient's arm on a table.
- ▶ The measurement should be done when the arm is exposed.



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# Tips for BP Measurement

- ▶ Get 2 readings from both arms at first visit with five minutes apart.
- ▶ Tell your patients which is the arm of the higher reading.
- ▶ Always record from the highest arm thereafter.
- ▶ Tell your patient the result in numbers.





# FACT

Inaccurate blood pressure tests could affect millions

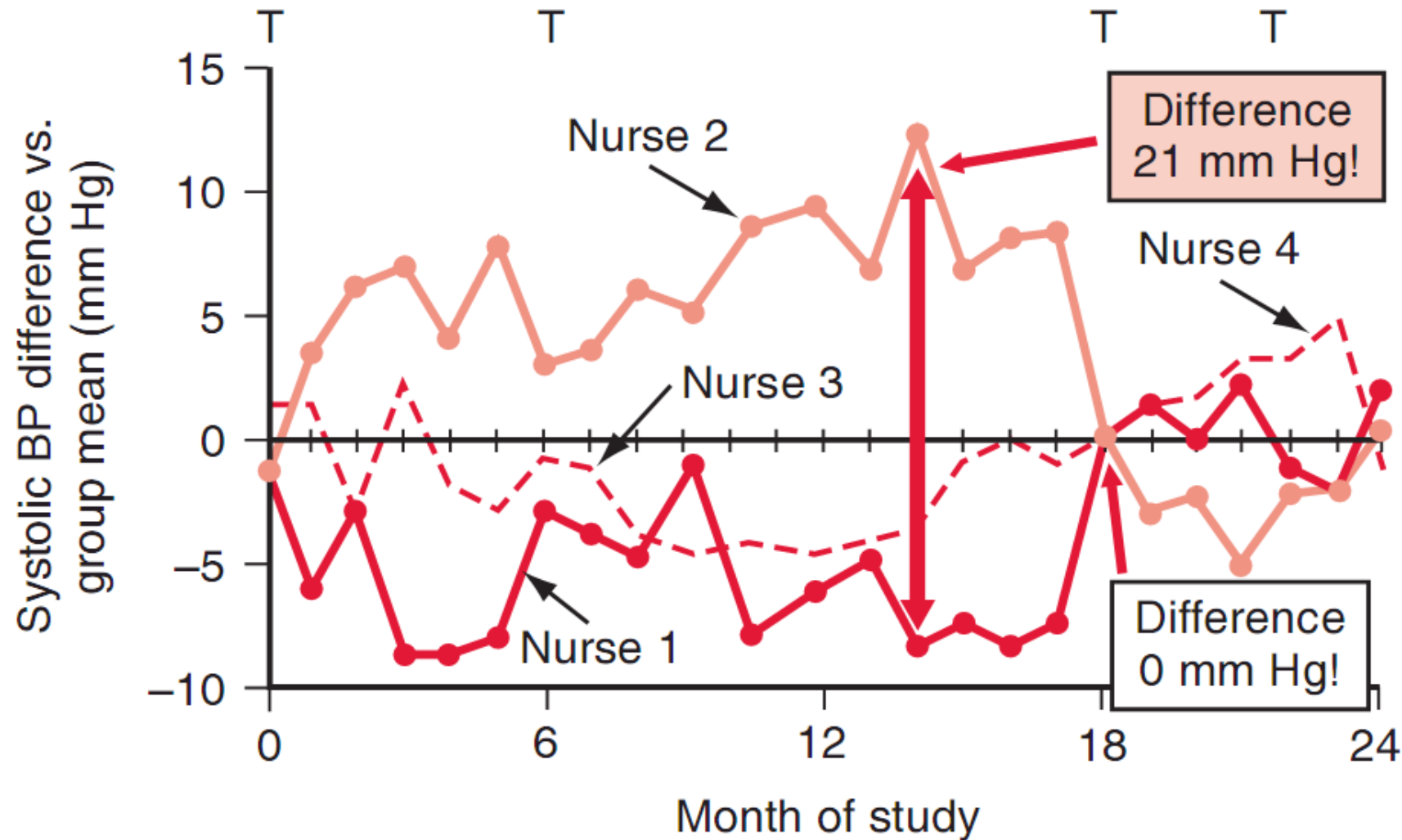


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# Training and measurement differences in blood pressure



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# BP measurement

## 1. Auscultation method: [mercury]

- ▶ Should be available in all clinical areas
- ▶ Taught to all healthcare workers
- ▶ Used to check oscillometric (automatic) monitors
- ▶ Always used in certain clinical conditions: arrhythmias; pre-eclampsia; certain vascular disorders



## 2. Non-mercury auscultation method:

Available in all clinical areas



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# BP measurement



## 3. Oscillometric monitors (automatic):

- ▶ Not suitable for diagnosis of HTN
- ▶ Not suitable for Arrhythmias; pre-eclampsia; certain vascular diseases

## 4. Aneroid monitors:

- ▶ Aneroid dial gauges easily prone to damage from dropping, causing significant errors in zero & calibration
- ▶ Suitable for HBPM



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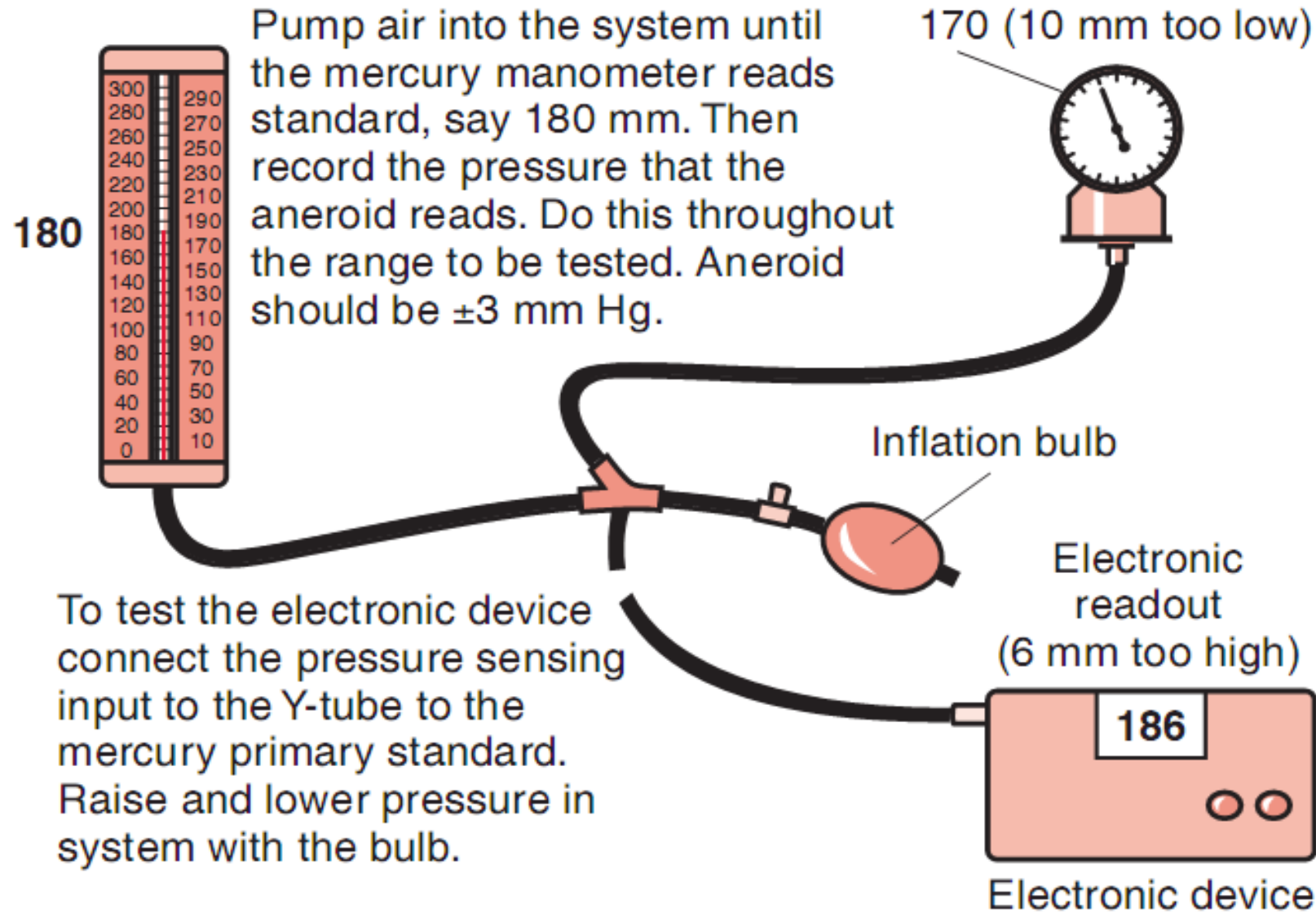


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# Calibrating Manometers Against the Mercury Column





# Blood Pressure Measurement

## Myths & Facts



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# what size cuff?

