

# **Hypertension: The Silent Killer**

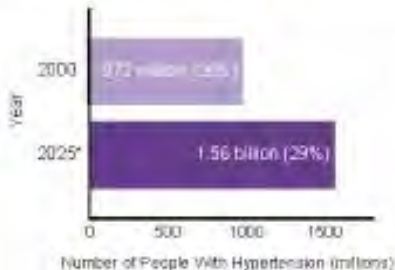
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Hypertension Excellence Center  
St George University Medical Center**

**Venue: Palm Beach Hotel  
November 21 , 2022**

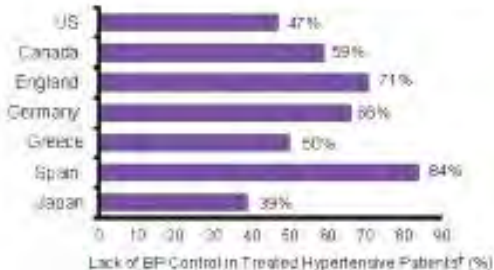
# Hypertension: "The Magnitude of the Problem Uncontrolled & Conquering the World" *The Lancet*

Volume 370, Issue 9567, August 18, 2007, Page 639

## Hypertension: a substantial and growing problem<sup>1</sup>



## Lack of BP control is widespread, despite treatment<sup>2</sup>



\*Projected. Most of the expected increase will be in economically developing regions.

†Based on a literature search of the MEDLINE database of studies from January 1990 through July 2003.

1. Kearney PM, et al. *Lancet* 2005; 365:217-223.

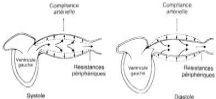
2. Kearney PM, et al. *J Hypertens* 2004; 22:11-19.

# What is Hypertension?

Hypertension is a Medical Term for High Blood Pressure

- Hypertension refers to Pressure exerted by circulating blood on the inner walls of the Arteries that carry blood from heart
- It is measured upon 2 values for Arterial Pressure :
  - Systolic Pressure as the Heart Contracts
  - Diastolic Pressure as it relaxes between Beats

# Systolic & Diastolic Pressure




# Environment & Risk Factors

- Salt intake: Na<sup>+</sup> vs Cl<sup>-</sup>

It is likely that increased Salt intake is a necessary but not sufficient cause of HTN

- Race :HTN more common and more severe in blacks
- Stress –certain personality traits ,such as hostile attitudes and time urgency/impatience
- Alcohol
- Dyslipidemia may be associated with the development of HTN
- Obesity-Overweight are strong independent risk factors for HTN
- Occupation
- Hereditary - Family Size and Crowding



## Contributory factors

- Overweight
- Excess alcohol  
Men 3 units/day; Women 2 units /days
- Excess salt intake
- Lack of exercise
- Environmental stress

# Risk Factors

## Risk Factors

### Non-Modifiable

- Age
- Race/ethnicity
- Gender
- Family history

### Modifiable

- Overweight
- Abnormal lipid metabolism
- Smoking
- Physical inactivity
- Unhealthy diet
- Excessive alcohol intake

# What Cause Hypertension ?

➤ **Primary or Essential or Genetic Hypertension**

➤ **Secondary or Identifiable Causes :**

- Kidney
- Renal-Vascular
- Adrenals
- Diabetes
- Neurogenic
- Sleep-Apnea
- Chronic Alcoholism
- Obesity-Metabolic Syndrome
- Iatrogenic Drugs:

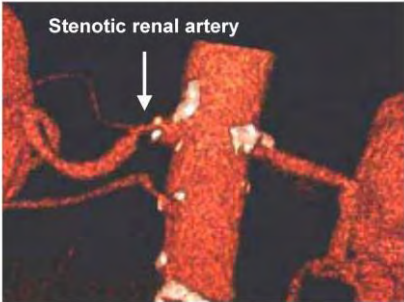
NSAID, Estrogen, Cortisone , B.C.P, Amphetamine, Cocaine, Diet Pills  
, Decongestants, Herbs (ginseng, yohimbine ..... ).....

