HYPERTENSION

King Saud University 1957 جامعة الملك سعود

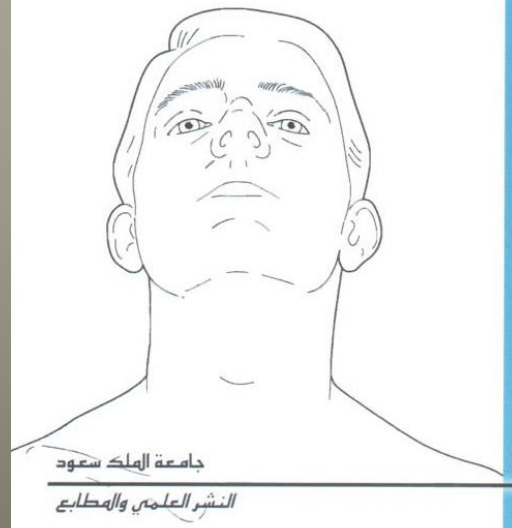
تأليف

نيكولاس ج. تالي سيمون أوكونر

كتاب الفحص الإكلينيكي الجيبي

ترجمة

أ.د. جمال بن صالح الوكيل



جامعة الملك سعود

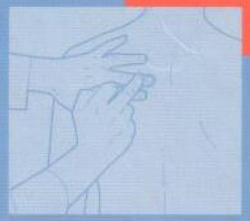
النشر العلمي والمطابع

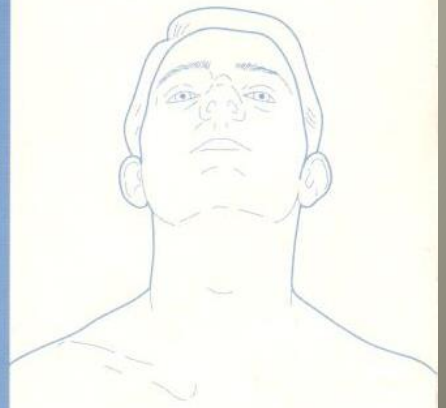
NICHOLAS J TALLEY

SIMON O'CONNOR

POCKET CLINICAL EXAMINATION

SECOND EDITION





The Objectives of this Lecture are:

1. To be able to recognize the definition of hypertension
2. To be able to identify the Stages of Hypertension
   (ACC/AHA - European Society of Cardiology/European Society of Hypertension (ESC/ESH)
3. To find out the complication of Hypertension
4. To learn how to measure blood pressure
5. To acquire knowledge on how to treat hypertension

Case

47 year old man came to your clinic with headache for 3 weeks. The nurse measure his Blood Pressure and was found to be 150/95 mmHg:

1. Does he have Hypertension?
2. What is the stage of Hypertension?
3. What investigation should you perform?
4. What could be your management on his case?
5. Is their any possible prevention to his disease and its complication?