Size does  
matter



Using too small a cuff/bladder  
can overestimate the blood pressure

Bladder should encircle arm by 80-100%



For cuff size follow manufacturer's recommendations

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## Too tight clothing



if the sleeves are too tight or bulky they act as a tourniquet giving inaccurate readings



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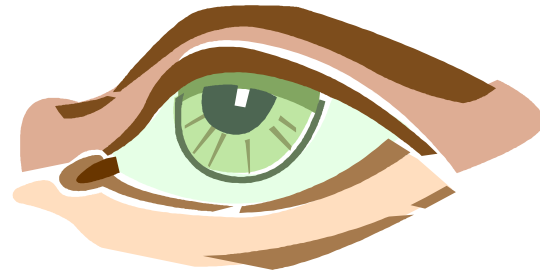
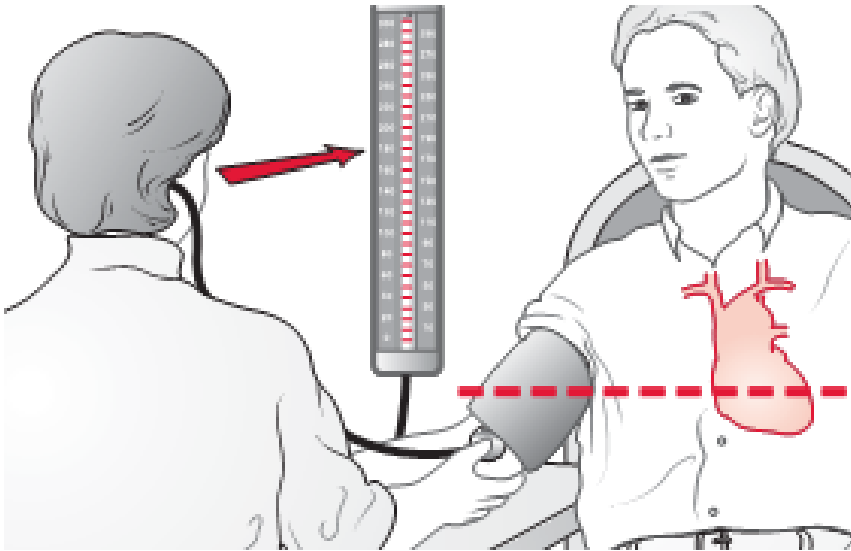
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## MYTH:

Mercury sphygmomanometer should be positioned level with the patients heart?

It should be level with the examiner's eye



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## MYTH:

The position of the arm is unimportant  
During BP measurement?

## FACT:

The arm should be well supported  
at HEART level (both sitting & standing)

An unsupported arm is performing  
isometric exercise thus raising BP

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At what rate should the cuff be deflated on a mercury or Greenlight sphygmomanometer?

FACT:

2mm/Hg per second



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*How we evaluate a patient with*

*“Newly Diagnosed HTN”?*

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# Objectives of Patient Evaluation

1. Assess lifestyle and identify other CV risk factors
2. Reveal identifiable causes of high BP
3. Assess the presence or absence of **target organ damage** and **CVD**

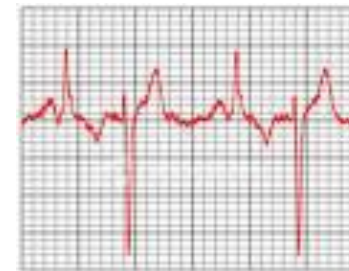
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# Routine investigations

- ▶ Urine tests for protein and blood
- ▶ Serum creatinine and electrolytes
- ▶ Fasting blood glucose
- ▶ Lipid profile
- ▶ Electrocardiogram
- ▶ Chest x-ray **no longer routinely indicated**



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# Etiology

## ▶ Essential hypertension:

- ▶ > 90% of cases
- ▶ hereditary component

## ▶ Secondary hypertension:

- ▶ < 10% of cases
- ▶ common causes: CKD, renovascular disease
- ▶ other causes: drugs, natural products, food

# Identifiable Causes of Hypertension

- ▶ Obstructive Sleep Apnea Syndrome
- ▶ Chronic kidney disease
- ▶ Renovascular disease
- ▶ Drug-induced
- ▶ Cushing's syndrome
- ▶ Thyroid or parathyroid disease
- ▶ Primary aldosteronism
- ▶ Pheochromocytoma
- ▶ Coarctation of the aorta

# Causes of 2° Hypertension

## ► Prescription drugs:

- NSAIDs, COX-2 inhibitors
- Prednisone, Triamcinolone
- Decongestants
- Estrogens: oral contraceptives
- Amphetamines/Anorexiant
- Cyclosporine, Tacrolimus
- Erythropoietin

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# Causes of 2° Hypertension

- ▶ Food substances:

- ▶ Sodium
- ▶ Ethanol
- ▶ Licorice



# Causes of 2° Hypertension

Street drugs, other natural products:

- ▶ Herbal ecstasy
- ▶ Nicotine withdrawal
- ▶ Cocaine abuse and cocaine withdrawal
- ▶ Narcotic withdrawal

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# Clinical Features of OSAS

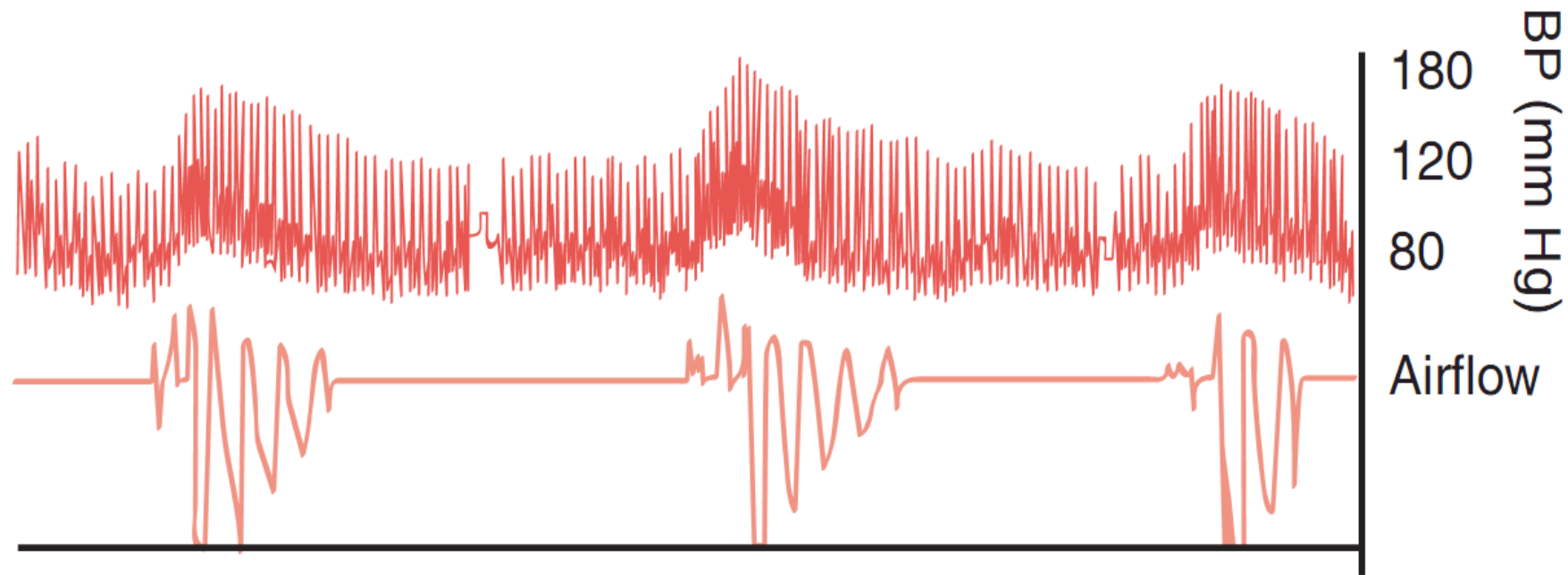
## **Daytime**

Excessive daytime sleepiness  
Impaired concentration  
Irritability/personality change  
Decreased libido

## **Night-time**

Snoring  
Unrefreshing sleep  
Choking episodes during sleep  
Witnessed apneas  
Restless sleep  
Nicturia

# Acute BP changes during and immediately following an obstructive apneic episode

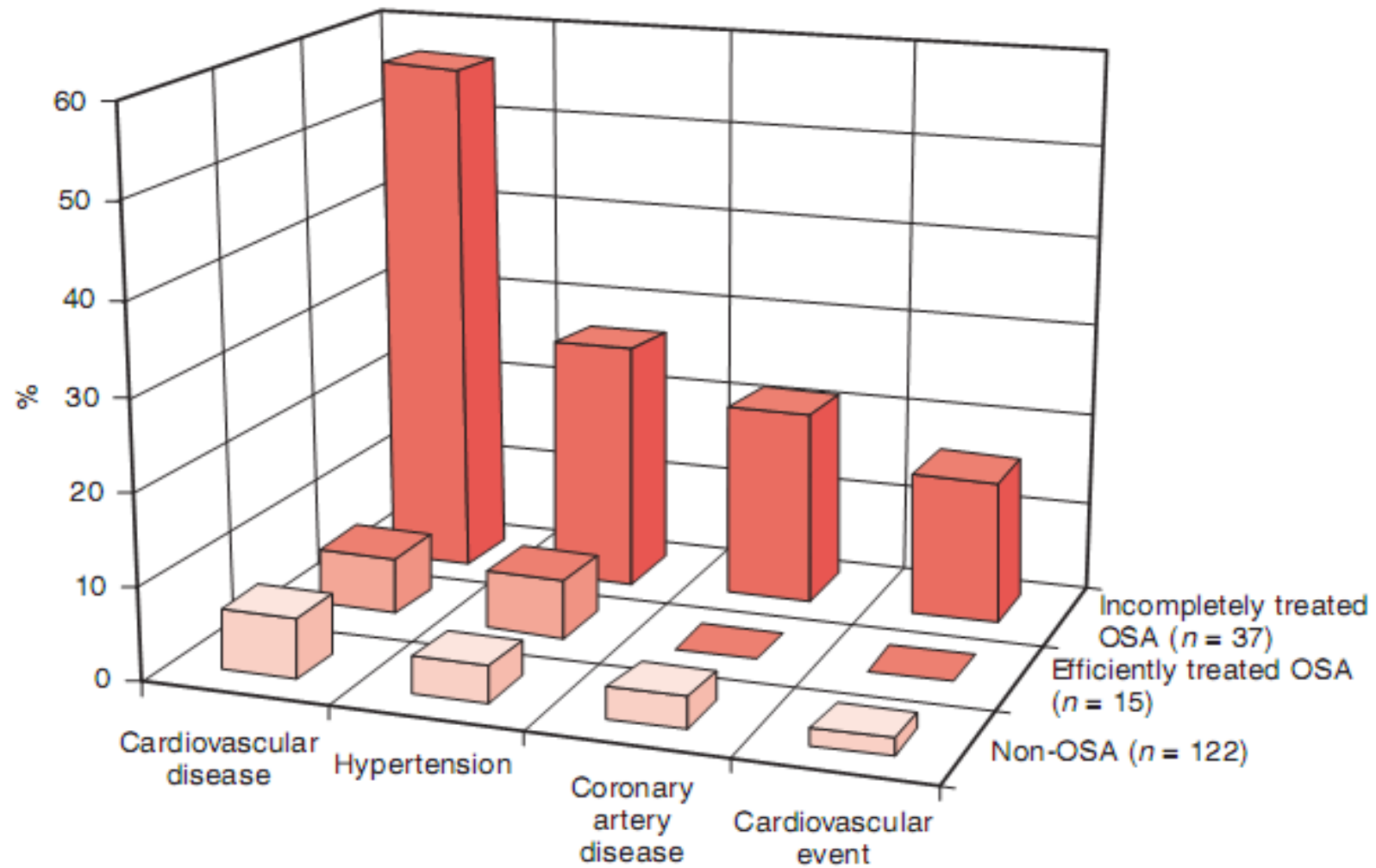


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## Incidence of CVD events during 7 years of follow-up in healthy middle-aged men at baseline



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# Home Blood Pressure Measurement

## HBPM

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# AHA “call to action” statement

HBPM should become a routine component of BP measurement for the majority of patients with known or suspected hypertension using validated oscillometric monitors that measure BP on the upper arm with an appropriate cuff size.