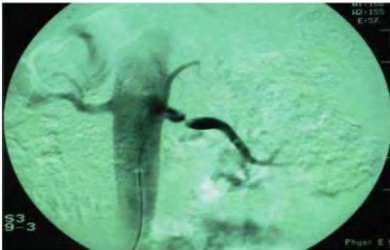


## Common Causes of Secondary Hypertension

- Obstructive Sleep Apnea Syndrome
- Renal Parenchymal Disease
- Primary Aldosteronism
- Renal Artery Disease

**Stenotic renal artery**







## JNC VII Report

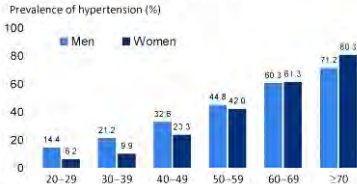
### Major Cardiovascular Risk Factors

- Hypertension
- Cigarette Smoking
- Obesity (BMI >30 )
- Physical Inactivity
- Dyslipidemia
- Diabetes Mellitus
- Microalbuminuria or GFR <60ml/min
- Family History of Premature CVDisease
- AGE > 55years Men > 65 years Women



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# Prevalence of Hypertension by Age and Gender



# Does Hypertension cause Symptoms?

- Hypertension is either discovered on :
  - Routine Check-up most of the times or Complications
- Most of the time it is Silent and for that reason it is called:

## The Silent Killer

- **Very rarely** can cause :
  - Headache, Tinnitus, Tension, Dizziness, Blurr Vision
- Unfortunately often Hypertension is discovered when there is already **Target Organ Damage or Complications**



**The endothelium  
in health and disease**

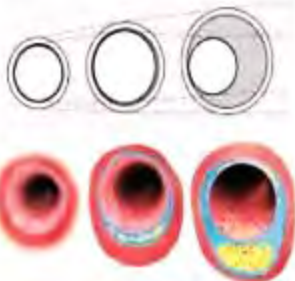


**THE CV CONTINUUM OF EVENTS**

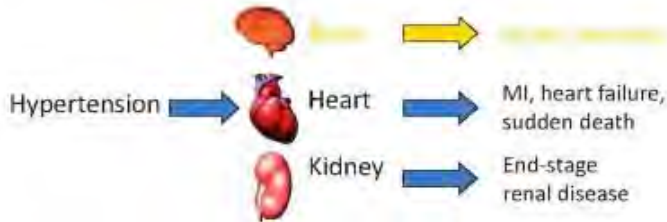
## Carotid wall thickening and plaque are markers of **atherosclerosis** : intimal changes



