HYPERTENSIO N

BARRIERS TO OPTIMUM BP CONTROL

Dr Deerren Matadeen

Specialist In Internal Medicine

At Bruno Cheong Hospital

CONTENT

PART 1

- **UNDERSTANDING HYPERTENTION**

PART 2

- **BARRIERS TO OPTIMUM BLOOD PRESSURE CONTROL**

BRIEF OVERVIEW: SYSTEMIC HYPERTENSION

- **Definition**
- **Prevalence and global burden**
- **Classification**
- **Clinical Manifestation**

DEFINITION

- **American College of Cardiology/American Heart Association**

-ACC/AHA (2017) Definition

Diagnosed when BP is consistently **SBP≥130 and/or DBP ≥80 mm Hg**.

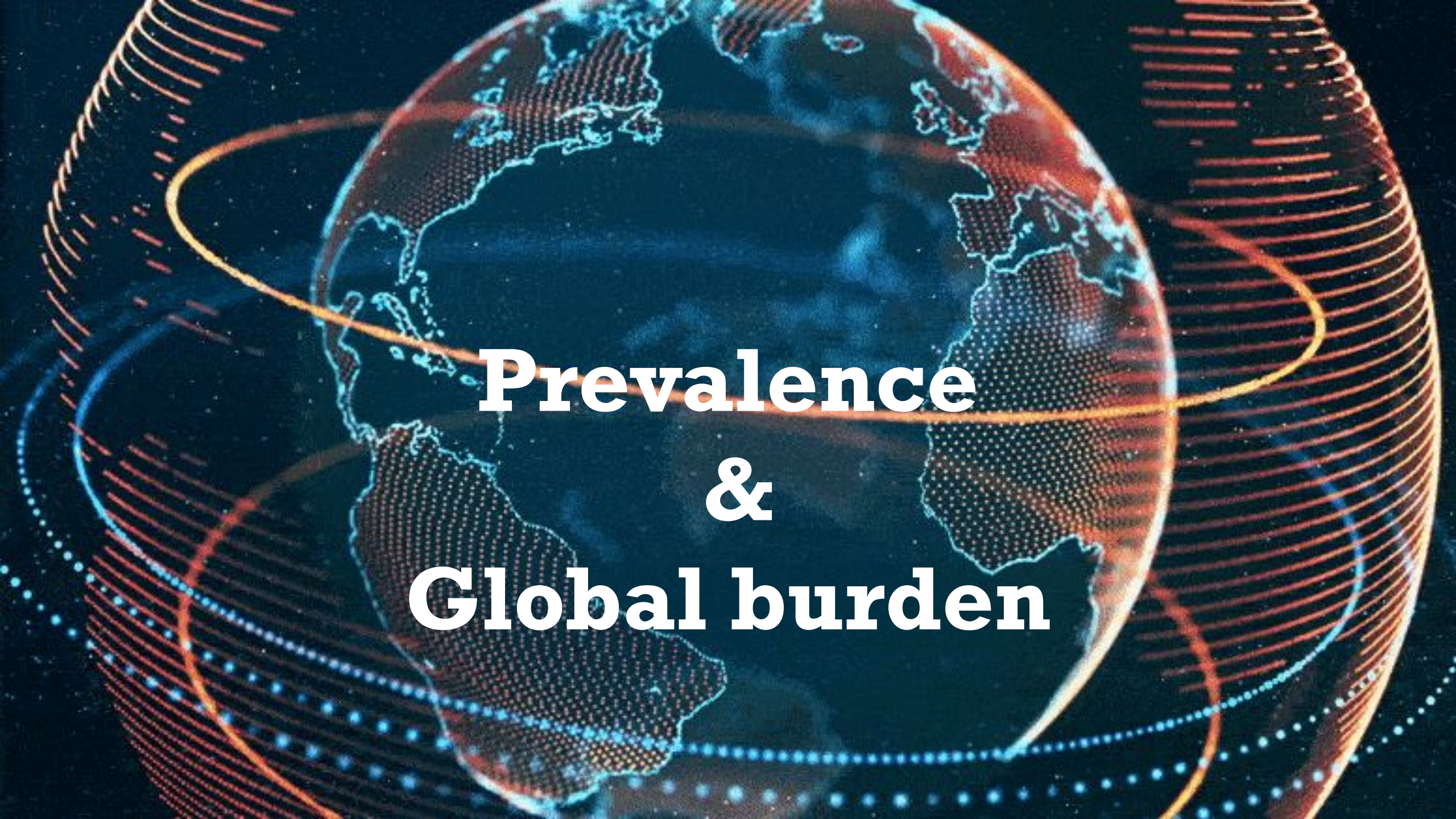
- **WHO (2021) Definition**

Measured on two different days, SBP on both days **is ≥140 mmHg** and/or the DBP on both days is **≥90 mmHg**.

- **European Society of Hypertension (ESH) - (2023) definition**

A persistent elevation in office systolic BP **≥140** and/or diastolic BP **≥90 mmHg**

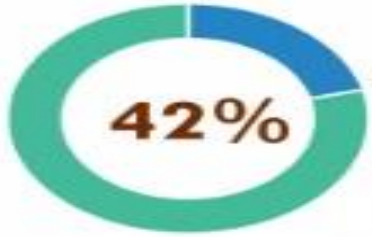
"Hypertension is the level of arterial BP at which the benefits of an intervention exceed the dose of inaction"


Prevalence
&
Global burden

1.28 billion adults aged 30–79 years

Two-thirds living in low- and middle-income countries

Unaware



Diagnosed & Treated

Un-controlled

- **An estimated 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries**
- **An estimated 46% of adults with hypertension are unaware that they have the condition.**
- **Less than half of adults (42%) with hypertension are diagnosed and treated.**
- **Approximately 1 in 5 adults (21%) with hypertension have it under control.**
- **Hypertension is a major cause of premature death worldwide.**
- **One of the global targets for noncommunicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030.**

CLASSIFICATION

	ACC/AHA (2017)	ESC/ESH (2023)
Definition of Hypertension (mm Hg)	≥130/80	≥140/90
Normal Blood Pressure ranges (mm Hg)	Normal: <120/80 Elevated: 120–129/<80	Optimal: <120/80 Normal: 120–129/80–84 High normal: 130–139/85–89
Hypertension Stages (mm Hg)	Stage 1: 130–139/80–89 Stage 2: ≥140/90	Grade 1: 140–159/90–99 Grade 2: 160–179/100–109 Grade 3: ≥180/110

Abbreviations: ACC, American College of Cardiology; AHA, American Heart Association; ESC, European Society of Cardiology; ESH, European Society of Hypertension.

TREATMENT TARGET as per ESC-ESH Guidelines

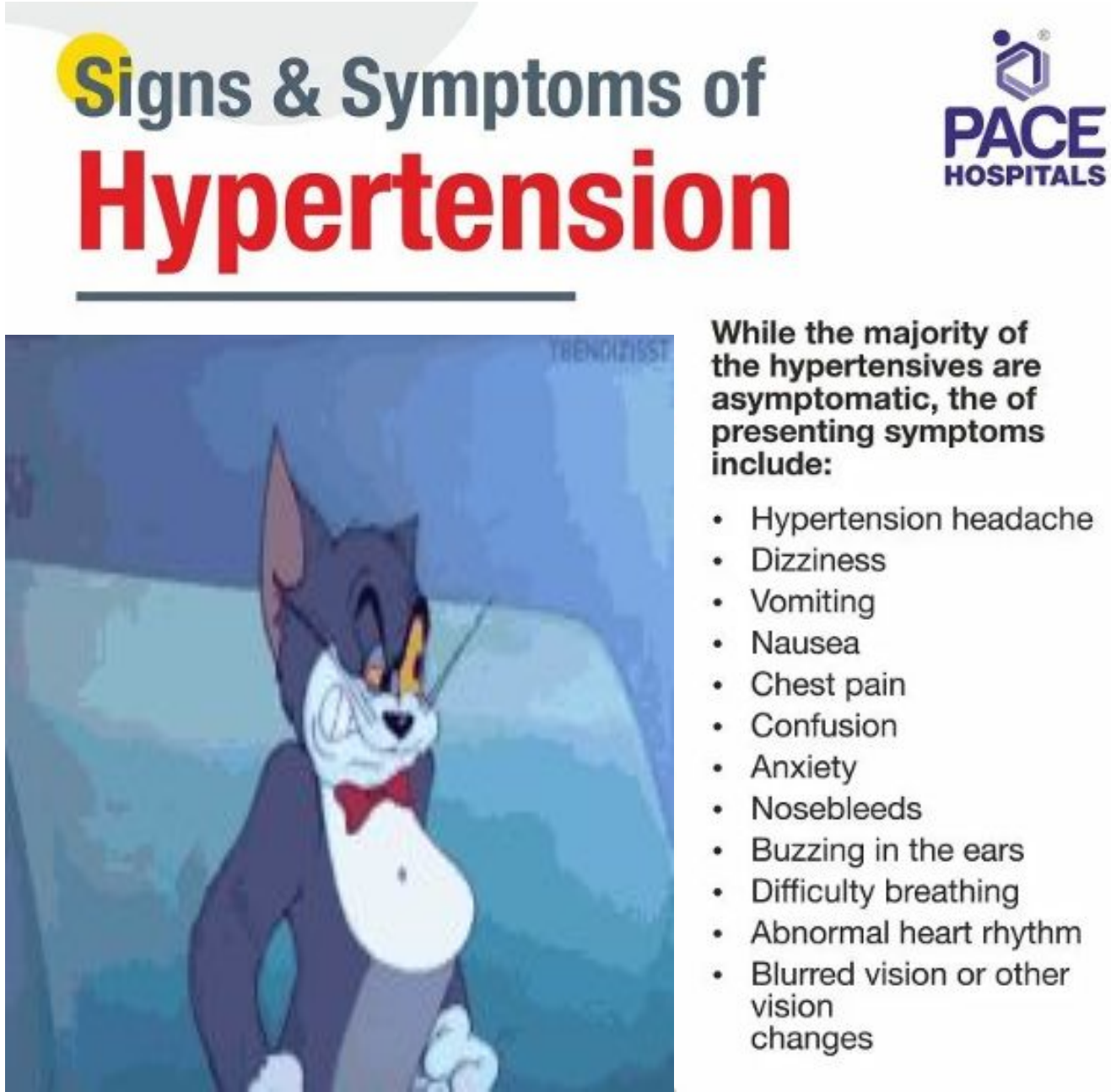
Treated BP values should be targeted to a range of 120-129/<80 mmHg in patients less

CLINICAL MANIFESTATIONS

- The early stages of hypertension have no clinical manifestations, other than elevations in blood pressure, hence the term often used, the silent Killer.

- This unfortunate fact means that there are no signs or symptoms to lead a person to seek health care.