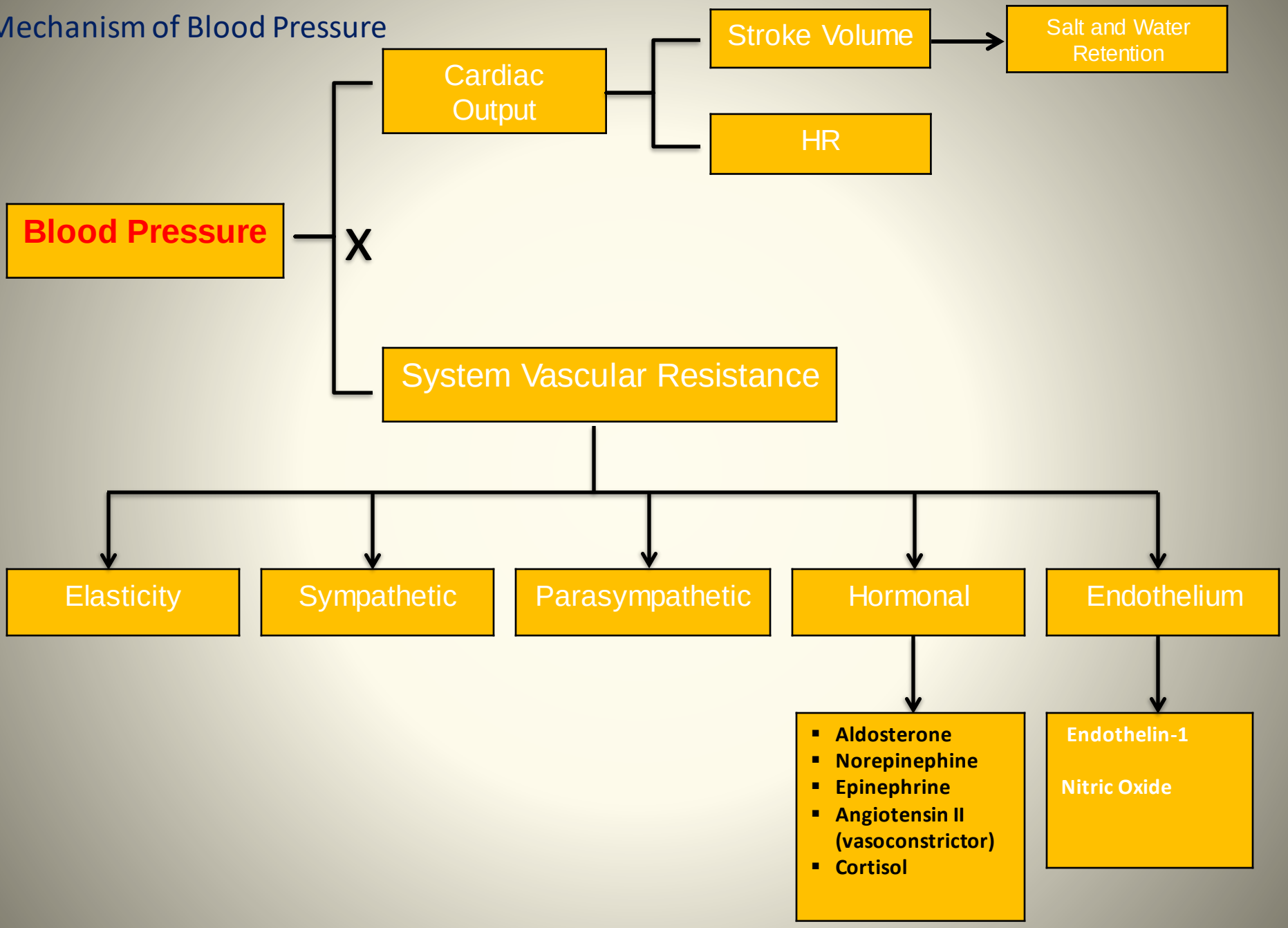
Prevalence of hypertension

- The 4th most common cause of death worldwide
- The overall prevalence of hypertension in adults is 30 - 45%
- The overall prevalence of hypertension in Saudi Arabia is 25.5%- 31.4%
- Onset stage 25-55 years mainly in 40-50y
- more common with advancing age
- prevalence of >60% in people aged >60 years
- Risk of HTN : A) aging , B) sedentary lifestyles C) increase their body weight