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# Why We Need HBPM?

1. *Better predictor of TOD*
  2. *Helps reduce the “white coat effect”*
  3. *Determine the presence of “masked hypertension”*
- 
- ▶ 2 to 3 readings should be taken while the subject is resting in the seated position, both in the morning and the evening, over 1 week.
  - ▶ An average total of 12 readings is recommended for making clinical decisions.
  - ▶ Discard first 24 hours of readings

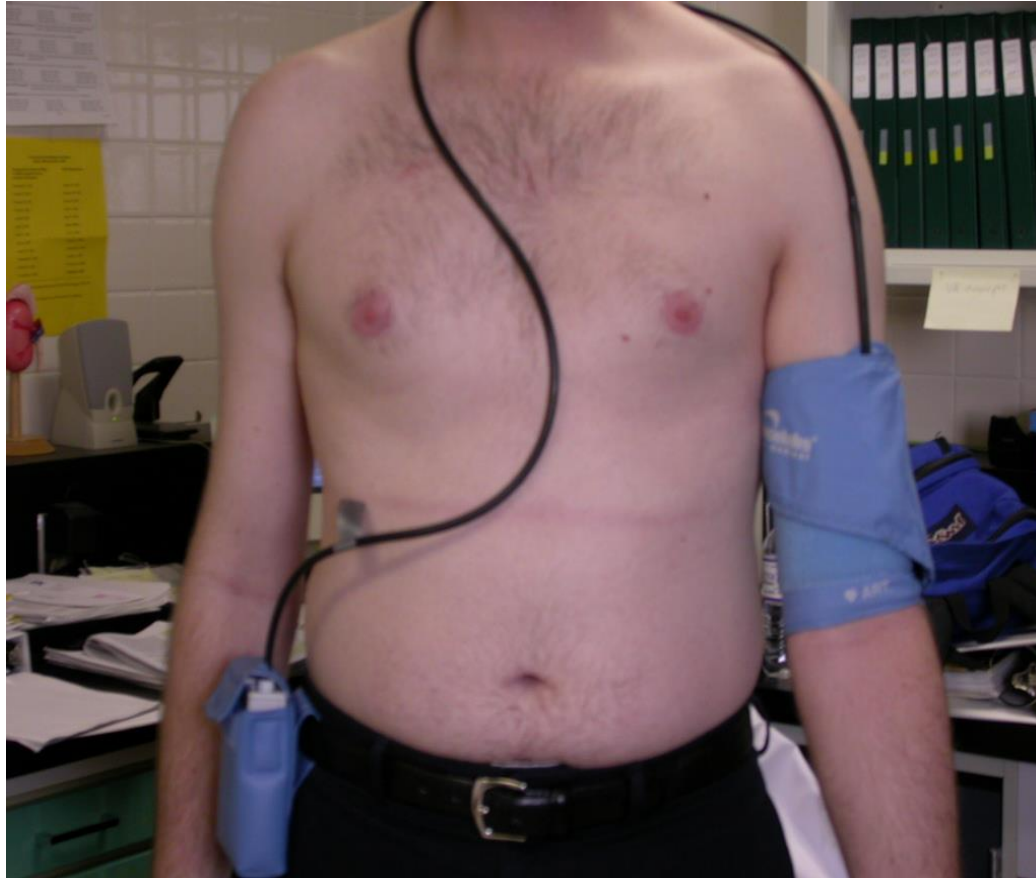
# Interpretation of the Results

- ▶ The levels of average HBPM considered as “definite hypertension” by the majority of the guidelines is  $\geq 135/85$  mm Hg.
- ▶ The WHO Guidelines recommended an upper limit of normality as 125/80 mmHg

# Appropriateness of HBPM

- ▶ Most patients are suitable for HBPM but do need instruction in the methods.
- ▶ Those unsuitable include patients with atrial fibrillation and other significant cardiac arrhythmias.

# Ambulatory Blood Pressure Measurement [ABPM]

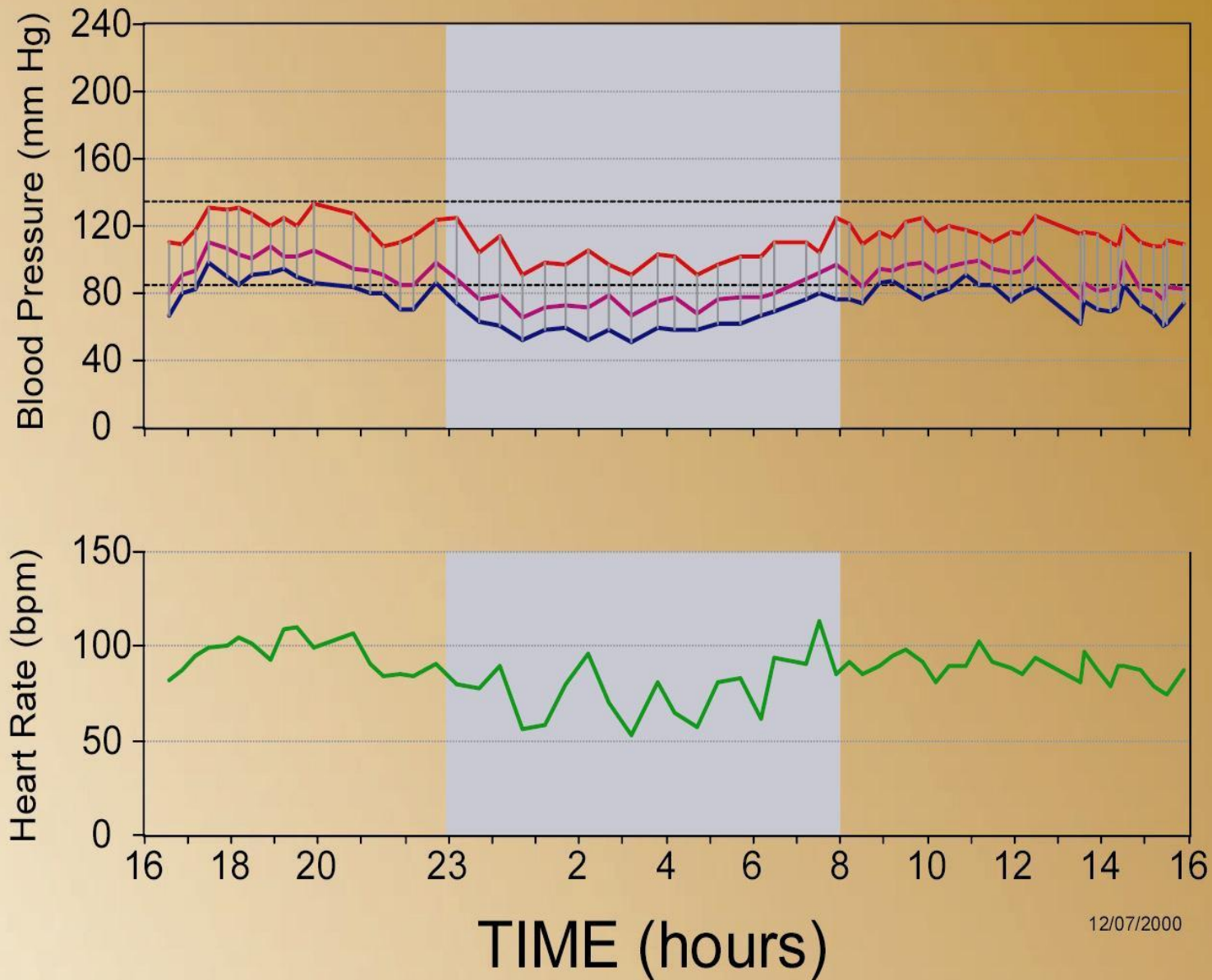


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# Normal Subject with "Dipping"



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# Indications for ABPM

1. Unusual variability
2. Possible “white coat hypertension”
3. Informing equivocal treatment decisions
4. Evaluation of nocturnal hypertension
5. Evaluation of drug-resistant hypertension
6. Determining the efficacy of drug treatment over 24 hours
7. Diagnoses and treatment of hypertension in pregnancy
8. Evaluation of symptomatic hypotension