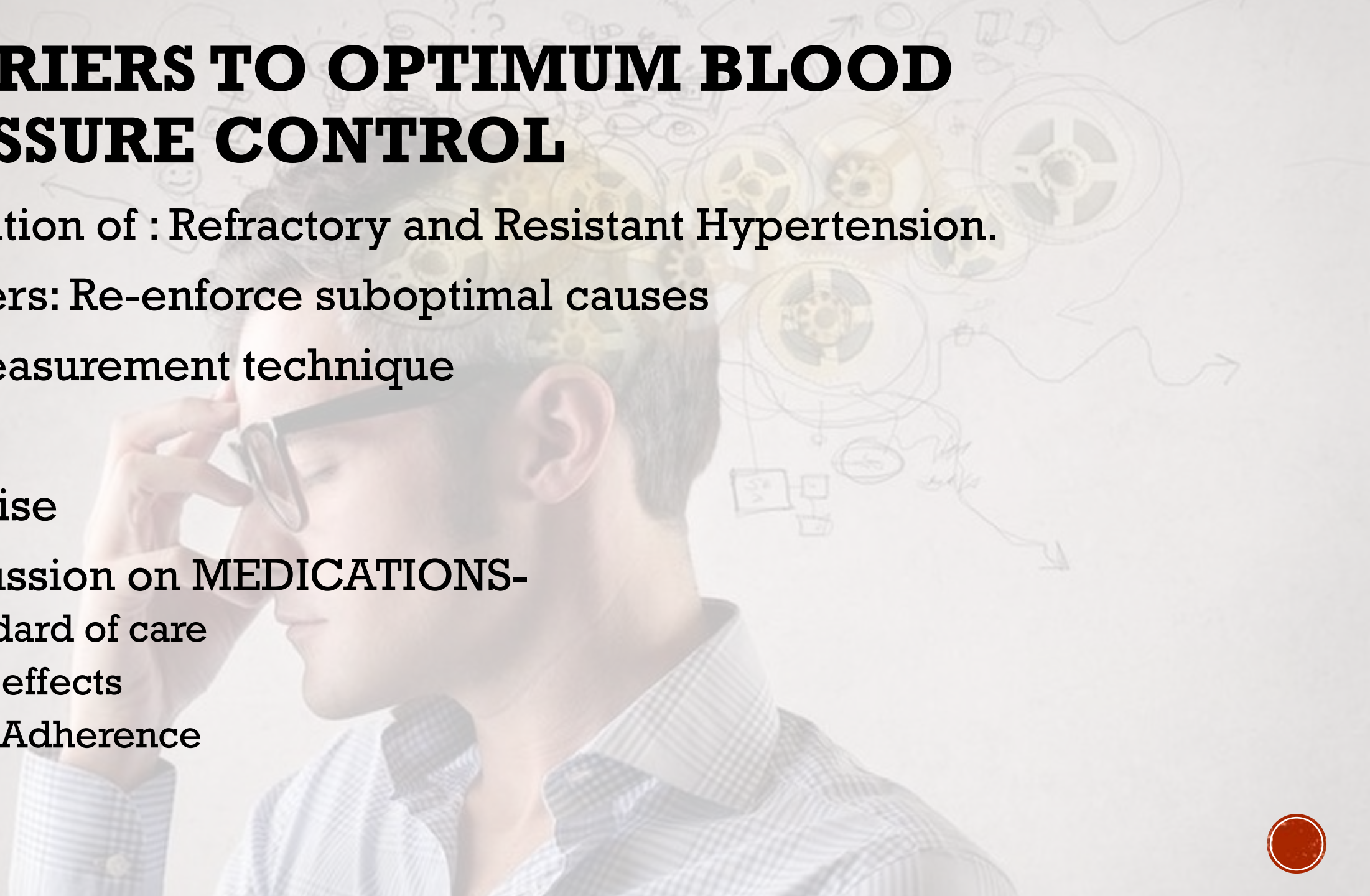
- As hypertension advances, without treatment, patients may report morning oocipital headache, fatigue, dizziness, palpitations, flushing, blurred vision, and epistaxis.



BARRIERS TO OPTIMUM BLOOD PRESSURE CONTROL

- Definition of : Refractory and Resistant Hypertension.
- Barriers: Re-enforce suboptimal causes

- BP measurement technique
- Diet
- Exercise
- Discussion on MEDICATIONS-
  - Standard of care
  - Side effects
  - Non-Adherence



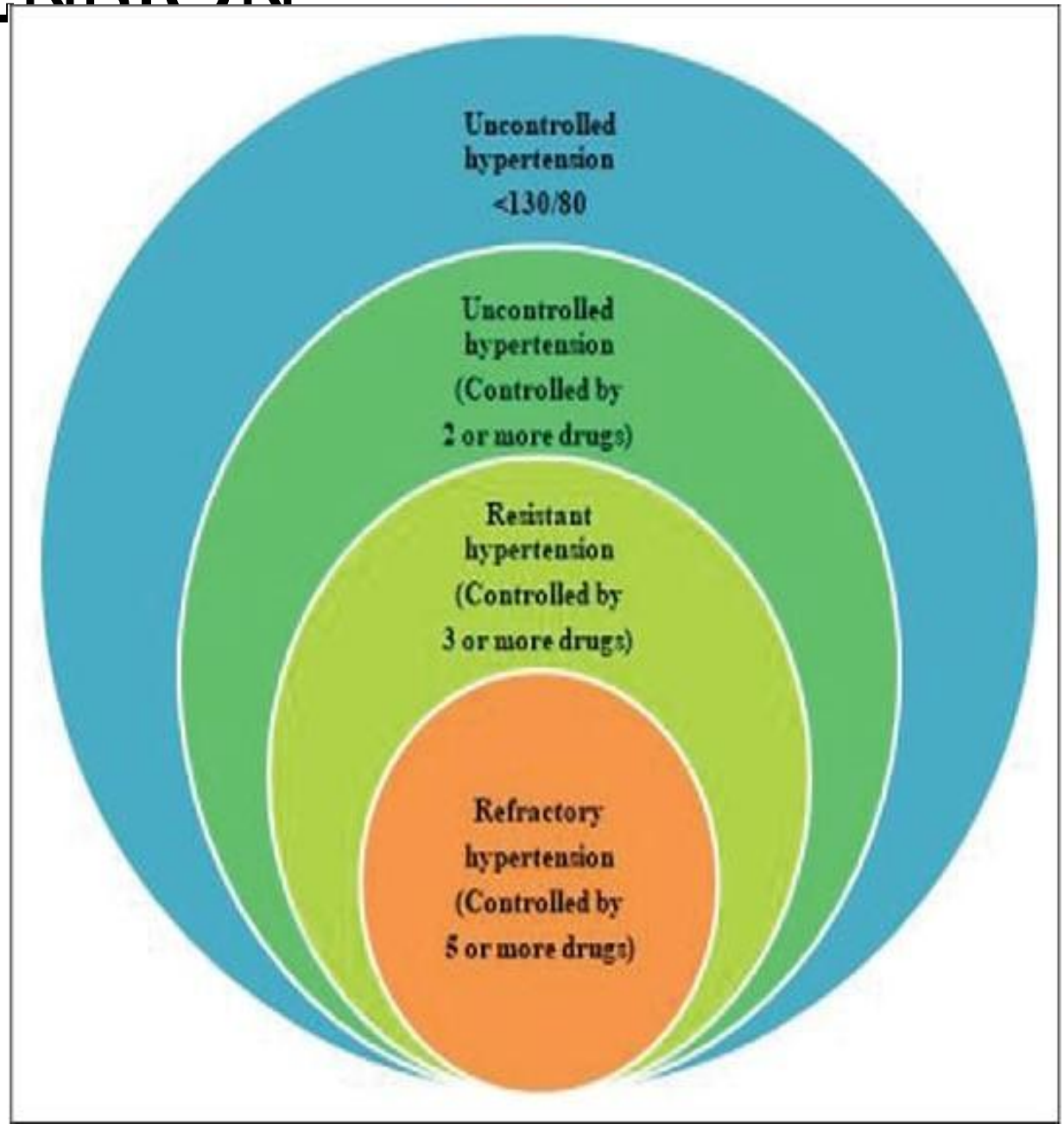
DEFINITION OF : REFRACTORY AND RESISTANT HYPERTENSION

- **What is considered as uncontrolled hypertension?**

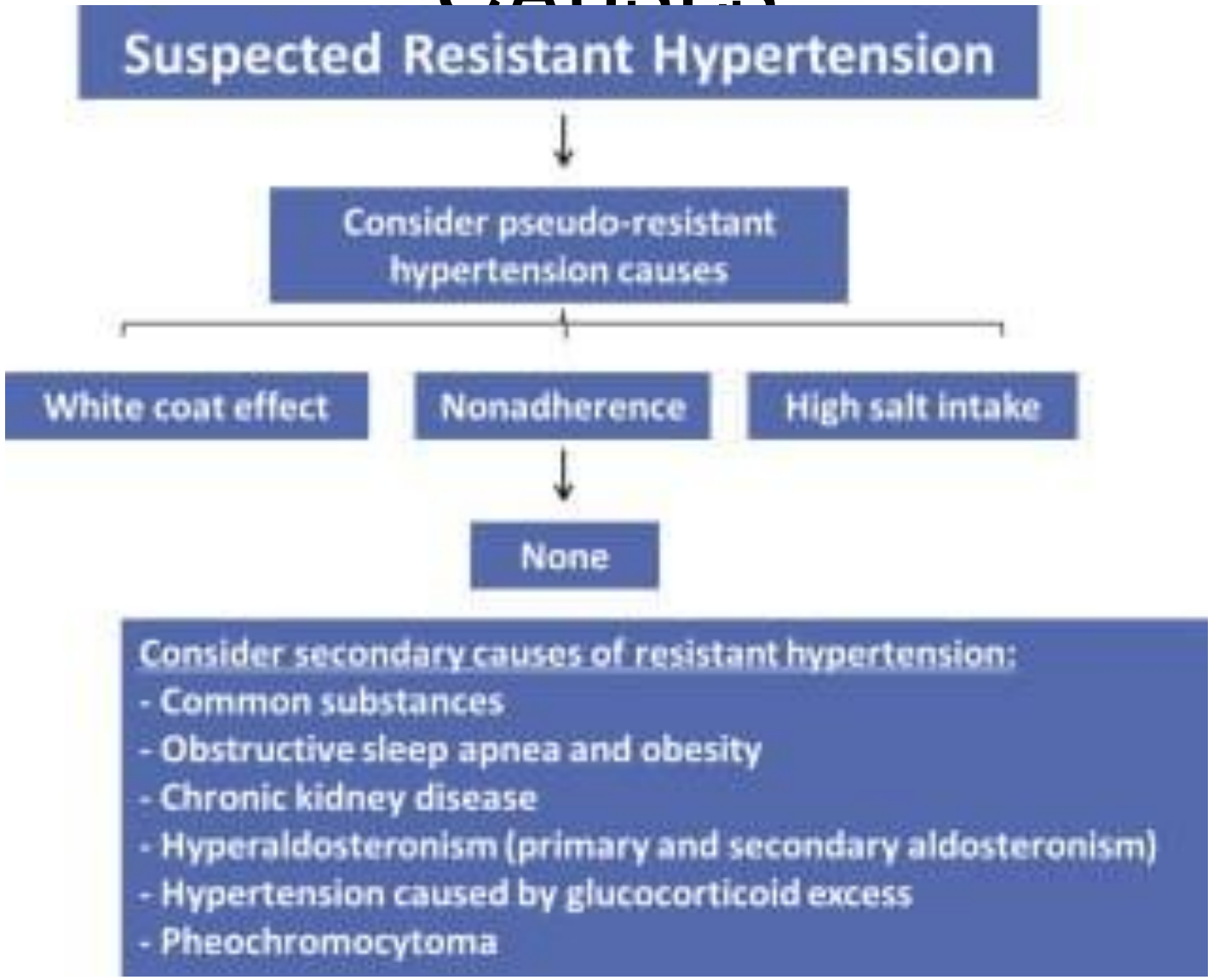
Uncontrolled hypertension may be classified as uncontrolled if it's not being treated or if medications that are supposed to help lower your blood pressure have been ineffective so far.

- Resistant and refractory hypertension refer to situations where hypertension persists despite specific amounts of treatment.

- **Resistant Hypertension:** The American Heart Association defines as the requirement of 3 or more medications (1 preferably a diuretic) to adequately control blood pressure to <140/90.
- **Refractory Hypertension:** persistent hypertension despite medications of at minimum of 3 follow-up visits during at least 6 months taking the maximum tolerated doses of at least 5 different anti-hypertensive medications.