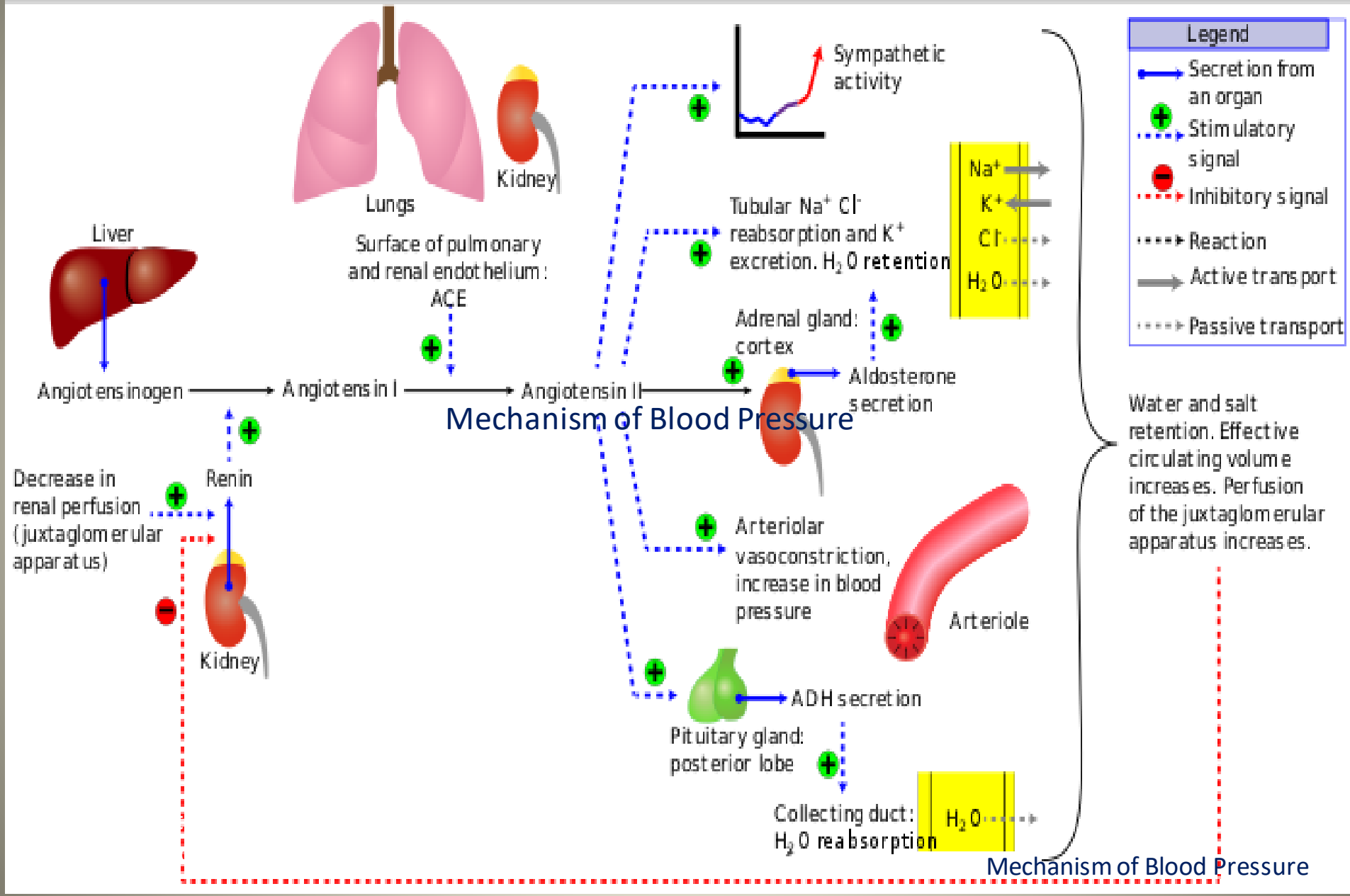
- **Only 72% are aware of their disease**

- **55% of participants on medication for hypertension had their blood pressure uncontrolled**