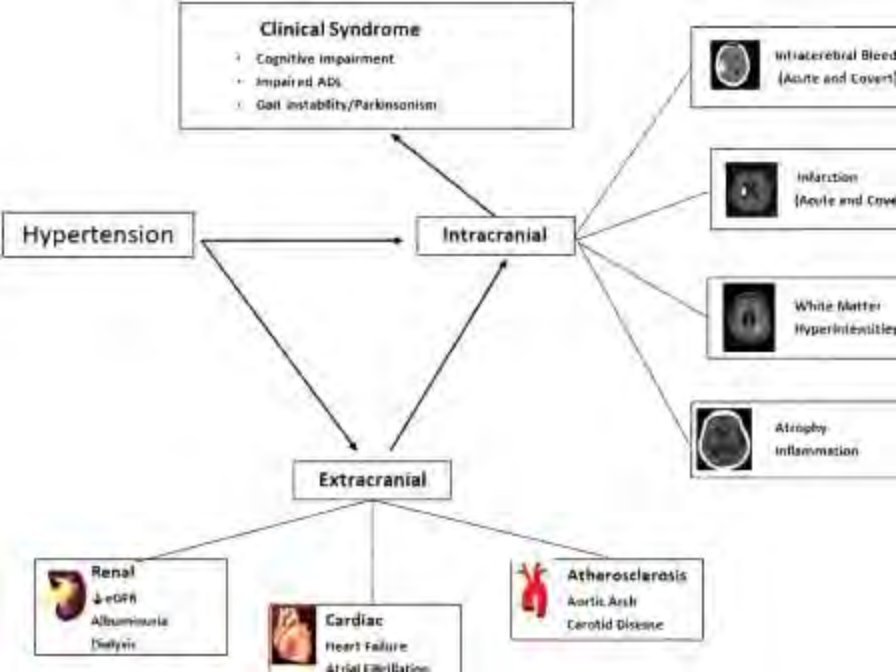
Carotid artery : earlier stage



# Consequences of Hypertension<sup>1-4</sup>



1. Vlach et al. *Am J Hypertens*. 1999;12:2099-2135. 2. Devereux RB, Berkow B, eds. *The Merck Manual of Diagnosis and Therapy*. 17th ed. 1999. 1625-1648. 3. Flynn CK, et al. (eds); J. Black HL, eds. *Hypertension Primer: The Essentials of High Blood Pressure*. 2nd ed. 1999. 175-176. 4. Heeley LA, et al. (eds); J. Black HL, eds. *Hypertension Primer: The Essentials of High Blood Pressure*. 2nd ed. 1999. 189-197.



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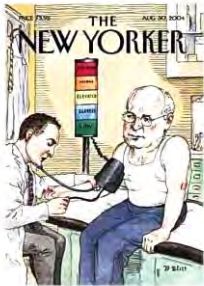
**The Times**, Saturday 13<sup>th</sup>

August, 2005

**FACT**

**Inaccurate blood  
pressure tests  
could affect  
millions**





## A Diagnosis of Hypertension

based exclusively on Physician readings is no longer acceptable

- Measurement error
- Small number of readings
- Effects of recent activities
- Expense & Inconvenience
- White coat effect

## B.P Measurement & Diagnosis of HTN

**Dx should not be made on 1 office visit**

**Usually 2-3 office visits at 1-4-wk intervals (depending on BP) required to confirm HTN**

**Dx might be made on a single visit, if BP is  $\geq 180/110$  with evidence of CVD**

**If possible, HTN should be confirmed by out-of-office BP measurement**





## Home/self BP monitoring

- Advise patients on accurate, independently validated, well maintained monitors
- Advise use of appropriate cuff size
- Wrist monitors are not recommended



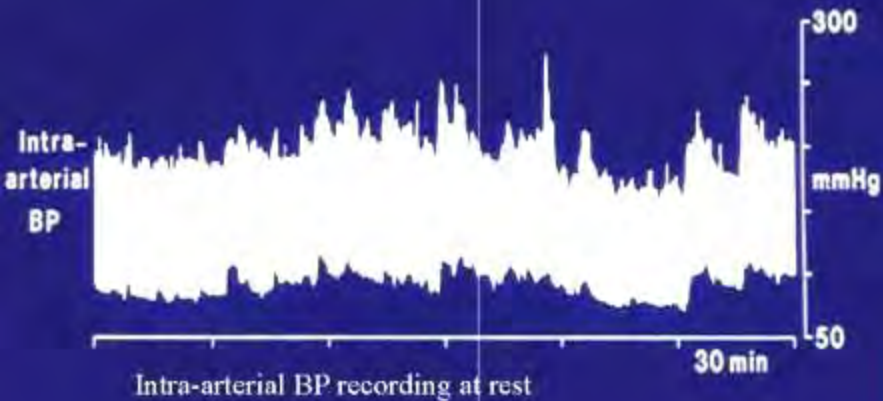
### Suggested measurement routine for patients

- Measure BP for 7 days prior to appointment
- Record BP twice a day. Morning and evening
- Discard first 24 hours of readings
- Take an average of at least 12 of these readings