CONSIDER PSEUDO-RESISTANT HYPERTENSION CAUSES



COMMONEST CAUSE OF HYPERTENSION

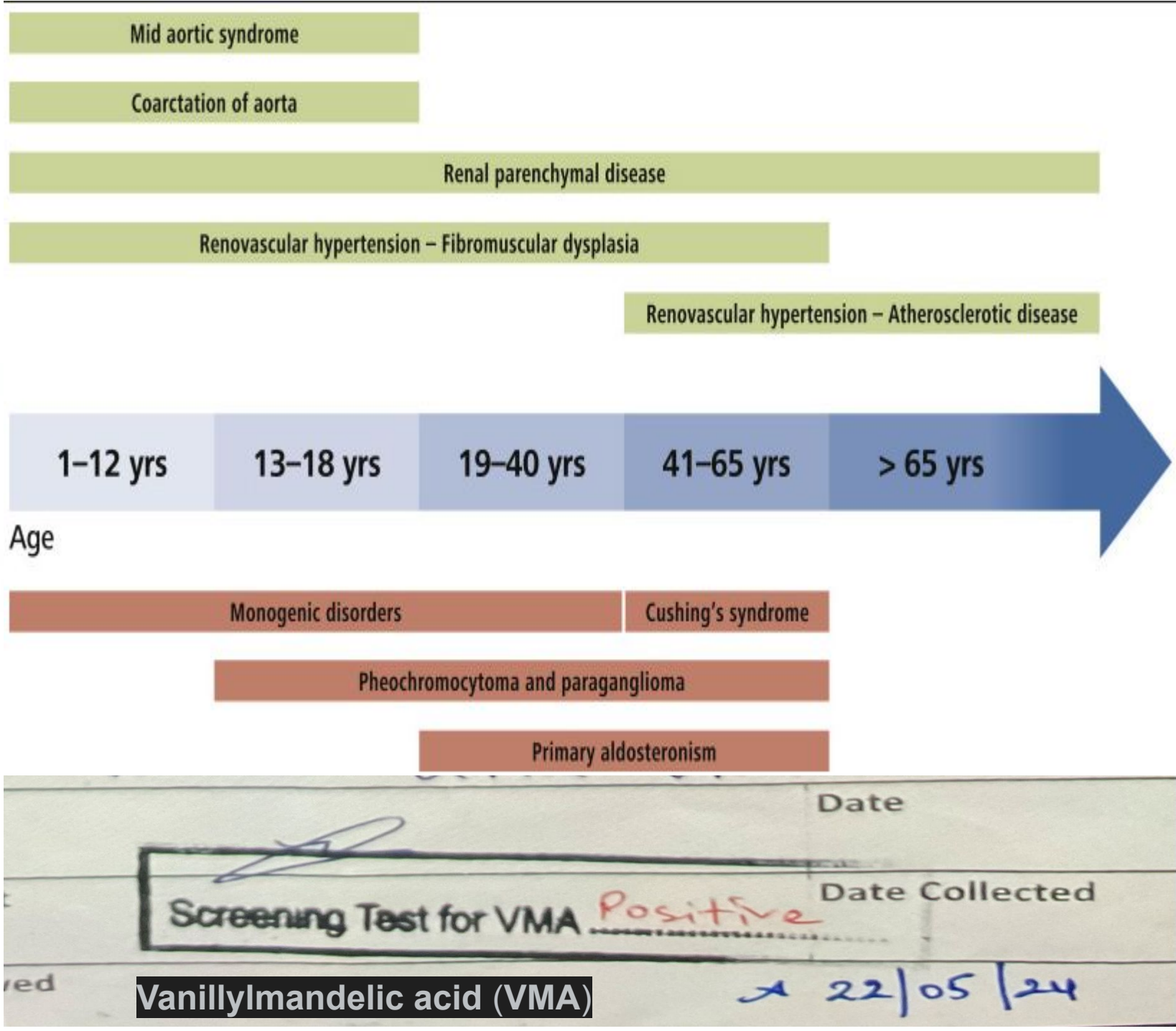
- **Primary (essential) hypertension 90 to 95% of all hypertensive patients**

is high blood pressure that is multi-factorial and doesn't have one distinct cause. It's also known as idiopathic or essential hypertension. {but is thought to be linked to genetics, poor diet, lack of exercise and obesity}. It is by far the most common form of high blood pressure, affecting the majority of those who experience hypertension.

- **80%** of all **secondary** causes due to RENAL PARENCHYMAL DISEASES

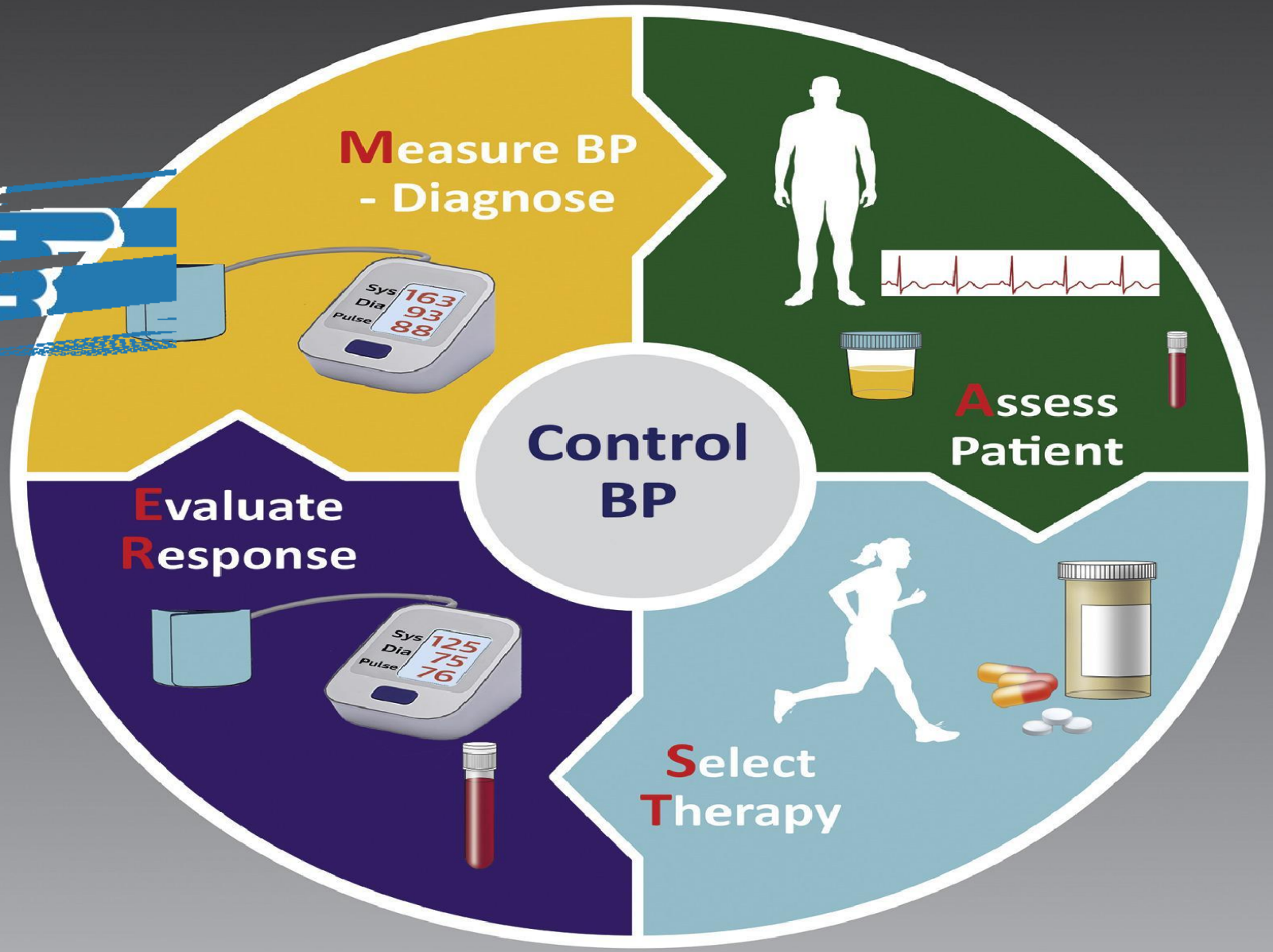
Secondary Hypertension

- Renal parenchymal disease: chronic pyelonephritis, primary glomerulonephritis, tubulointerstitial nephritis (accounts for 80% of all secondary causes)
- Systemic disorders with renal involvement: systemic lupus erythematosus, systemic sclerosis, vasculitides
- Renovascular disease: atherosclerotic disease, fibromuscular dysplasia, polyarteritis nodosa
- Endocrine disease: pheochromocytoma, Cushing syndrome, primary hyperaldosteronism
- Drugs: cocaine, [33] amphetamines, cyclosporine, clonidine (withdrawal), phencyclidine, diet pills, oral contraceptive pills
- Drug interactions: monoamine oxidase inhibitors with tricyclic antidepressants, antihistamines, or tyramine-containing food
- Central nervous system factors: CNS trauma or spinal cord disorders, such as Guillain-Barré syndrome
- Coarctation of the aorta
- Preeclampsia/eclampsia
- Postoperative hypertension



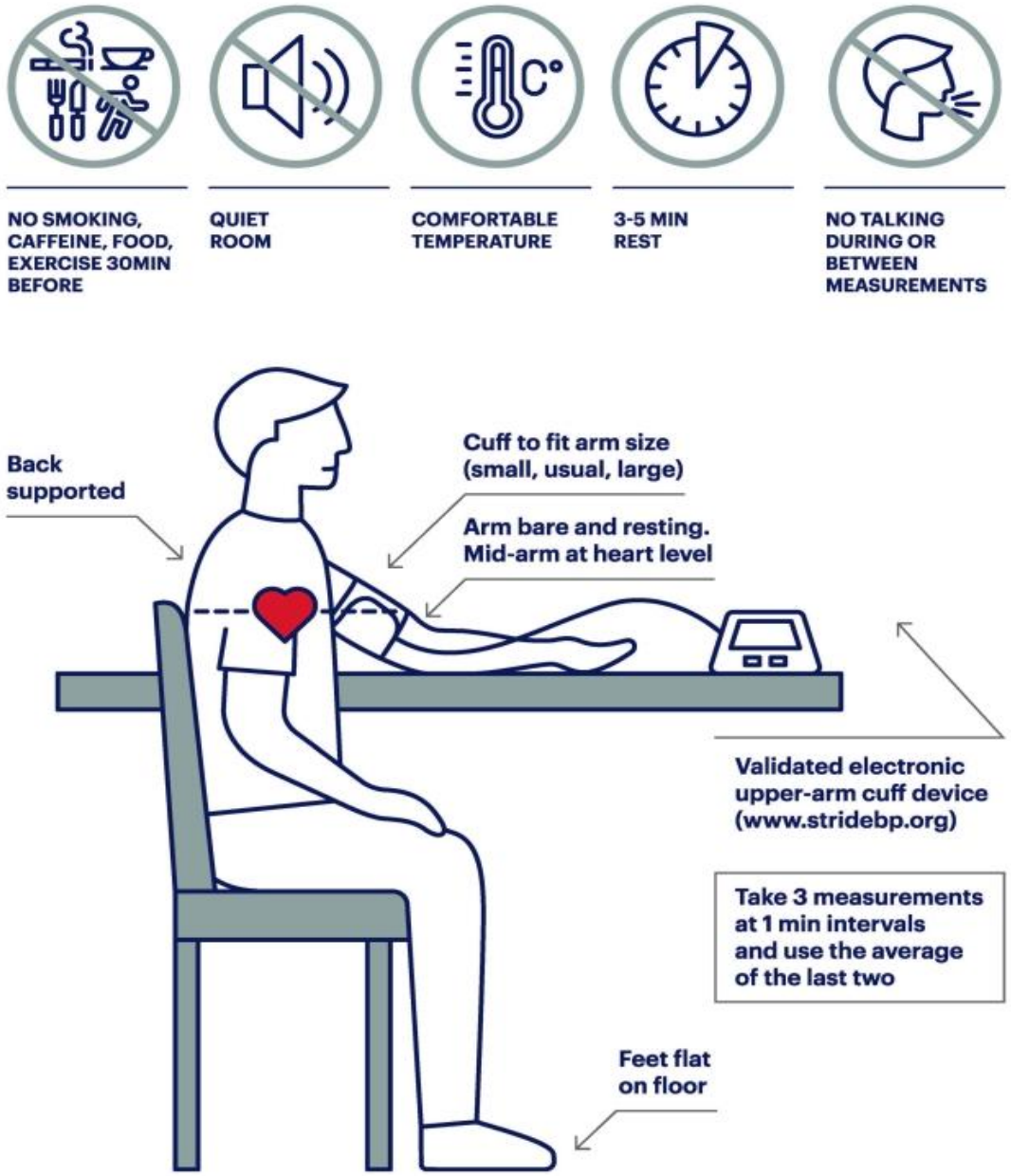
Vanillylmandelic acid (VMA)

ESH MASTERplan for Hypertension Management



CLICK HERE

WHAT IS THE MOST ACCURATE WAY TO TAKE BLOOD PRESSURE?