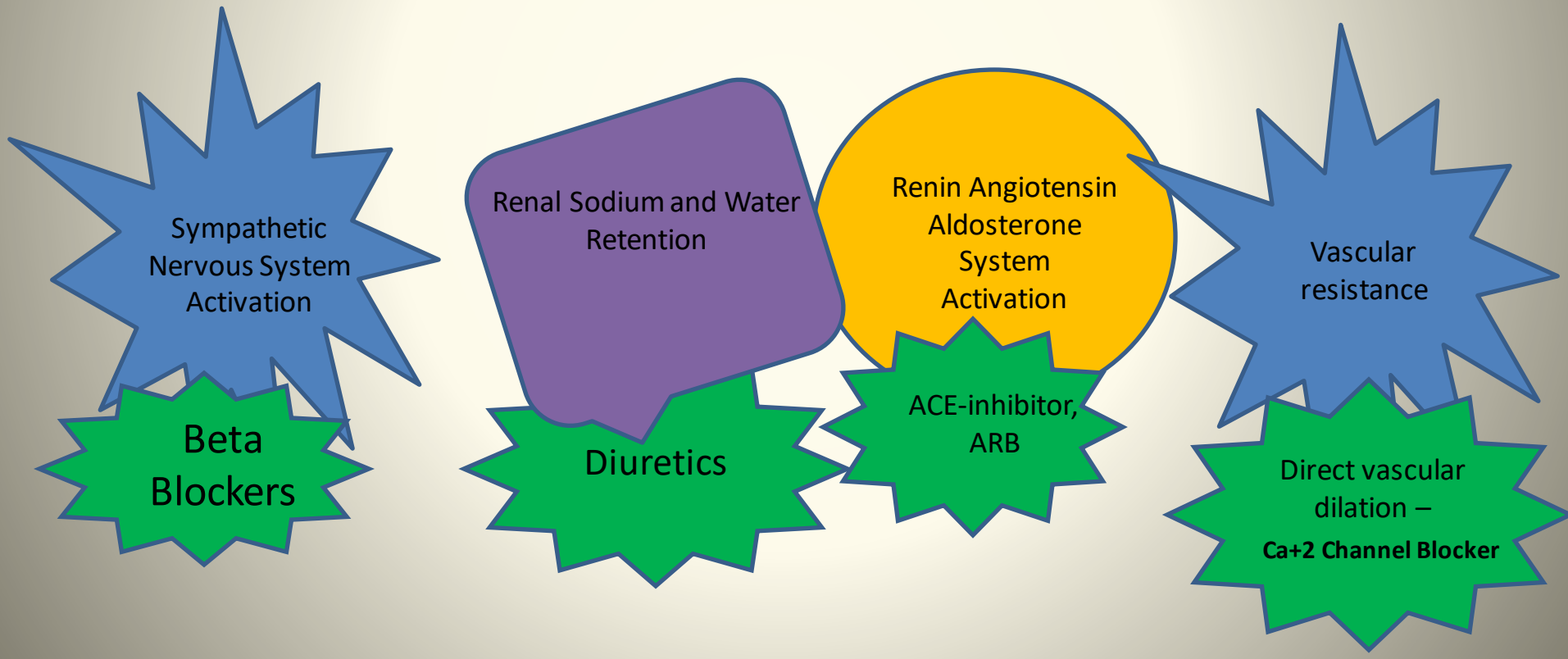
Mechanism of Blood Pressure



Renin-angiotensin-aldosterone system



Treatment “Essential "Hypertension?



Hypertension

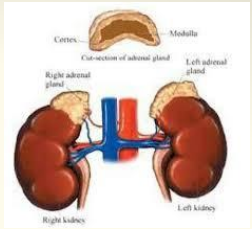
- In 90%-95% of cases no cause can be found primary hypertension (essential)
- Secondary hypertension 5-10%

Essential HTN

- Risk factors (modeflied)
  - Obesity---metabolic syndrome
  - Unhealthy.diet—Excessive.salt.intake--lowpotassium intake
  - Excessive alcohol intake
  - Polycythemia
  - Lack of exercise
  - Non-steroid anti-inflammatory drugs
- Risk factors (Non modeflied)
  - Family history of essential HTN
  - Aging
  - Race &gentic