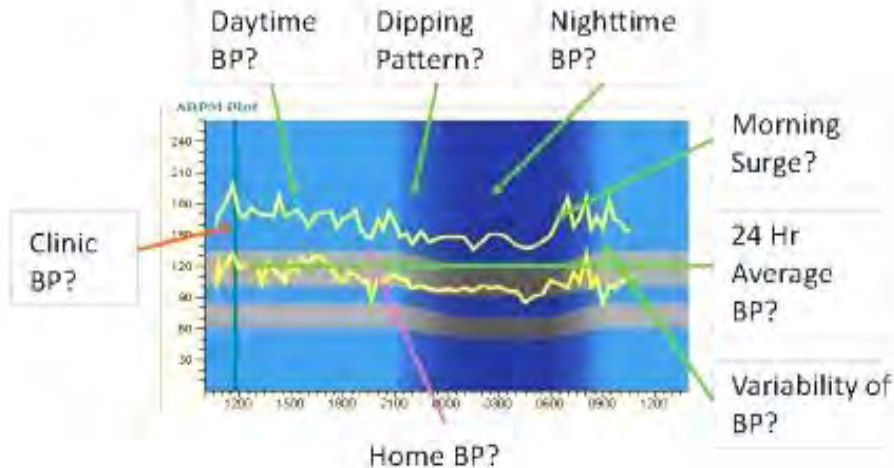
## Physiological Variations in BP

- **Age:**
  - SBP and DBP gradually rise with age (after about 30 years), the SBP more so and more sustained than the DBP
- **Sex:**
  - the rise in BP with age is greater in males
- **Circadian variation (diurnal variation):**
  - lowest during sleep (nocturnal dip) and highest in the mornings after waking up
- **Increased transiently during physical stress** (e.g. muscular exercise), mental stress (anger, apprehension, resentment, mental concentration), emotional excitement
- **The effect of Gravity:** When erect, BP in any vessel varies in relation to the vertical distance from the heart level

# BP VARIABILITY: IntraArterial

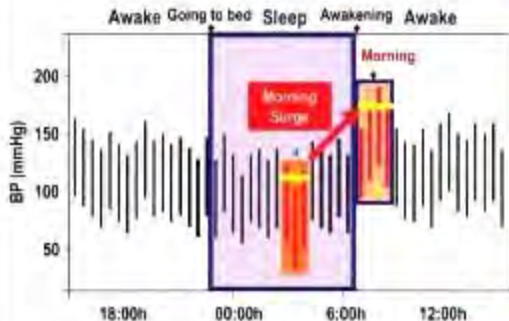


# What is the True Blood Pressure?



# Which reading mostly predict CV Morbidity?

## Three Main BP Reading



### Three main BP measures

- 1) Ambulatory BP
  - 24-hour BP
  - Daytime BP
  - Nighttime BP
  - Morning BP
- 2) Nocturnal BP fall
  - Dipper
  - Non-dipper
  - Riser
  - Extreme-dipper
- 3) Morning BP surge (+BP variability)

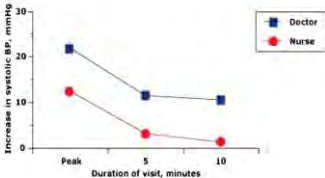
#### *Diary-based definitions (best)*

Daytime: from awakening to going to bed  
Nighttime: from going to bed to awakening  
Morning: the 2 hours after awakening

#### *24-hour clock-based definitions (when diary time is not available)*

Daytime: 09:00 to 20:59 hours  
Nighttime: 01:00 to 05:59 hours  
Morning: 07:00 to 08:59 hours

# White-Coat Hypertension



# Blood Pressure Categories

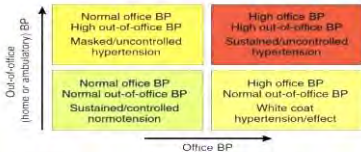
## American Heart Association

# Blood Pressure Categories



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

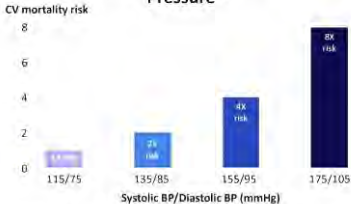
# Blood Pressure Phenotypes



**Figure 1 | Classification of blood pressure (BP) phenotypes based on office and out-of-office (home and ambulatory) BP in untreated and treated patients.**