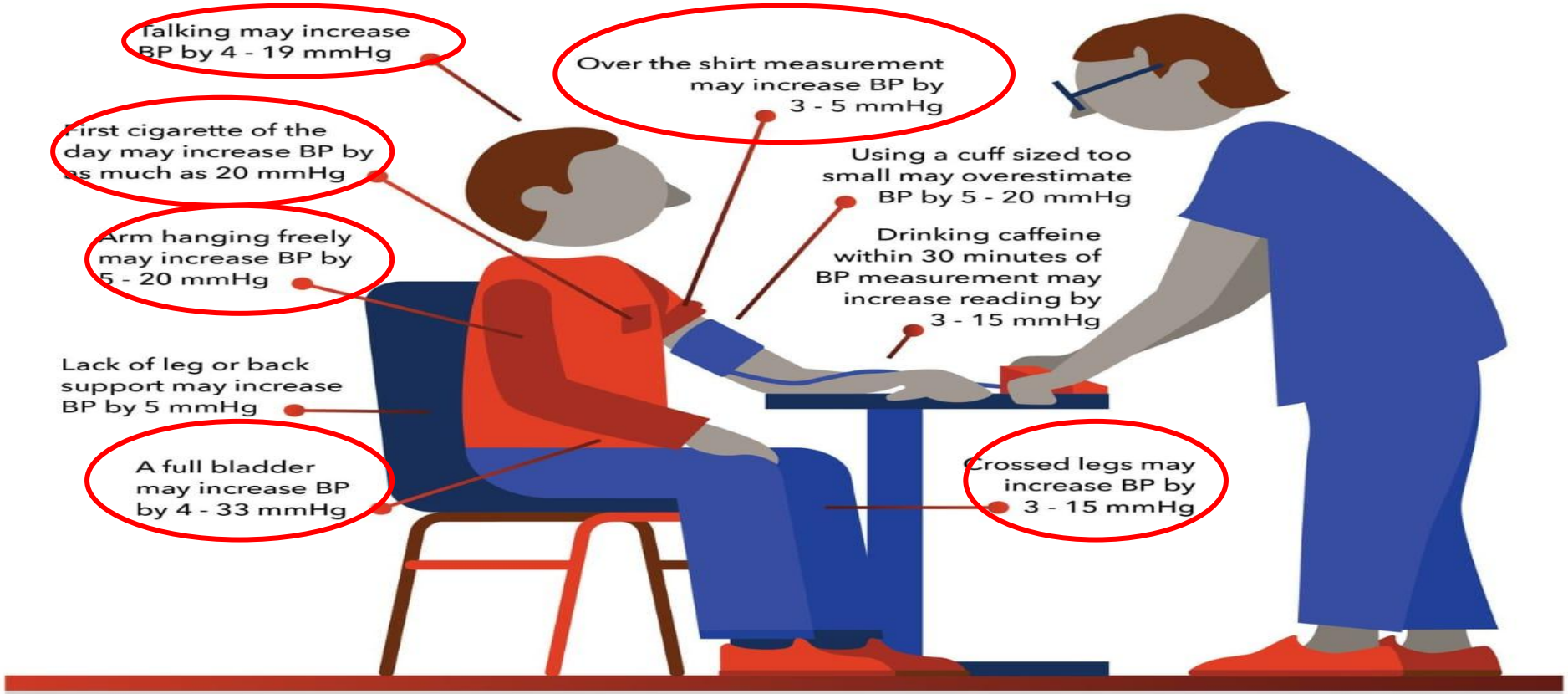


CORRECT BLOOD PRESSURE MEASUREMENT IS KEY

- **Avoid tobacco products, foods, drinks, exercise and caffeine 30 minutes before blood pressure measurement.**
- **Use the bathroom so there's no pee in your bladder.**
- **Make sure you're sitting up straight with your legs uncrossed and your feet fat on the floor.**
- **Rest the arm you'll use on the table,so your arm is at heart level and relax your arm.**
- **Ideal size of cuff (Width 40% & Length 80% of the circumference of the arm) Smaller cuff=higher BP…etc.**
- **Wrap the blood pressure measurement cuff around your upper arm (2.5cm above your antecubical fossa). You can use your left or right arm. Make sure your sleeve isn't between the cuff and your arm. The cuff should touch your skin.**

MISMEASUREMENT OF BLOOD PRESSURE IN THE OFFICE: FINDING THE COMMON MISTAKES

AMERICAN COLLEGE of CARDIOLOGY



Abbreviations

- BP: blood pressure
- mmHg: millimeters of Mercury (unit of measurement for BP)

Faculty

Yvonne Commodore-Mensah, PhD, MHS, RN
Joseph E. Ebinger, MD
Scott B. Kirkpatrick, MD
Eugene Yang, MD, FACC

View the references

Educational grant support provided by Medtronic.

Visit ***ACC.org/LearnHTN*** to learn more!

BLOOD PRESSURE MEASUREMENT

- **When to measure:** Measure your blood pressure twice a day, ideally in the morning and the evening. Each time take 2 readings, at least 1 minute apart
- **Measure your blood pressure in both arms when you first start.** They will give slightly different readings. From then on, use the arm that gave you the higher reading each time or use the arm that your doctor or nurse uses when they measure your blood pressure at OPD visit.
- **Frequency:**

❖ can be daily

❖ two weeks after starting a new blood pressure medicine can tell you if it's working.

❖ Some people have higher readings in their provider's office (white coat syndrome). Other people get higher readings at home, so it's good to have a mix of both in-home and in-office readings.

❖ a week before a checkup (to distinguish between white coat hypertension)

PLEASE NOTE :Don't check your blood pressure too often. Some people become worried or stressed about small changes in their readings if they take them too often. Worrying can also raise your blood pressure in the short term, making your reading higher than it should be.

PATIENT ASSESSMENT

NON MODIFIABLE RISK FACTORS

- Age
- Sex
- Genetic factors
- Ethnicity

MODIFIABLE RISK FACTORS

- Obesity
- Salt intake
- Saturated fats
- Dietary fibre
- Alcohol
- Physical activity
- Environmental stress
- Socio economic status
- Other factors

WHO definition of non-adherence

The extent to which a person's behaviour:

- taking medication
- following a diet
- and/or executing lifestyle changes

corresponds with agreed recommendations from a health care provider

IN MAURITIUS – DIETS AND LIFESTYLES RISKS

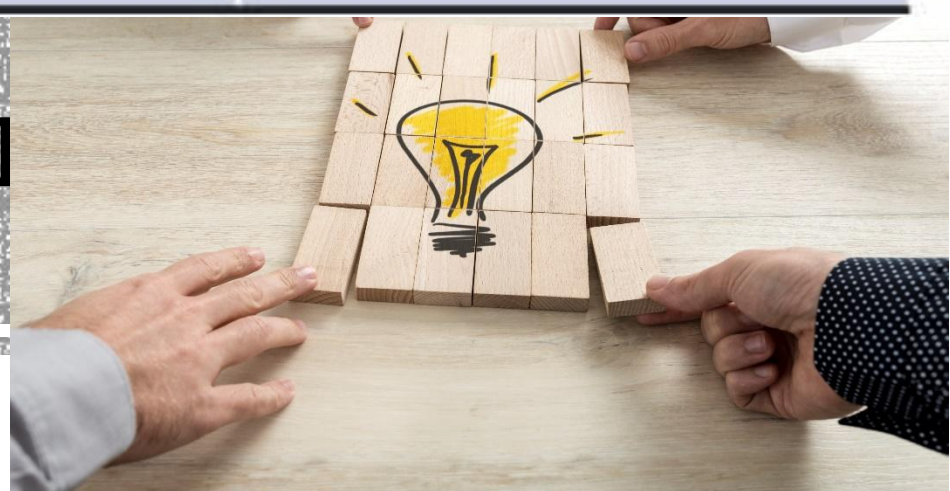
- The Mauritian population are descendants of immigrants who arrived from India, China, Africa and France.
- Most of the Mauritian population follow the Indian culture and gastronomy.
- The Indian gastronomy often comprises mostly of rice and curry which are high in fat and carbohydrates.
- Added to this, most foodstuffs such as pickles, salted fish and octopus, and Bombay duck (commonly and locally known as "Bombli"), which are very popular among the Mauritian population,are high in sodium, and salt has a very negative impact on hypertension.
- Moreover, the increase in fast food companies in Mauritius has also led the population to adopt an unhealthy manner of food consumption, westernizing the eating habits of people.
- People are refusing their safe meal prepared at home for unhealthy and unhygienic fast foods.
- A constant consumption of these food stuff have led to an obese population. Approximately 45.5% of the Mauritian population is considered to be obese.
- Obesity entails several health risks of which is hypertension.

Source: A Proposed Framework for Hypertension in Mauritius. 2018 Journal of Health Inform Africa.