# Why we need to treat HTN?

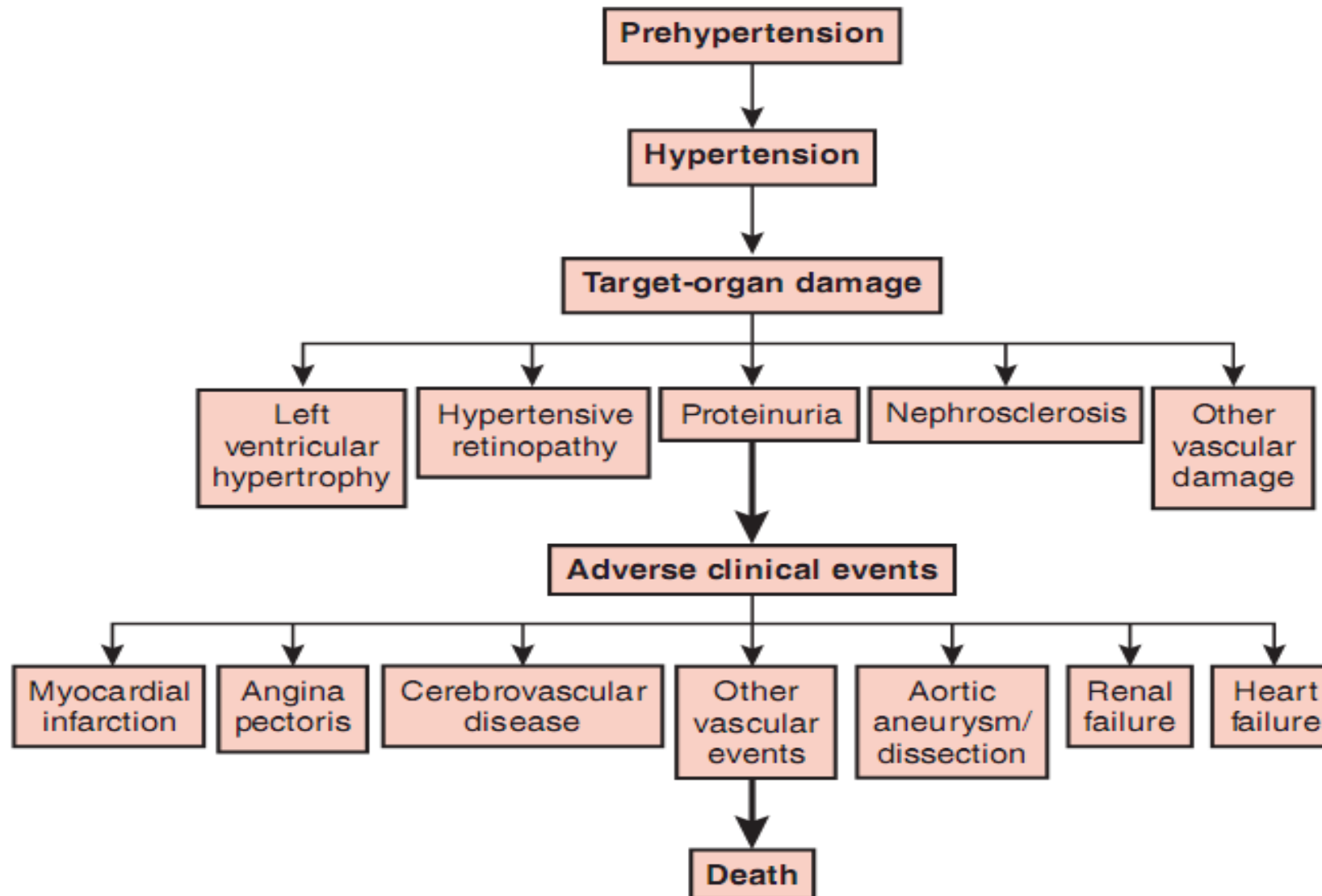
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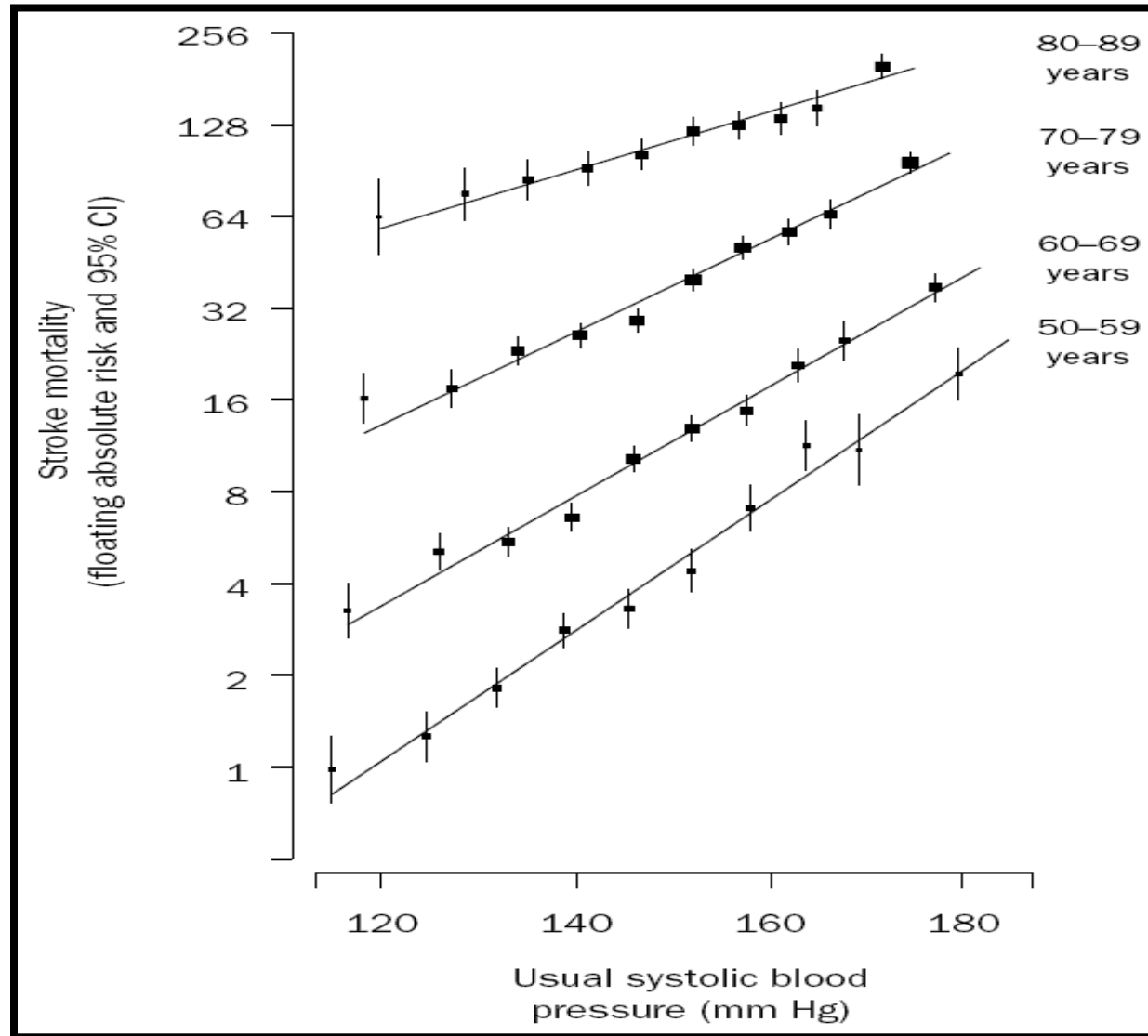
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# The Natural History of Untreated HTN



# BP and Risk of Stroke Mortality



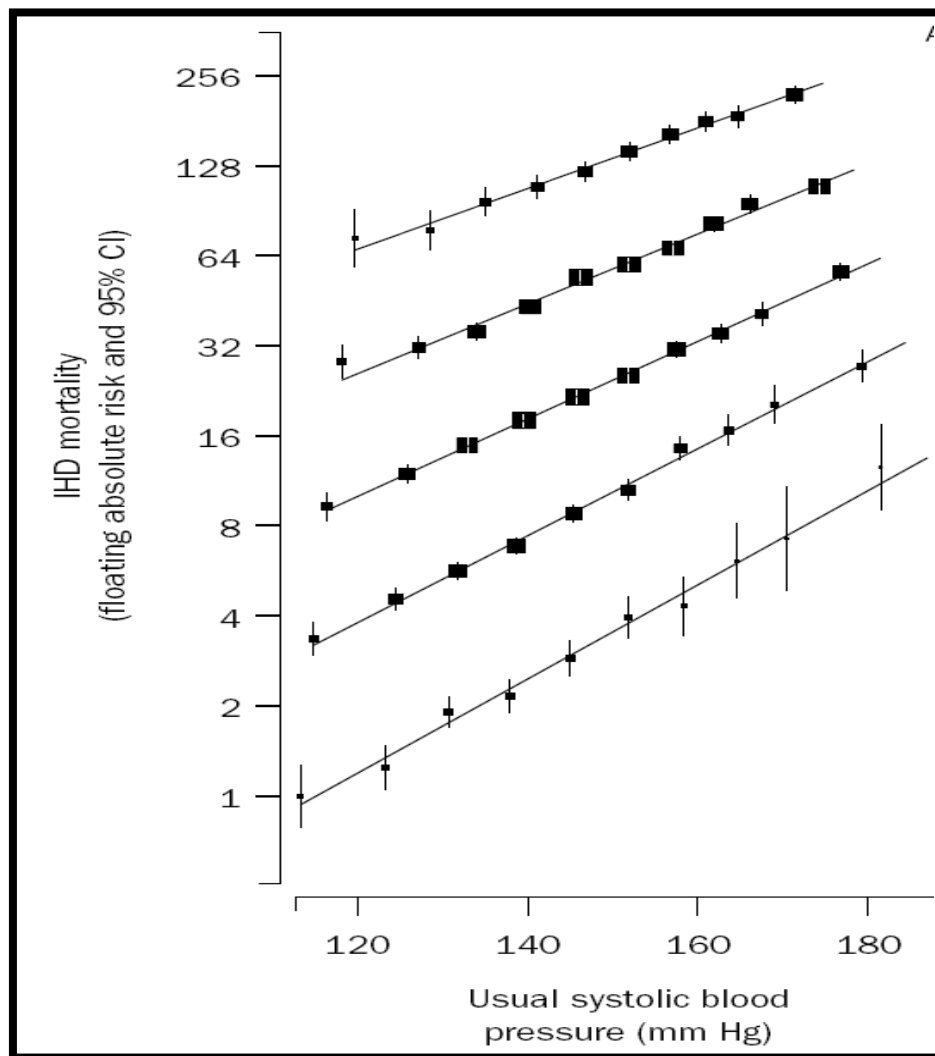
*Lancet 2002;360: 1903-13*

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# BP and Risk of IHD Mortality



*Lancet 2002;360: 1903-13*

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# Treatment goals

## Short term goal

- ▶ Reduce blood pressure

## Long term goal

- ▶ Reduce mortality
- ▶ Reduce stroke
- ▶ Reduce congestive heart failure
- ▶ Reduce coronary artery disease
- ▶ Reduce nephropathy
- ▶ Reduce retinopathy

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# Are these Risks Only in Patients with True Hypertension?