# Cardiovascular Mortality Risk Doubles with each 20/10 mmHg increment in Systolic/Diastolic Blood Pressure\*



\* Individuals aged 40–69 years

Lewington et al. Lancet 2002;360:1903–13

# Blood Pressure Reduction

- Meta-analysis of 61 prospective, observational studies
- 1 million adults
- 12.7 million person-years

2 mmHg  
decrease in  
mean SBP



7% reduction in  
risk of ischaemic  
heart disease  
mortality

10% reduction in  
risk of stroke  
mortality

**Table 3. Lifestyle Modifications to Manage Hypertension\***

Modification	Recommendation	Approximate Systolic BP Reduction, Range
Weight reduction	Maintain normal body weight (BMI, 18.5-24.9)	5-20 mm Hg/10-kg weight loss <sup>b</sup>
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat	8-14 mm Hg <sup>b, c</sup>
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 mEq/L (2.4 g sodium or 6 g sodium chloride)	2-8 mm Hg <sup>b</sup>
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 minutes per day, most days of the week)	4-9 mm Hg <sup>b, c</sup>
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks per day (1 oz or 30 mL ethanol [eg, 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey]) in most men and no more than 1 drink per day in women and lighter-weight persons	2-4 mm Hg <sup>b</sup>

Abbreviations: BMI, body mass index; calculated as weight (kilograms) divided by the square of height (metric); BP, blood pressure; DASH, Dietary Approaches to Stop Hypertension.

\*For overall cardiovascular risk reduction, stop smoking (eg, 10 effects) or improve eating through healthy choices (avoid all trans fats) is important and could be higher for some individuals.



## Diet and Hypertension

- Non-pharmacologic way of treating hypertension
- DASH diet
  - Dietary Approaches to Stop Hypertension
  - High in whole grains, fruits, vegetables, and low fat dairy
  - Adequate Calcium, Potassium, Magnesium
  - Low in red meat, sweets and sugar beverages
  - Low in saturated and trans fat, cholesterol



# MIND Diet = DASH Diet + Mediterranean Diet

**MIND Diet** : Mediterranean/ DASH intervention for Neurodegenerative Delay

The **MIND diet** is designed to prevent dementia and loss of brain function as you age. It combines the Mediterranean diet and the DASH diet to create a dietary pattern that focuses specifically on brain health.

**DASH**: Dietary Approach to stop Hypertension

**Green, leafy vegetables, fruits, Berries, whole grains, beans, nut and seeds, and olive oil, fish,**

Moderate portions of Poultry, dairy products and eggs, Limited intake of Meat

Other important elements of the Mediterranean diet are *sharing meals with family and friends, enjoying a glass of red wine* and being physically active

**Exercise**: Regular Aerobic physical exercise 150min/week. (Brisk Walking)

**Vitamin** : Yes for Vit if Deficiency, Preventive ??? (ok for a 1 tab Multivitamin)

**The golden rules of weight loss still apply** : Burn more calories than you eat or drink

**Stay Strong**

- You lose muscle mass as you age. Offset that by doing strength training.

- You can use weight machines at a gym, lighter weights you hold in your hands, or your own body,

weight for resistance like in yoga

**Eat More Protein** Because you're at risk for losing muscle mass, make sure your diet includes about one gram of protein 1g/kg

**Hydrate, Hydrate, Hydrate**

Drink plenty of water. Sometimes, thirst masks itself as hunger. As you get older, you may not be as quick to notice when you're thirsty.

**Outsmart Your Metabolism**: Eat more small meals and snacks, and don't go much longer than 3 hours without eating. "

Because your metabolism is already slow, if you're starving yourself, it just gets slower.



C. Monet

THANK YOU