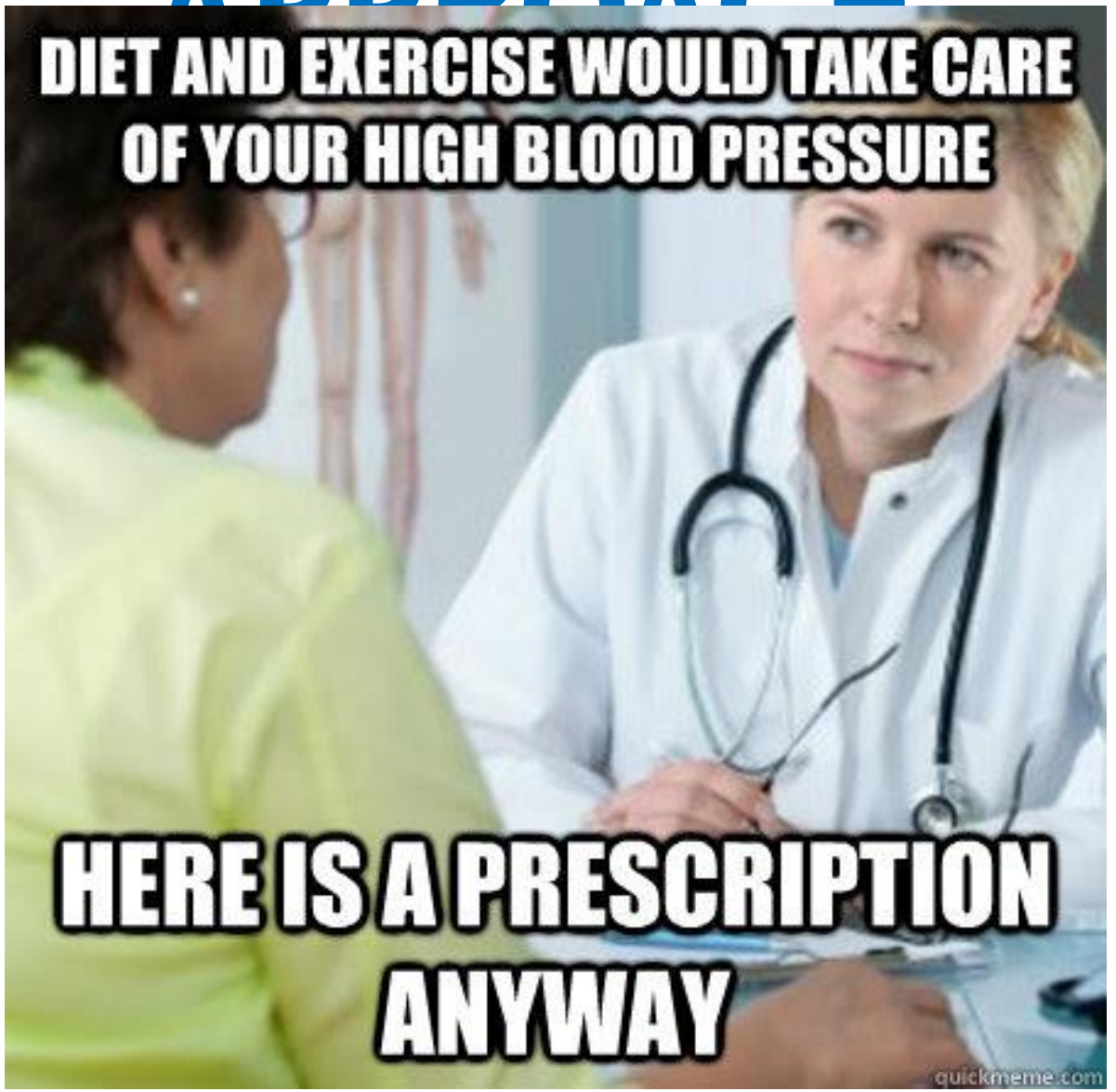
Table 11–2. Lifestyle modifications to manage hypertension.[1]

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
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated fat and total fat	8–14 mm Hg
Dietary sodium reduction	**Excessive intake of sodium (defined by the WHO in 2022 as more than 2 g of sodium or more than 5 g of sodium chloride per day)**	2–8 mm Hg
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
Moderation of alcohol consumption	Limit consumption to no more than two 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 one drink per day in women and lighter-weight persons	2–4 mm Hg

ADDRESSING MODIFIABLE RISK FACTORS



PHARMACOLOGICAL APPROACH



WHATS THE ISSUES WITH MEDICATIONS?

1. STANDARD OF CARE.

2. SIDE EFFECTS

3. NON-ADHERENCE

PHARMACOLOGICAL MANAGEMENT AND TREATMENT GUIDELINES ACCORDING TO 2023 EUROPEAN SOCIETY OF CARDIOLOGY & EUROPEAN SOCIETY OF HYPERTENSION(ESC & ESH)

1 Pill

Initial therapy
Dual combination

ACEi or ARB + CCB or diuretic

Consider monotherapy in low risk grade 1 hypertension (systolic BP <150mmHg), or in very old (≥80 years) or frailer patients

1 Pill

Step 2
Triple combination

ACEi or ARB + CCB + diuretic

2 Pills

Step 3
Triple combination + spironolactone or other drug

Resistant hypertension
Add spironolactone (25–50 mg o.d.) or other diuretic, alpha-blocker or beta-blocker

Consider referral to a specialist centre for further investigation

Beta-blockers
Consider beta-blockers at any treatment step, when there is a specific indication for their use, e.g. heart failure, angina, post-MI, atrial fibrillation, or younger women with, or planning, pregnancy

ARBs :	Losartan
ACEi :	Enalapril
Calcium channel blockers :	Amlodipine
Thiazide diuretics :	Hydrochlorothiazide
Beta-Blockers :	Atenolol and Metoprolol
Alpha and Beta- blocker :	Carvedilol
Alpha blocker :	Prazosin
Aldosterone antagonist :	Spirinolactone
Central sympatholytics :	Alpha-methyldopa
Vasodilator :	Hydralazine

THE AMERICAN COLLEGE OF CARDIOLOGY (ACC) AND AMERICAN HEART ASSOCIATION (AHA) GUIDELINES MANAGEMENT OF HYPERTENSION TAILORED TO DIFFERENT POPULATIONS

Race and Ethnicity Considerations:

1. **African Americans:**
    1. **First-Line Therapy:** Thiazide diuretics or CCBs are recommended as initial therapy.
    2. **Combination Therapy:** If blood pressure is not controlled with one agent, a combination of a thiazide diuretic and a CCB is often effective.
2. **Non-African Americans:**
    1. **First-Line Therapy:** ACE inhibitors, ARBs, thiazide diuretics, or CCBs can be used as initial therapy.
3. **Chronic Kidney Disease (CKD):**
    1. **Preferred Agents:** ACE inhibitors or ARBs are recommended due to their protective effects on the kidneys.

Specific Populations:

1. **Elderly Patients:**
    1. Lower starting doses and slower titration of medications are often recommended to avoid adverse effects.
2. **Patients with Diabetes:**
    1. The target blood pressure is also less than 130/80 mm Hg.
    2. ACE inhibitors or ARBs are preferred due to their beneficial effects on renal outcomes.
3. **Patients with Heart Failure:**
    1. Beta-blockers, ACE inhibitors, ARBs, and mineralocorticoid receptor antagonists are commonly used.
4. **Patients with Ischemic Heart Disease:**
    1. Beta-blockers and ACE inhibitors or ARBs are often preferred.
5. **Patients with Stroke or Transient Ischemic Attack (TIA):**
    1. Thiazide diuretics, ACE inhibitors, or ARBs are recommended.

Side Effects of Commonly Used Drug Classes to Treat Hypertension in the Elderly

Beta-Blockers

Bradycardia,[a] hypotension,[a] AV block, dizziness,[a] fatigue,[a] depression,[a] diarrhea,[a] N/V,[a] bronchospasm, hypoglycemia, hyperglycemia impotence

Alpha-Blockers

Orthostatic hypotension,[a] dizziness,[a] sinus tachycardia, vertigo, syncope, diarrhea, fatigue,[a] peripheral edema, N/V,[a] priapism, impotence, floppy iris syndrome

Calcium Channel Blockers

Bradycardia, hypotension, tachycardia, ventricular fibrillation, dizziness,[a] fatigue,[a] peripheral edema,[a] N/V,[a] constipation,[a] anorexia, flushing,[a] increased liver enzymes, AV block

ACE Inhibitors

Angioedema, dry cough,[a] hyperkalemia,[a] dizziness,[a] hypotension,[a] fatigue,[a] syncope, dysgeusia, rash,[a] N/V[a]

ARBs

Orthostatic hypotension,[a] diarrhea,[a] hyperkalemia, dizziness,[a] fatigue,[a] myalgia, nasal congestion, insomnia, syncope

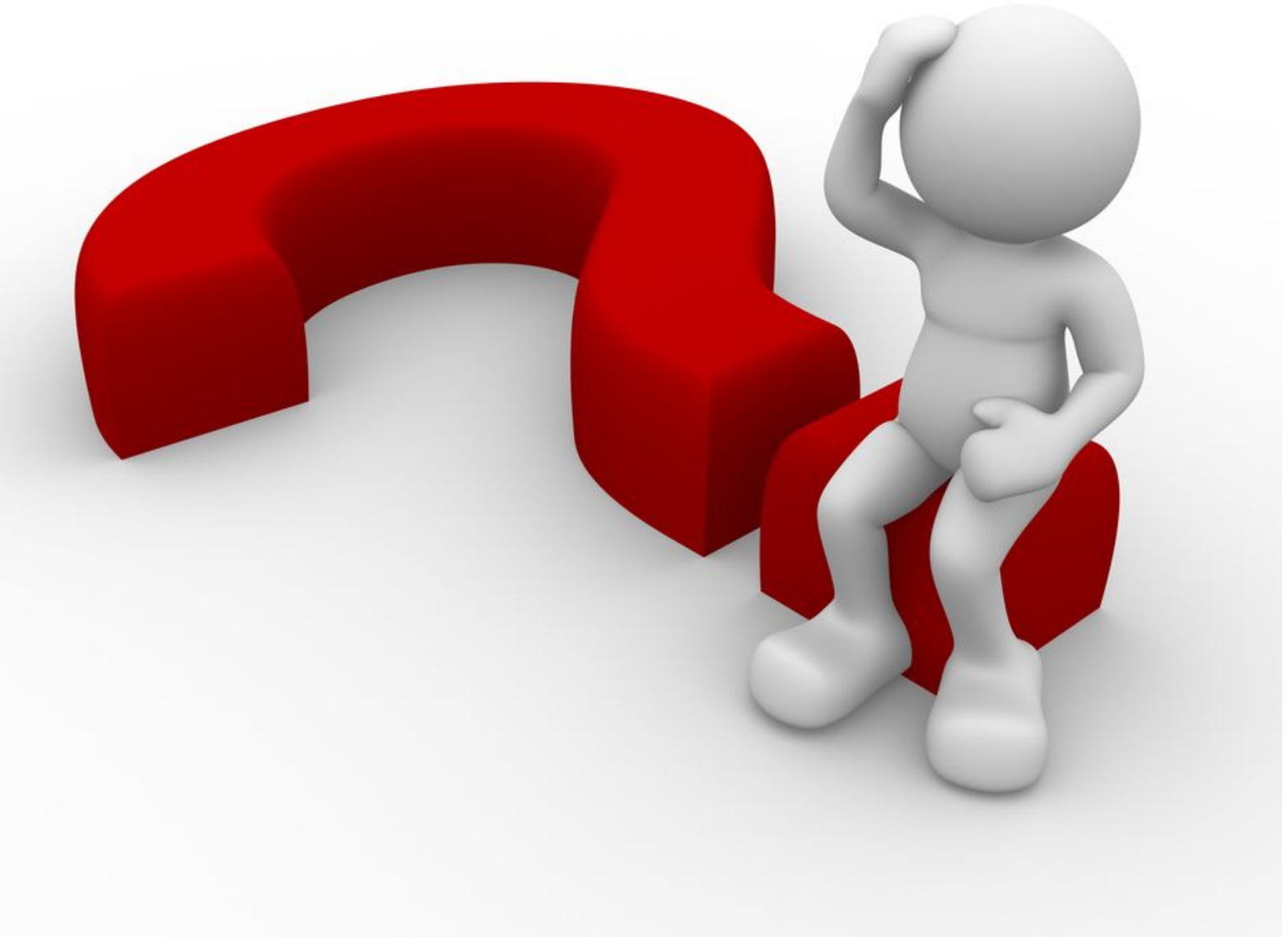
Diuretics

Hypomagnesemia, ototoxicity, hypokalemia, hypochloremia, hyperuricemia, orthostatic hypotension Hyponatremia

[a] Most common. ACE: angiotensin-converting enzyme; ARB: angiotensin receptor blocker; AV: atrioventricular; N/V: nausea/vomiting.