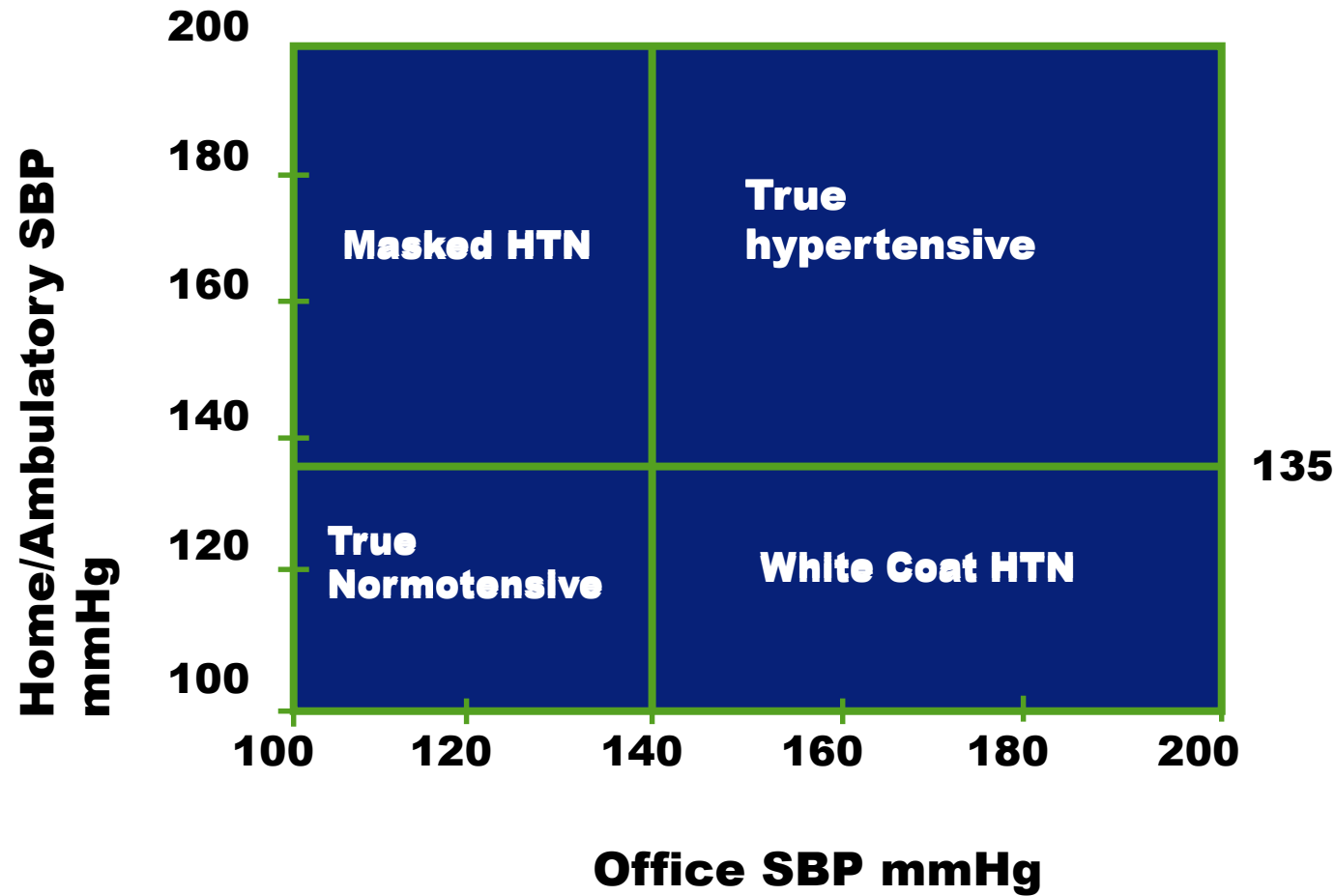


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# The Concept of Masked HTN



*Derived from Pickering et al. Hypertension 2002; 40: 795-796.*

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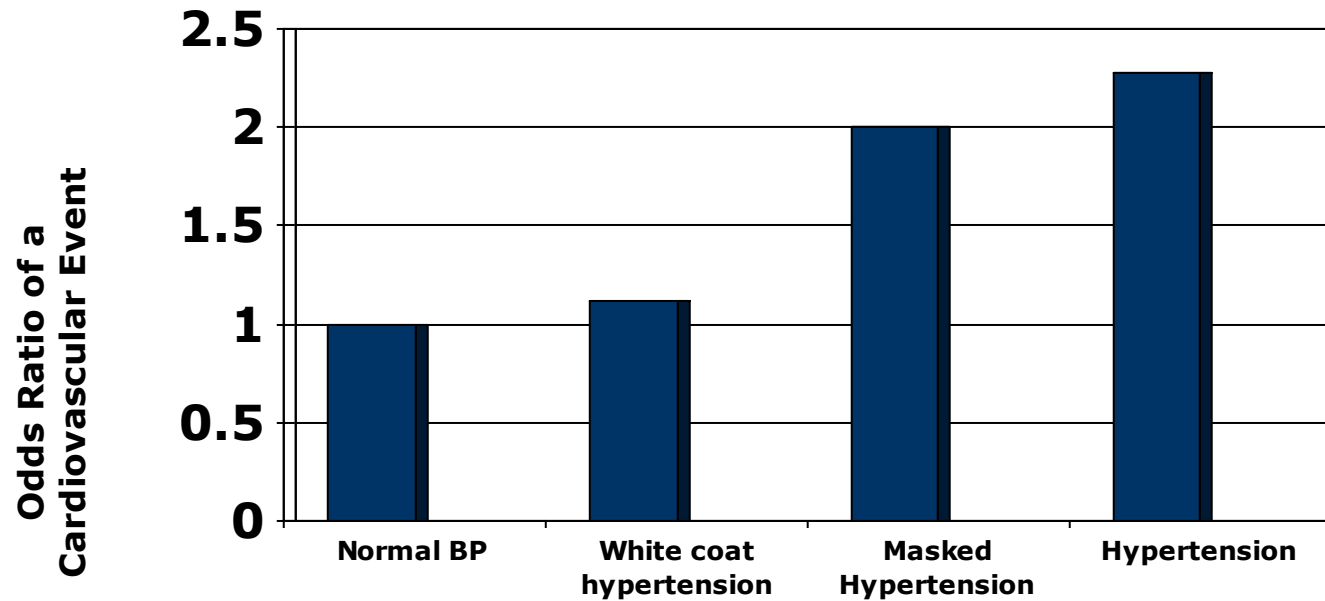
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# The Prognosis of White Coat and Masked Hypertension

Prevalence is approximately 10% in hypertensive patients.

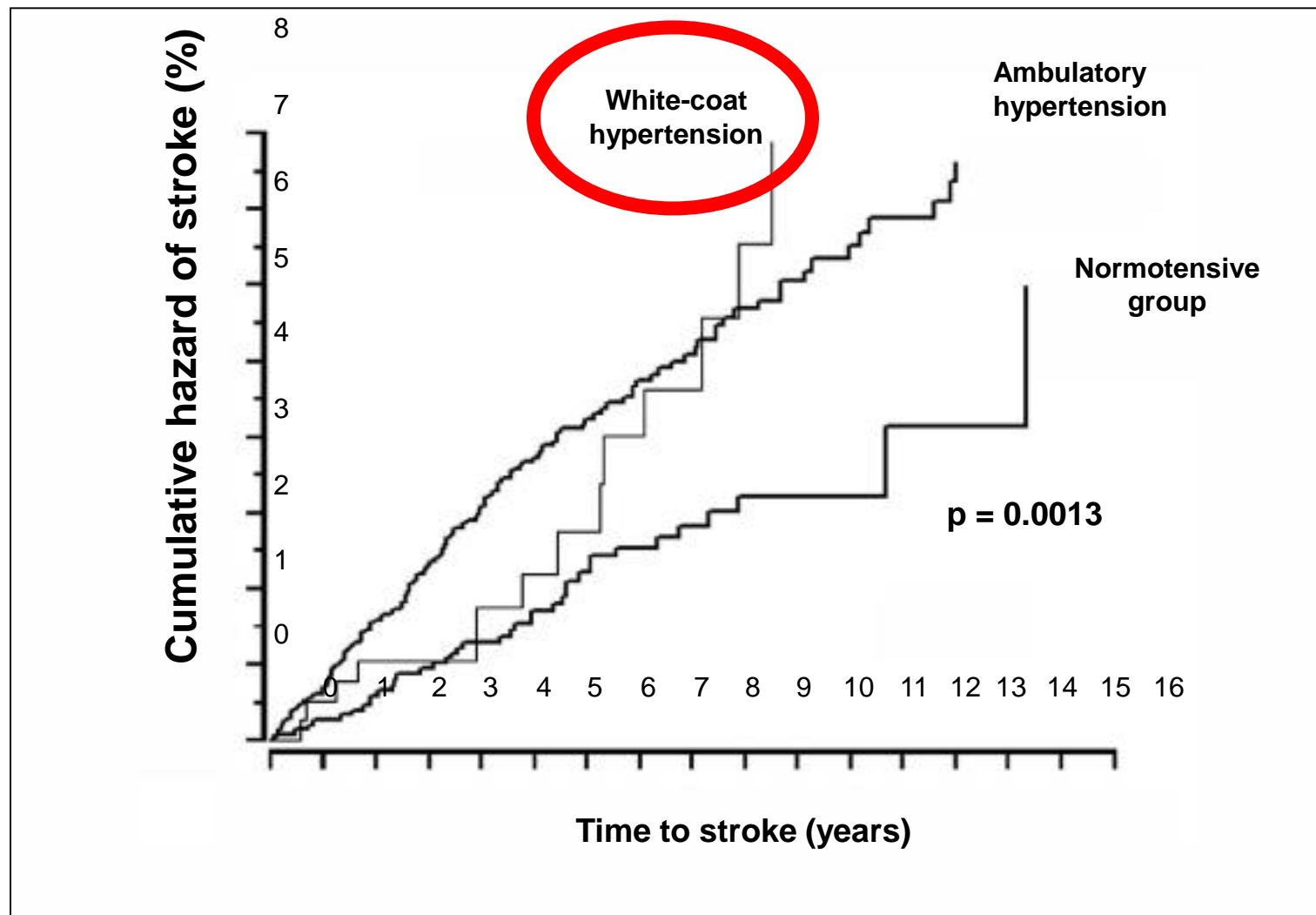


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# Cumulative hazard for stroke in 3 groups of subjects: Normotensive, White-Coat Hypertension, and Ambulatory hypertension



*Hypertension. 2005;45(2):203-208*

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***Is there a Difference  
Between Systolic and  
Diastolic  
Hypertension?***

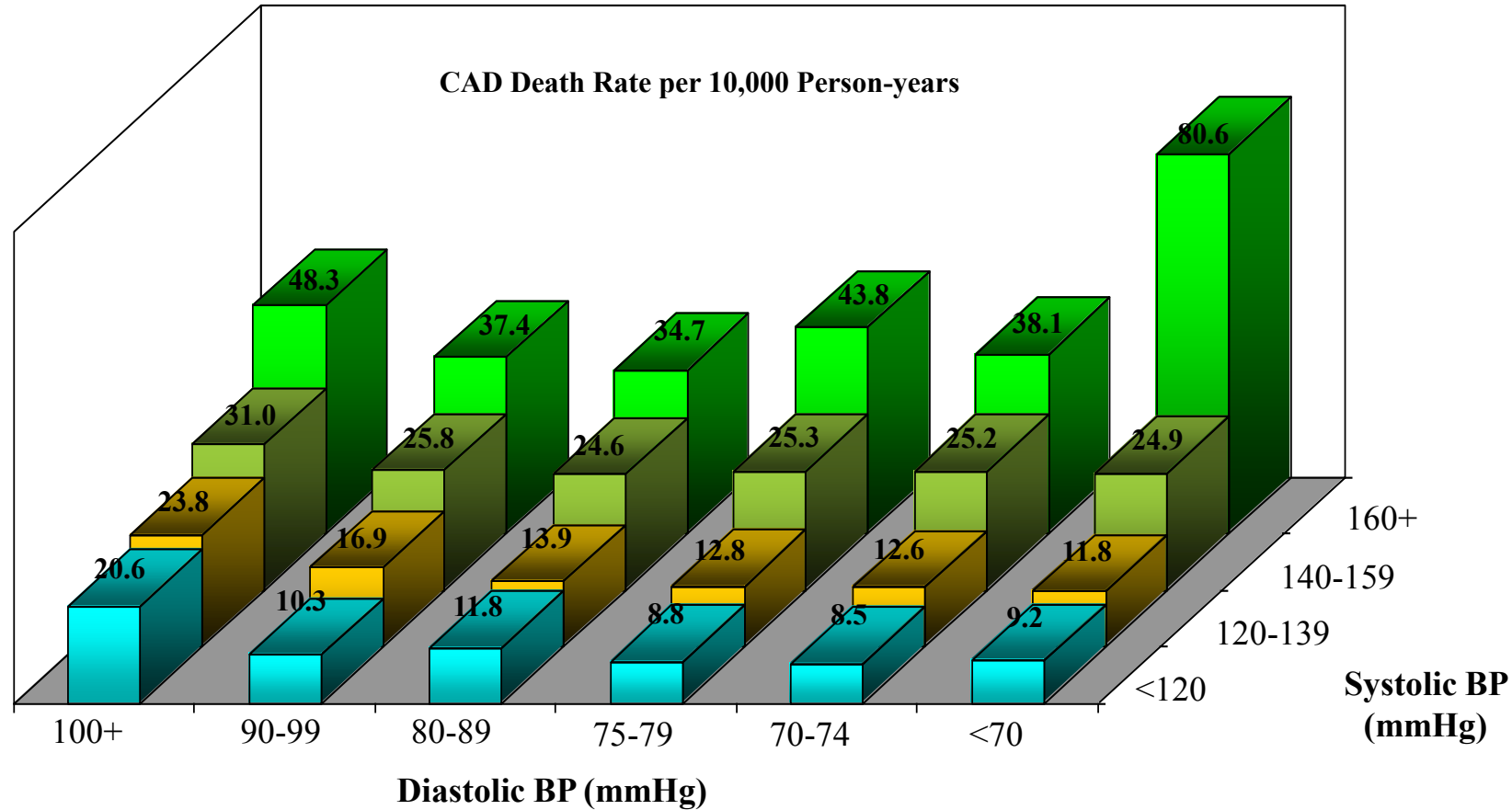


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# Effect of SBP and DBP on Age-Adjusted CAD Mortality: MRFIT



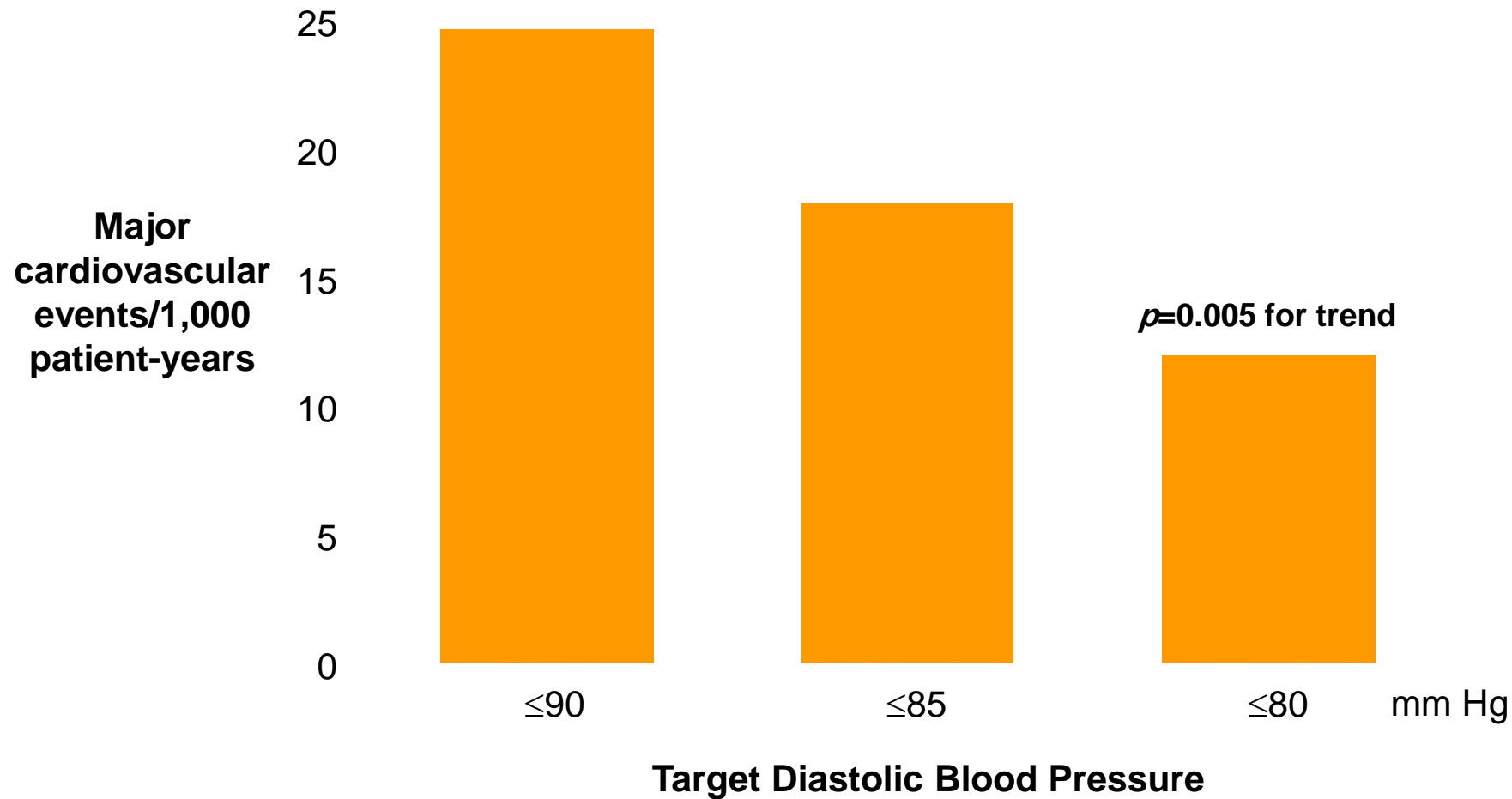
Neaton et al. Arch Intern Med 1992; 152:56-64.

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# HOT Study: Significant Benefit From Intensive Treatment in the Diabetic Subgroup



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

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# Benefits of Lowering BP

Diseases Reduction	Average Percent
Stroke	35-40%
Myocardial Infarction	20-25%
Heart Failure	50%



# **90% of Hypertensives have other Cardiovascular Risk factors**



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Emberson et al. *Eur Heart J.* 2004;25:484-491.

# Failures of Patient Education

- ▶ 50% of patients discontinue their anti-hypertensive within 1 year of initiating treatment.

Can J Cardiol 2005;21:589-93

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# When to Treat?