NOTE: Beta-blockers plus non-dihydropyridine calcium channel blockers (Diltiazem & Verapamil) may worsen heart failure through negative inotropic effects.

HOW DO WE EVALUATE RESPONSE TO Rx



Challenges in hypertension treatment

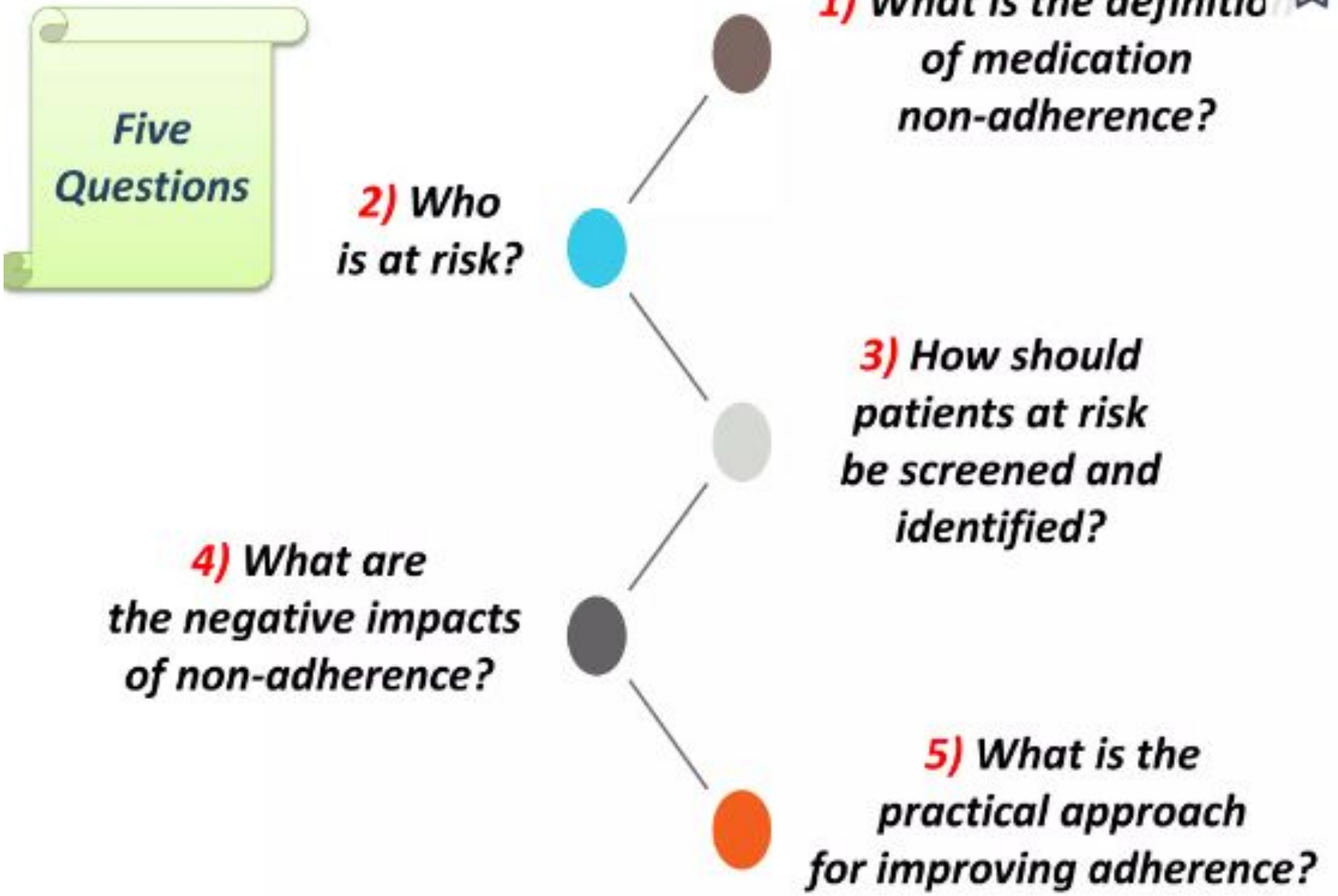
Hypertension: Leading cause of global disease burden

Yet.....Despite the availability of effective therapy we are not doing well !!!

One key reason could be non-adherence

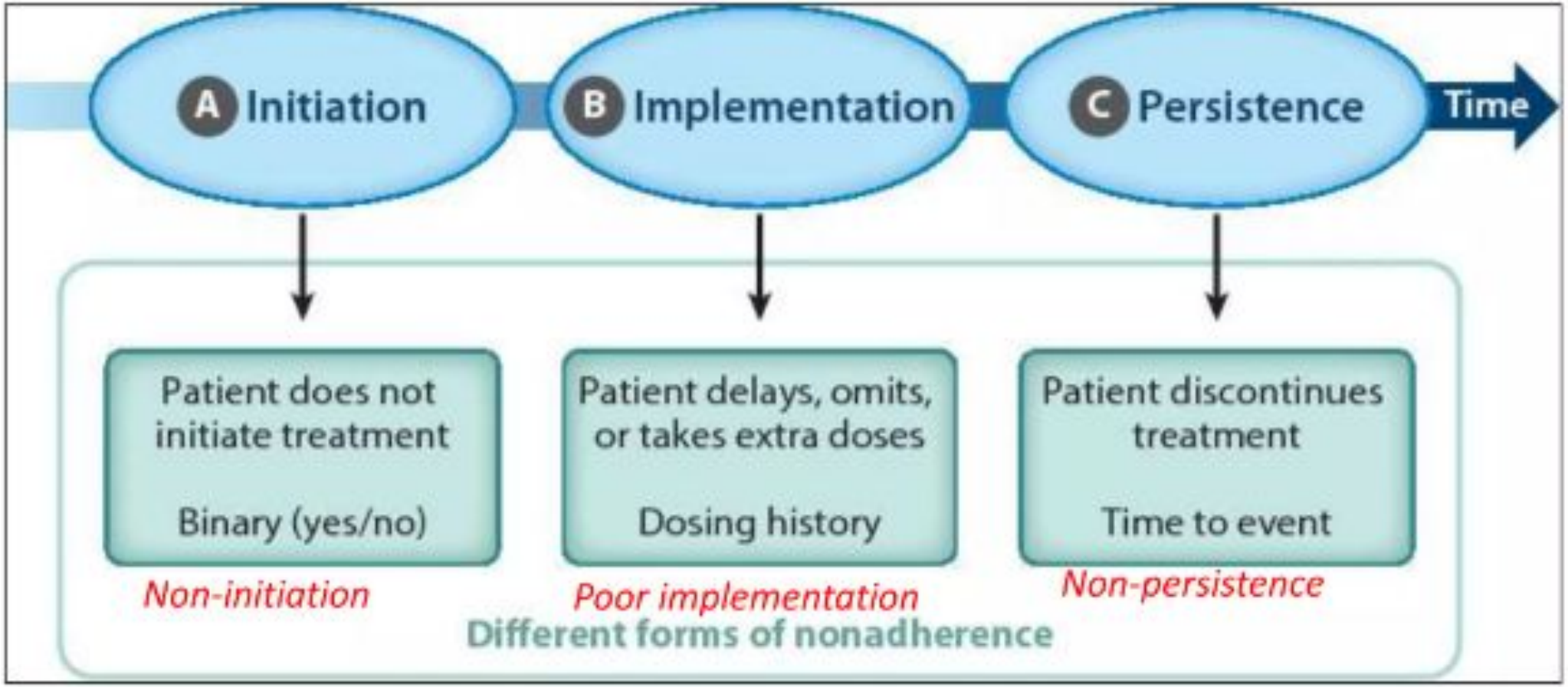
"Drugs don't work in patients who don't take them"

C Everett Koop: US Surgeon General 1981-89


Five Questions
1) What is the definitio of medication non-adherence?
2) Who is at risk?
3) How should patients at risk be screened and identified?
4) What are the negative impacts of non-adherence?
5) What is the practical approach for improving adherence?


Definition of
Medication Non-adherence

The more scientific definition of medication adherence
is the process by which patients take their medication as prescribed,
which is further divided into **3 quantifiable components:**
initiation , implementation , and discontinuation



There are 2 types of medication-taking behaviors.

Unintentional non-adherence is a passive process

Ability→Practicalities

Intentional non-adherence is an active decision

Motivation→Perceptions

NON ADHERENCE MULTIFACTORIAL

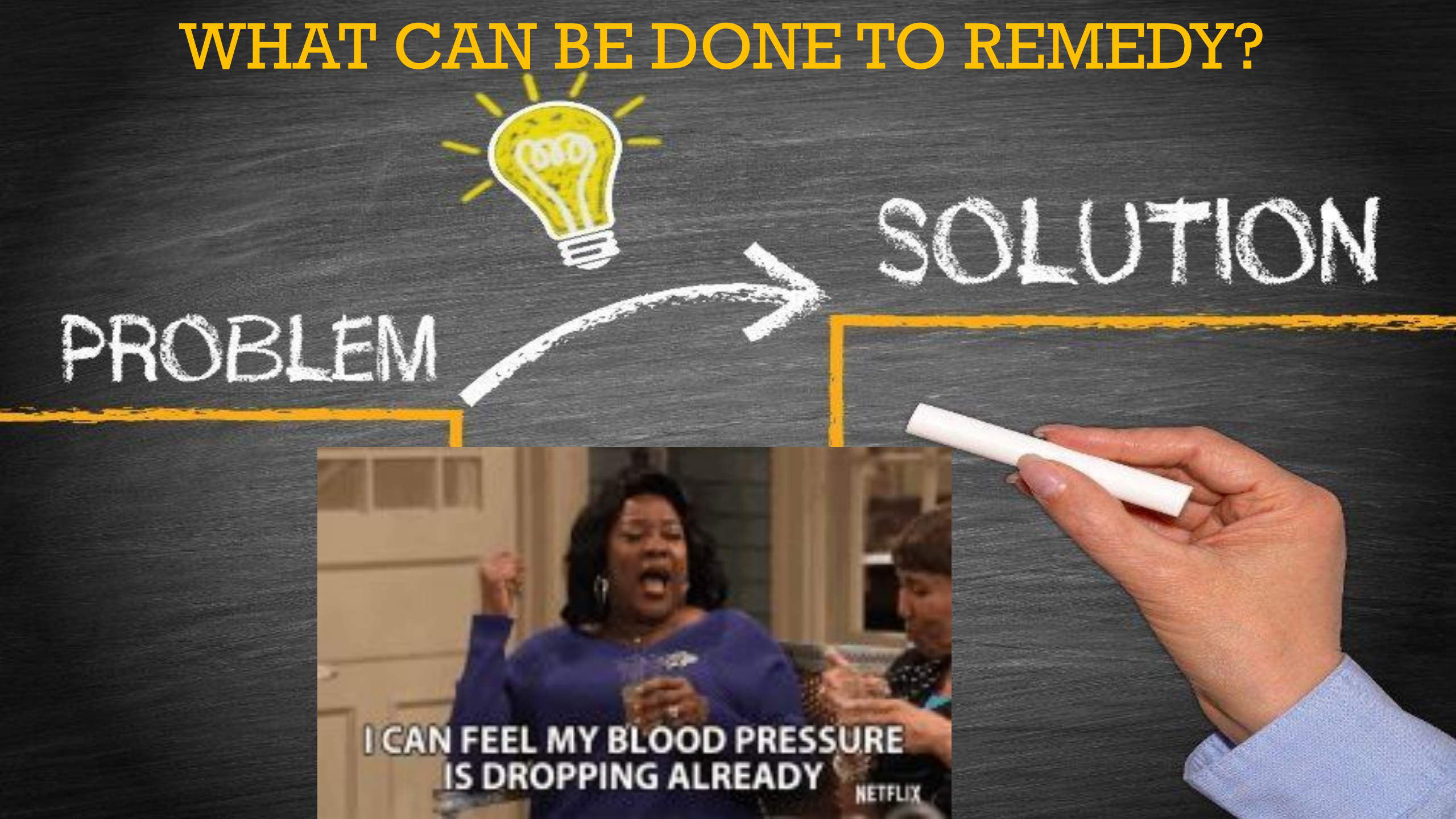
Patient-Related

1. Cognitive Impairment like alzheimer +/- Depression
2. Fail to see benefits (mostly asymptomatic)
3. Poor Knowledge about disease
4. Unstable living conditions

Therapy Related

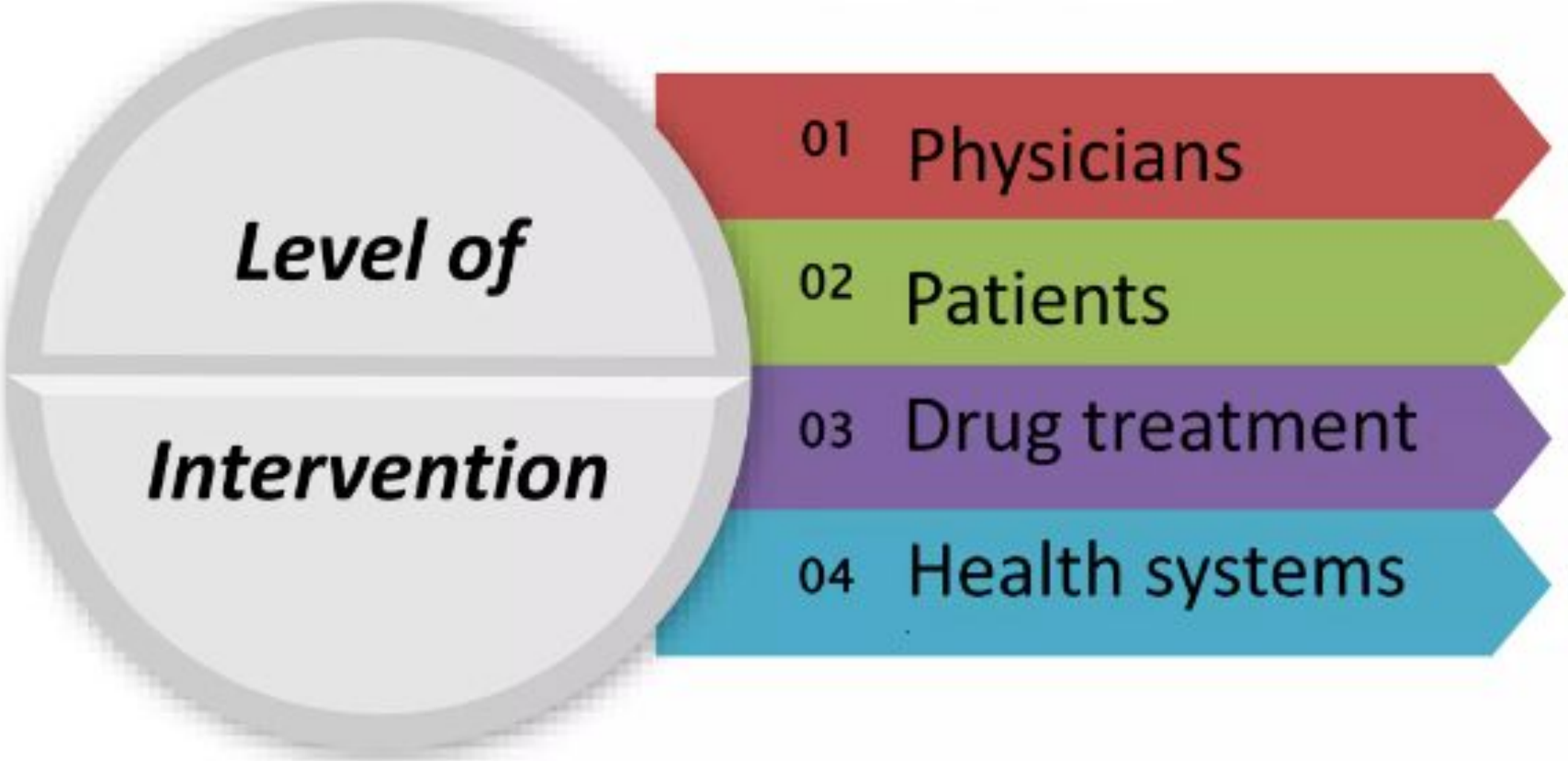
1. Complexity of treatment like multiple pills
2. Duration of treatment which generally declines over time
3. Frequent changes
4. Medication cost
5. Patient-doctor poor relationship
6. Long wait times

WHAT CAN BE DONE TO REMEDY?



Interventions that may improve drug adherence in hypertension

(2018 ESC/ESH Guidelines)



Physician level
Provide information on **the risks** of hypertension and **the benefits** of treatment, as well as agreeing **a treatment strategy** to achieve and maintain BP control using **lifestyle measures and a single-pill-based treatment strategy when possible** (information material, programmed learning, and computer-aided counselling)
Empowerment of the patient
Feedback on behavioural and clinical improvements
Assessment and **resolution of individual barriers** to adherence
Collaboration with other healthcare providers, especially nurses and pharmacists

Telemonitoring refers to the transmission of symptom scores, physiological data including heart rate, blood pressure, oxygen saturation, and weight directly to care providers either via automated electronic means or by web-based or phone-based data entry.

Patient level
Self-monitoring of BP (including telemonitoring)
Group sessions
Instruction combined with motivational strategies
Self-management with simple patient-guided systems
Use of reminders
Obtain family, social, or nurse support
Provision of drugs at worksite


Weekly Pill Organizer
SUN
MON
TUE
WED
THU
FRI
SAT

Healthcare

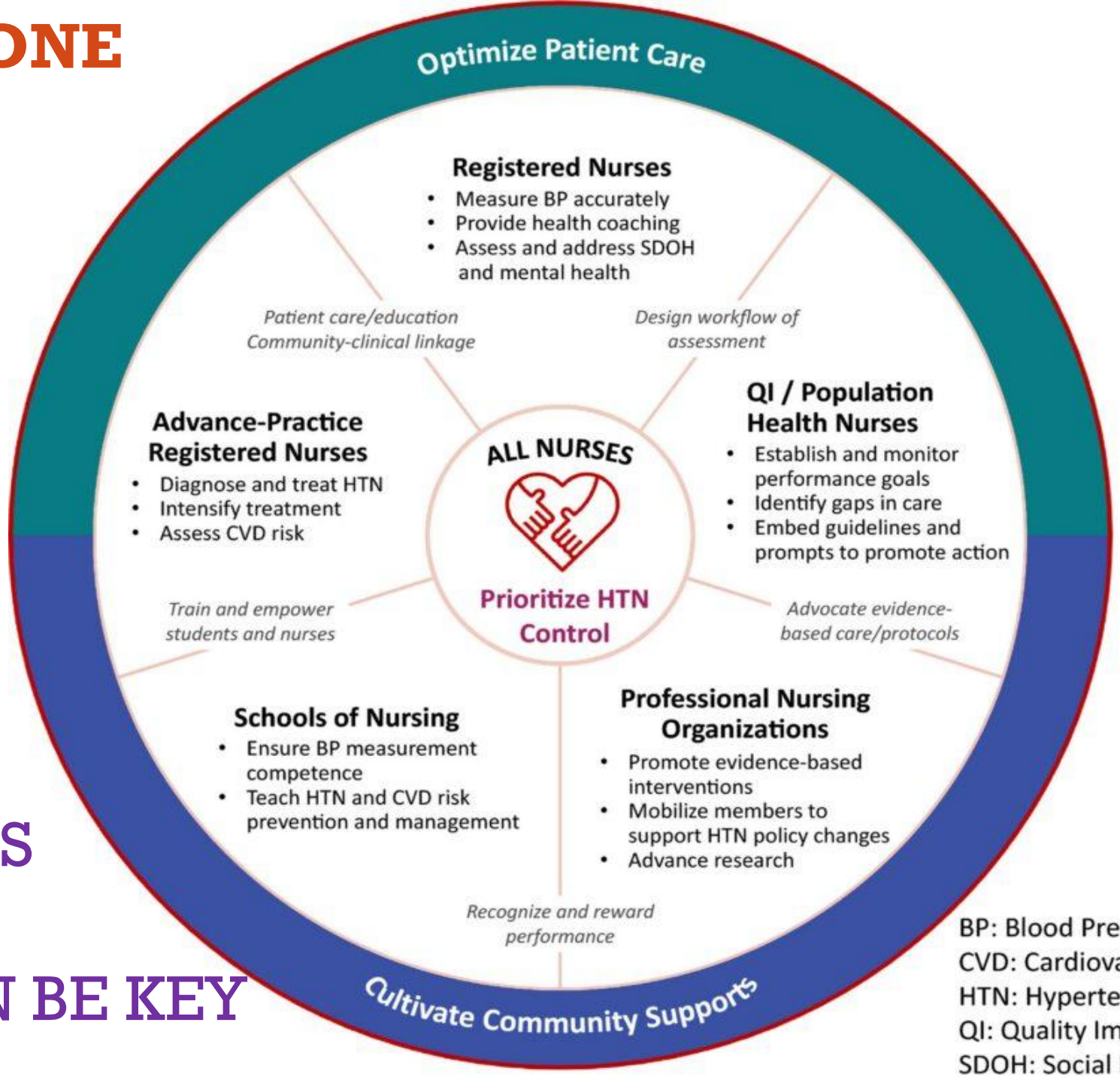
- Supporting the development of a monitoring system. (OPDs, Creating Specialized Hypertension Nurses and educating on telemonitoring of home BP)
- Giving Access to a broad array of Hypertensive medicine. (Like longer acting Telmesartan or Olmesartan or combination medications)
- Reimbursement of certain medicine purchased through social security(like in France) or access to medical insurance.
- Development of a national databases, including prescription data and its access to physicians and pharmacists – Starting shortly in Region 4
- Easy accessibility of drugs- bringing it closer to the patient home.