1. **Medication Required if:**

- ▶ Sustained raised BP  $\geq$  140/90 mmHg
- ▶ Any reading  $\geq$  160/100 mmHg  
(*despite non-pharmacological treatment*)

2. **OR if:**

- ▶ BP  $\geq$  140/90 mmHg ... **AND** patient has:
  - 1. *Target Organ Damage, or*
  - 2. *CVD , or*
  - 3. *10 year CVD risk > 20%*

# Target-Organ Damage

- ▶ Brain: stroke, TIA, dementia
- ▶ Eyes: retinopathy
- ▶ Heart: left ventricular hypertrophy, angina, HF
- ▶ Kidney: chronic kidney disease
- ▶ Blood Vessels: peripheral arterial disease

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# Treatment Goals

- ▶ Reduce morbidity & mortality
- ▶ Select drug therapy based on evidence demonstrating risk reduction

Patient Population	Target Blood Pressure
Most patients	< 140/90 mmHg
Diabetes mellitus	< 130/80 mmHg
Chronic kidney disease	<130/80 mmHg

# 2007 AHA Recommendations

## ► More aggressive BP lowering for high risk patients

Most patients for general prevention	<140/90 mmHg
<ul style="list-style-type: none"><li>• Patients with diabetes (CAD risk equivalent),</li><li>• Significant CKD</li><li>• Known CAD (MI, stable angina, unstable angina),</li><li>• Noncoronary atherosclerosis (stroke, TIA, PAD, AAA)</li><li>• Framingham risk score <math>\geq 10\%</math></li></ul>	<130/80 mmHg
Patients with left ventricular dysfunction (HF)	<120/80 mmHg

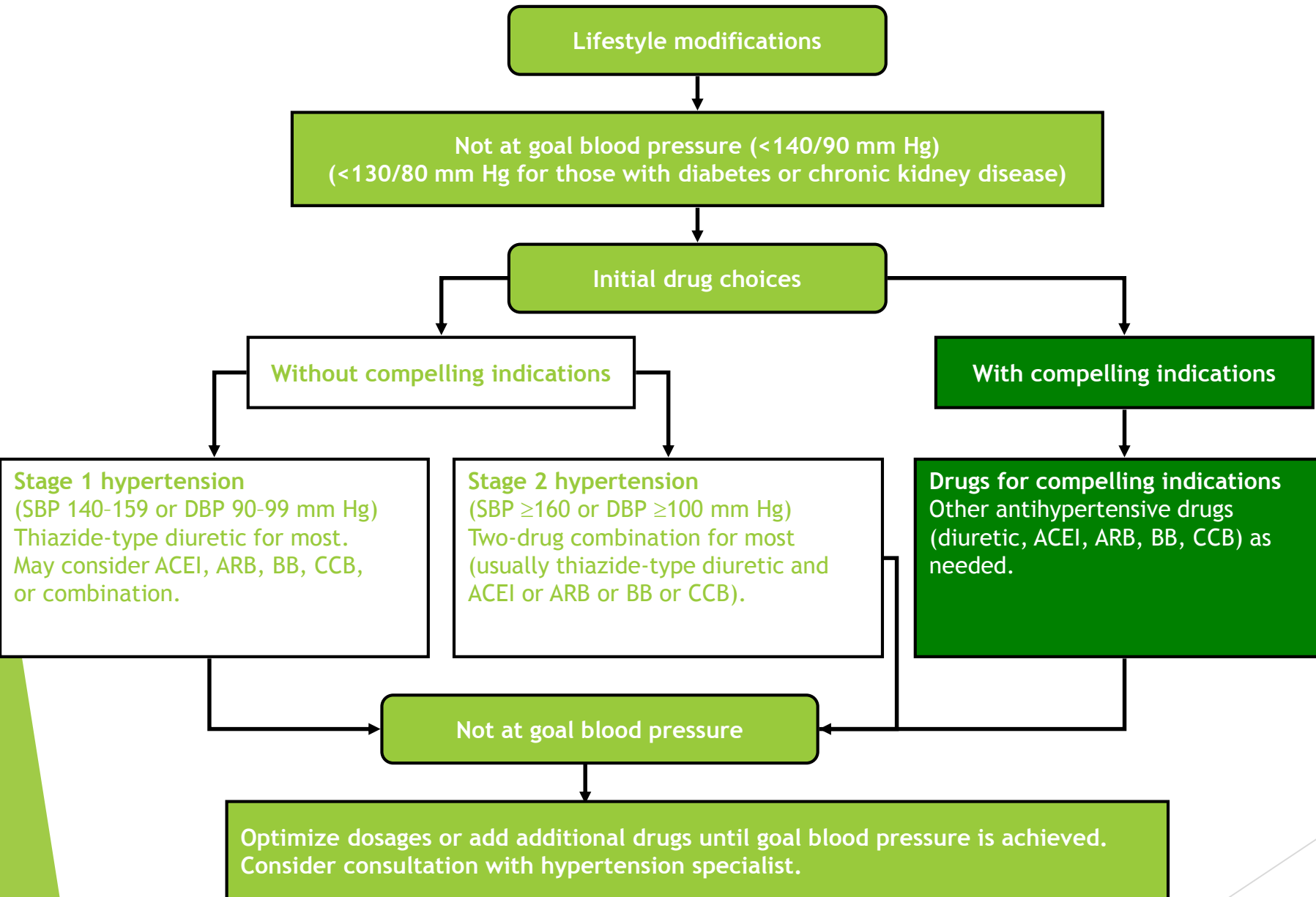
Rosendorff C, Black HR, Cannon CP, et al. Treatment of hypertension in the prevention and management of ischemic heart disease: A scientific statement from the American Heart Association Council for High Blood Pressure Research and the Councils on Clinical Cardiology and Epidemiology and Prevention. Circulation 2007;115(21):2761–2788.

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# JNC 7: Treatment Algorithm





# Key Diet History Questions

- ▶ Do you use a salt shaker?
- ▶ Do you taste your food before you add salt?
- ▶ How often do you eat salty foods, such as chips, salted nuts, canned and smoked foods?
- ▶ Do you read labels for sodium content?
- ▶ How many servings of fruits and vegetables do you eat everyday?
- ▶ How often do you eat or drink dairy products? What kind?
- ▶ How often do you eat out? What kinds of restaurants?
- ▶ How often do you exercise, including walking?

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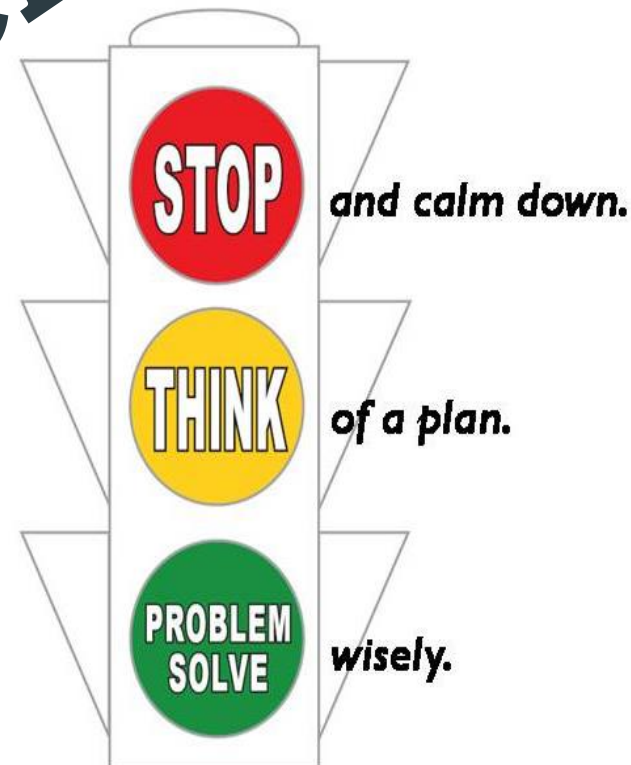
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## **FACT: Lifestyle intervention for blood pressure reduction**

<b>Intervention</b>	<b>Recommendation</b>	<b>Expected SBP reduction</b>
<b>Weight reduction</b>	Maintain ideal body mass index (20-25kg/M <sup>2</sup> )	<b>5-10 mmHg per 10kg loss</b>
<b>DASH eating plan</b>	Eat diet rich in fruit, vegetables, low-fat dairy products. Eat less saturated and total fat	<b>8 -14 mmHg</b>
<b>Sodium restriction</b>	Reduce dietary sodium intake to <100mmol/day <2.4g sodium or <6 g salt (sodium chloride)	<b>2 - 8mmHg</b>
<b>Physical activity</b>	Regular aerobic physical activity, e.g. brisk walking for at least 30 min most days	<b>4 - 9 mmHg</b>
<b>Alcohol moderation</b>	Men ≤ 21 units per week Women ≤ 14 units per week	<b>2-4 mmHg</b>



# Pharmacotherapy



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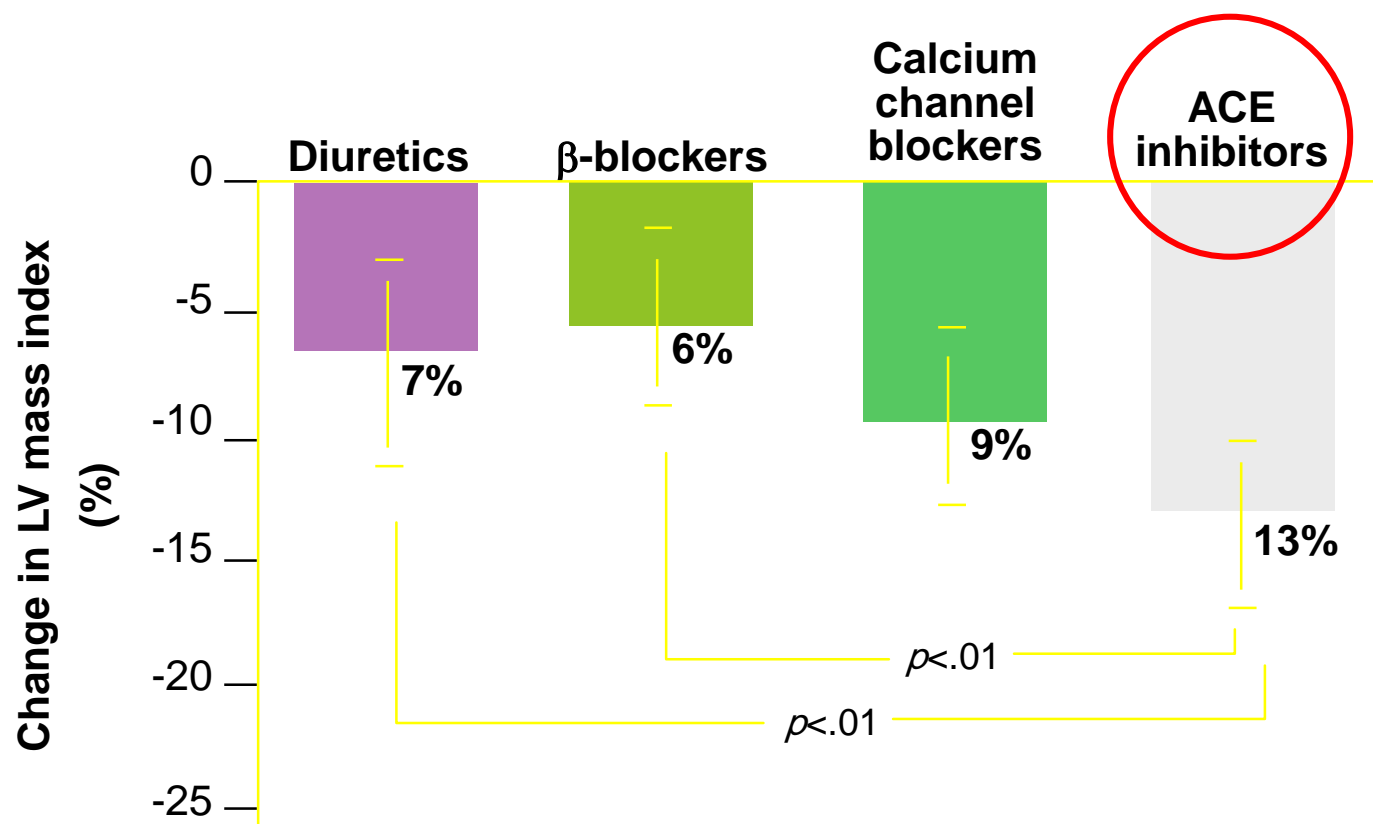
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# Compelling Indications

- ▶ Heart Failure:
  - ACEi, ARB, Diuretics, BB, Aldosterone antagonist
- ▶ Post- MI:
  - BB, ACEi, Aldosterone antagonist
- ▶ High CVD risk:
  - Thiazide, ACE, BB, Ca channel blocker
- ▶ DM:
  - ACE, ARB, CCB, Thiazide, BB
- ▶ CRF
  - ACE, ARB. For creatinine 2-3 try loop diuretic
  - Thiazide, ACE inhibitor

# Reversal of LV Hypertrophy By Antihypertensive Treatment



# TIPS on drugs for HTN

- ▶ Most patients should start with a **diuretic** as they enhance the effectiveness of other agents.
- ▶ Most patients will require **more than one agent**.
- ▶ Add a baby **aspirin** to improve cardiovascular outcomes.

# TIPS on drugs for HTN

- ▶ CCB for isolated systolic hypertension
- ▶ For **DM**: ACEi or ARB with or without diuretic, then add CCB and then BB.
- ▶ When ACEi causes cough, substitute ARB
- ▶ Don't use short acting CCB (increase mortality).



# Combination Therapy



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# Rules of Combination Therapy

1. Most patients require  $\geq 2$  drugs
2. A **thiazide-type diuretic** should be one of these agents unless contraindicated
3. **Combination regimens** should include a **diuretic** (preferably a thiazide)
4. If BP is  $>20/10$  mmHg above goal, initiate therapy with two agents.

# Reasons for Inadequate Control of BP?

1. Ineffective drugs?
2. Resistant hypertension?
3. Drug costs?
4. Drug side-effects?
5. Poor adherence/compliance?
6. Physician inertia?

# *Hypertension Emergencies*

## Hypertensive Crises

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# Hypertensive Crisis

- ▶ BP > 180/120 mmHg
  - ▶ reduce gradually
- ▶ Hypertensive urgency
  - ▶ elevated BP
  - ▶ no acute or progressing target-organ injury
- ▶ Hypertensive emergency
  - ▶ acute or progressing target-organ damage
    - ▶ encephalopathy, intracranial hemorrhage, acute left ventricular failure with pulmonary edema, dissecting aortic aneurysm, unstable angina, eclampsia

# Hypertensive Crises

- ▶ They represent about 1% of patients who present for evaluation of hypertension.
- ▶ They account for up to 25% of all emergency department visits
- ▶ The clinical **outcome for untreated patients** with a hypertensive emergency:
  - ▶ 1-year mortality rate is 70% to 90%
  - ▶ 5-year mortality rate is nearly 100%

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# Hypertensive Emergencies and Urgencies

- ▶ **Hypertensive emergency** combines a severe elevation in BP with acute, ongoing target organ damage.
- ▶ **Hypertensive urgencies**, may be better termed severe elevations in BP. without acute target organ damage.



# Hypertensive Emergency

- ▶ It is associated with severe elevation in BP, accompanied by progressive TOD.
- ▶ It is not the degree of BP elevation, but the clinical status of the patient that defines it as an emergency.
- ▶ Patients with hypertensive emergencies need to be treated with parenteral medications.

# Hypertensive Emergencies

1. Hypertensive encephalopathy
2. Malignant hypertension: [acute retinopathy]
3. Intracranial hemorrhage or brain infarction
4. Acute coronary syndromes
5. Acute pulmonary edema
6. Acute aortic dissection
7. Rapidly progressive renal failure
8. Eclampsia
9. Life-threatening arterial bleeding
10. Head trauma

# Severe Blood Pressure Elevation (Hypertensive Urgency)

- ▶ Severe elevations in BP without progressive TOD.
- ▶ Examples include Severe BP Elevation with:
  - ▶ severe headache
  - ▶ shortness of breath
  - ▶ Epistaxis
  - ▶ severe anxiety
- ▶ Even though these patients may have signs of **chronic** target organ damage

# Severe Blood Pressure Elevation (Hypertensive Urgency)

- ▶ Most of these patients are not adherent to drug therapy or have inadequately treated hypertension.
- ▶ **These patients require neither hospital admission nor acute lowering of BP, and they can safely be treated in the outpatient setting with oral medications.**

# EVALUATION

*Therapy may need to be initiated before all test results are obtained or before the underlying cause of the emergency becomes known.*

# EVALUATION

1. A focused **history** and **examination**.
2. **CBC**
3. **BUN, creatinine, electrolytes**
4. **Urinalysis**
5. **Electrocardiogram**
6. **CXR**
7. **Brain CT scan** for patients with neurologic signs and symptoms

# Treatment of Hypertensive Emergencies

- ▶ These patients require immediate admission to an ICU or monitored bed for IV therapy.
- ▶ BP should not be rapidly lowered into the “normal” range
- ▶ The initial goal of therapy is to reduce mean arterial BP to no more than 25% within the first 2 hours.



# Treatment of Hypertensive Emergencies

- ▶ Over the next 2 to 6 hours, BP should be reduced slowly toward 160/100 mm Hg.
- ▶ If this is well tolerated, further gradual reductions toward normal over the next 24 to 48 hours.
- ▶ The most notable exceptions:
  - ▶ Acute aortic dissection (SBP target: <120 mm Hg over 20 minutes)
  - ▶ Acute stroke in evolution (BP lowering is not recommended).

# Treatment of Hypertensive Emergencies

- ▶ It is unclear which drug is superior to another.
- ▶ Parenteral agents should be used initially.
- ▶ Oral agents can be started as the parenteral agent is tapered.
- ▶ Typically, patients with hypertensive emergencies are volume depleted, so loop diuretics are not recommended unless there is evidence of volume overload.
- ▶ The use of diuretics may be necessary after 12 hours of intravenous vasodilator therapy.

# Treatment of Hypertensive urgencies

- ▶ First of all, rule out a true hypertensive emergency
- ▶ Address the cause
- ▶ Patients should be treated with oral agents, with the intent to decrease the BP over the next 24 to 48 hours.
- ▶ Sometimes, antihypertensive drug treatment carries an even greater risk.
- ▶ Short-acting nifedipine is contraindicated.

# *Pay attention please . . .*

- ▶ Some patients present with severely elevated BPs that can be attributed to:
  - ▶ ***pain***
  - ▶ ***anxiety and fear***
- ▶ These patients should be treated with **analgesics** or **anxiolytics** before antihypertensive agents are considered.

# When Shall You Refer Your Patient to an Internist or Hypertension Specialist?

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# Indications for Specialist Referral

## Urgent treatment needed

- ▶ Accelerated hypertension (severe HTN and grade III-IV retinopathy)
- ▶ Severe hypertension (>220/120mmHg)
- ▶ Impending complications (e.g. TIA, LVF)

# Indications for Specialist Referral

## Possible underlying cause

- ▶ Any clue in history or examination of a secondary cause
- ▶ Raised serum creatinine
- ▶ Proteinuria or haematuria
- ▶ Sudden onset or worsening of hypertension
- ▶ Resistant to multi-drug regimen ( $\geq 3$  drugs)
- ▶ Young age
- ▶ Any hypertension <20 years; needing treatment <30 years

# Indications for Specialist Referral

## Therapeutic problems

- ▶ Multiple drug intolerance
- ▶ Multiple drug contraindications
- ▶ Non-adherence or non-compliance



## Special situations

- ▶ Unusual blood pressure variability
- ▶ Possible 'white coat' hypertension
- ▶ Hypertension in pregnancy



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# Thank You for Your Attention

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