We ARE NOT A ONE PERSON ARMY TO FIGHTER AGAINST HTN

AHSCP
Certified Hypertension Clinician

The American Hypertension Specialist Certification Program

SPECIALISED NURSES AND FAMILY DOCTORS /COMMUNITY PHYSICIANS CAN BE KEY



BP: Blood Pressure
CVD: Cardiovascular Disease
HTN: Hypertension
QI: Quality Improvement
SDOH: Social Determinants of Health

TECHNOLOGY EASILY AVAILABLE BUT JUST NEED TO BE MADE AWARE OF, CAN SOLVE A LOT OF THE PERSONAL AND PROFESSIONAL ISSUES TO COMPLIANCE

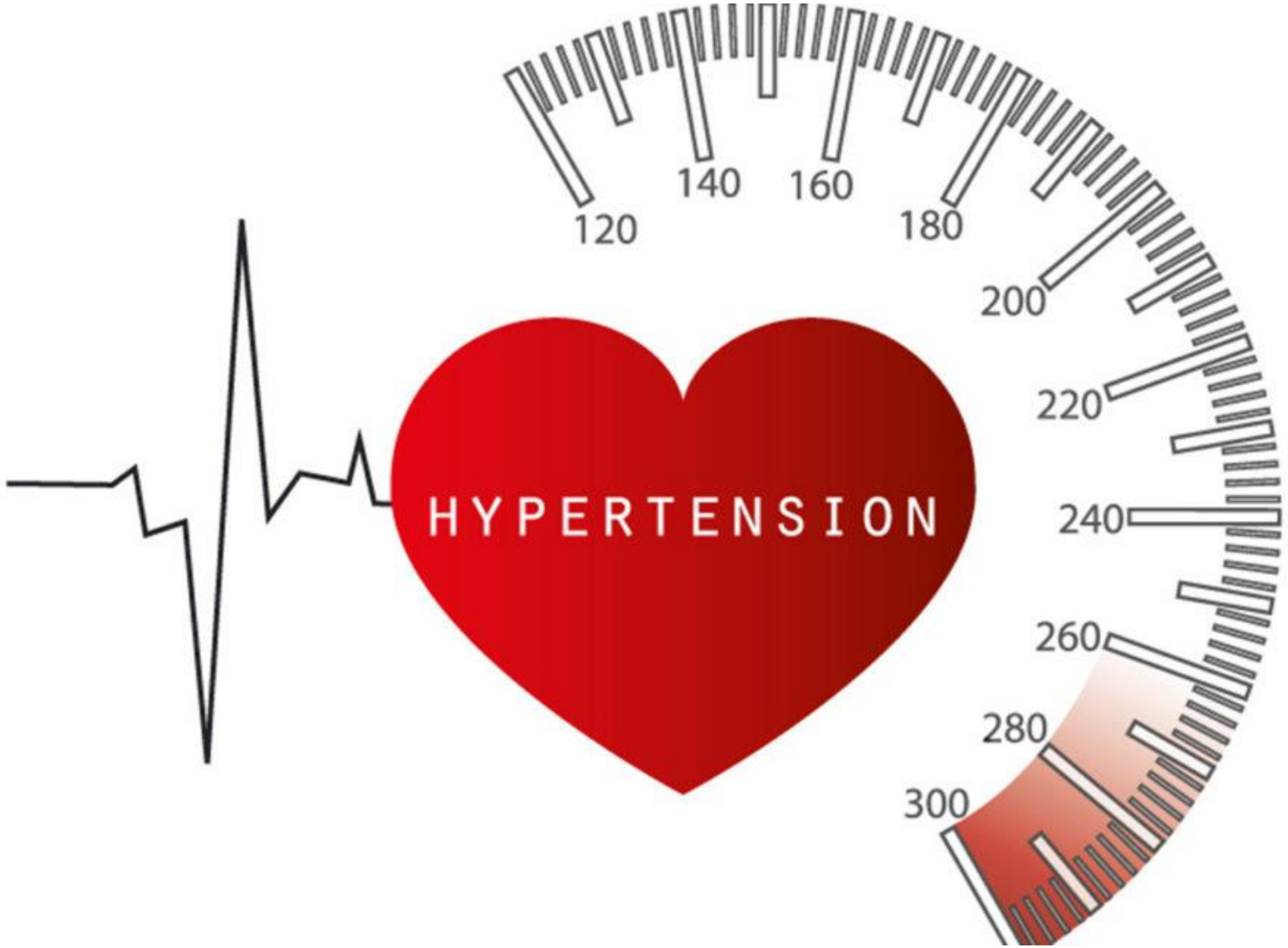
Consider easy to use technology-based solutions

Smart pill bottles

A smartphone app improves medication adherence

Using Technology to Improve Medication Adherence

WHY TALK ABOUT THE IMPORTANCE OF A WELL CONTROL BP?



Why is this important?

Cardiovascular risk

DOUBLE For every increase of:

SBP by 20mmHg

&

DBP of 10mmHg.

This is the result of a ***meta-analysis*** involving more the 1 million participants

Impact of non-adherence to antihypertensive medications

Patient Consequences & Healthcare system Consequences

Cardiovascular
• Hypertensive crisis
• Left ventricular hypertrophy
• Vascular stiffness
• Myocardial infarction
• Chronic heart failure
• Death

Cerebrovascular
• Stroke
• Cognitive dysfunction
• Dementia

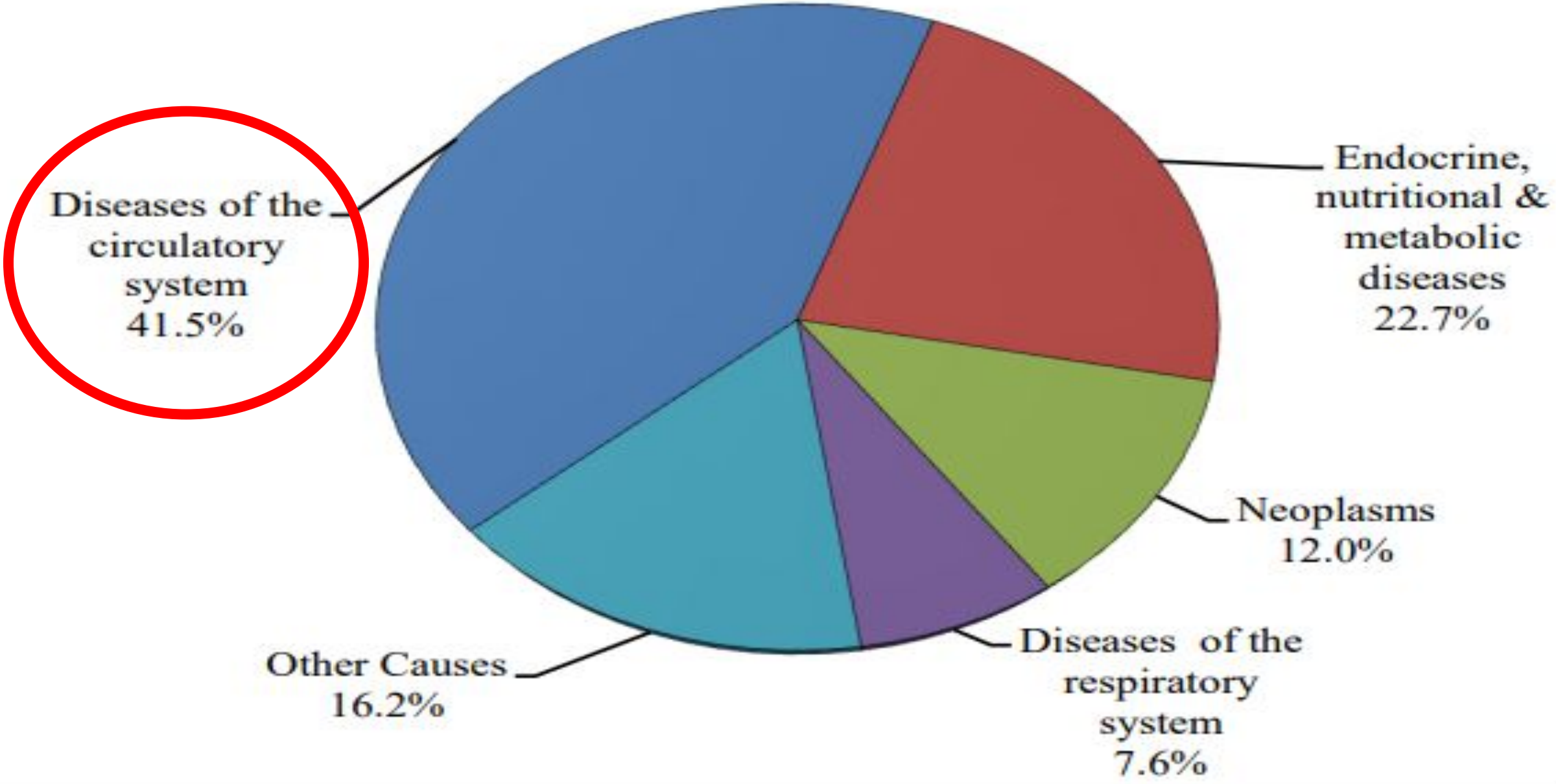
Economic
• Increased healthcare costs
• Reduce quality of life
• Disability

Renal
• Microalbuminuria
• Chronic kidney disease
• End-stage renal disease

PROGNOSIS

- If untreated nearly
  - 1/2 of hypertensive patients die of heart disease
  - 1/3 die of stroke
  - Remaining 10 to 15% die of renal failure

Main underlying causes of deaths by ICD-10 chapters, 2022



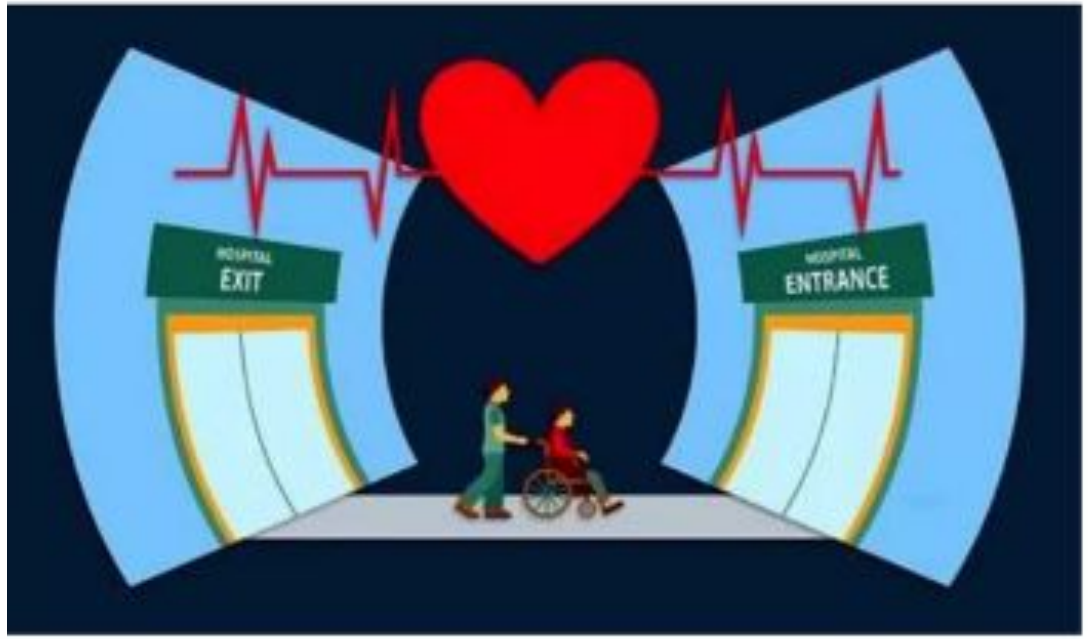
ECONOMIC IMPACT

Medication Adherence Stats

Non-adherence also leads to a lot of monetary loss for all stakeholders

$300 Bn

The approx. annual avoidable healthcare cost due to non-adherence in the US (which is 10% of total healthcare spendings in the US)



Did you know

that it's estimated that between 20% to 50% of patients are non-adherent ?

As a result, hospital admissions and readmissions take a giant leap.

1 in 3

Medicine-related hospital **admissions** that are due to non-adherence

66%

Hospital **readmissions** that occur annually due to non-adherence.

CONCLUSION

- ***Every patient should be considered as potentially non-adherent.***
  - Rule out non-adherence routinely
  - It's not just if a patient is non-adherent,but why ?
    "Understanding the key drivers of non- adherence"

- ***Here are ways to improve hypertension medication adherence to improve BP control.***
  - Prescribe fixed-dose combinations
  - Switch to less expensive "generic" drugs
  - Adopt standardized clinical guidelines

Warm , friendly sounding
"We would like you to adhere to the prescribed regimen"

Adherence →High

Finger-pointing connotation
"You will comply or there will be consequences"

Adherence→Low


17th May
2024
World Hypertension Day

THANK YOU