Secondary Hypertension

- Primary renal disease(CKD)
- Renovascular disease



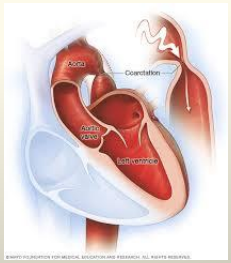
- Oral contraceptives
- Sleep apnea syndrome

- Primary hyperaldosteronism

- Cushing's syndrome

- Pheochromocytoma
- Other endocrine disorders

- Coarctation of the aorta



Types Of BP Apparatuses

Non-automated device [non-AOBP]

Mercury Type

Aneroid Type

Half automated device

Automated Device

Digital Type

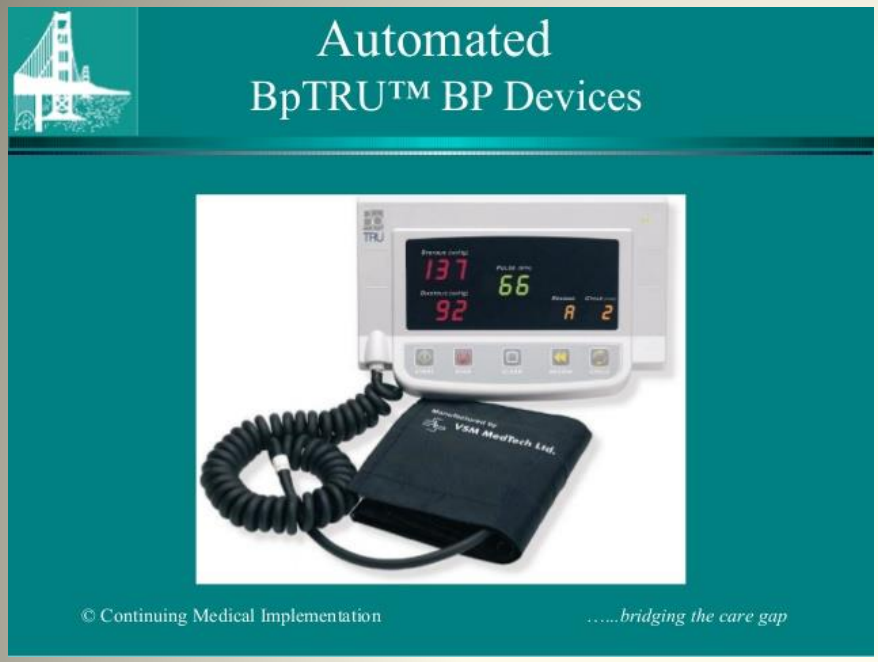
- Finger and/or wrist BP measuring devices are not recommended

- AOBP is the preferred method of performing in-office BP measurement

Type of Instrument of Blood Pressure Measurement

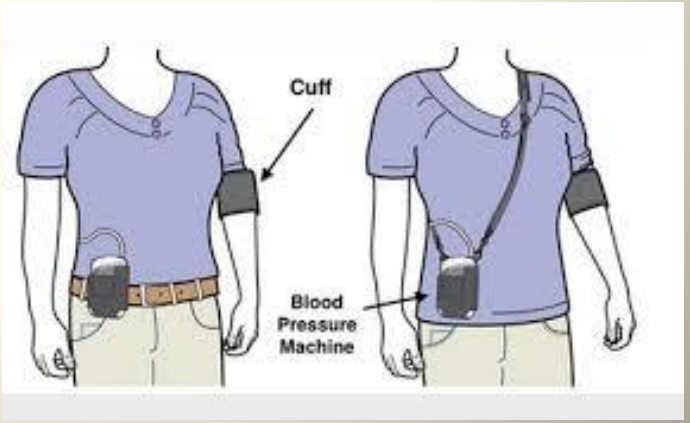
Home Blood Pressure Monitoring

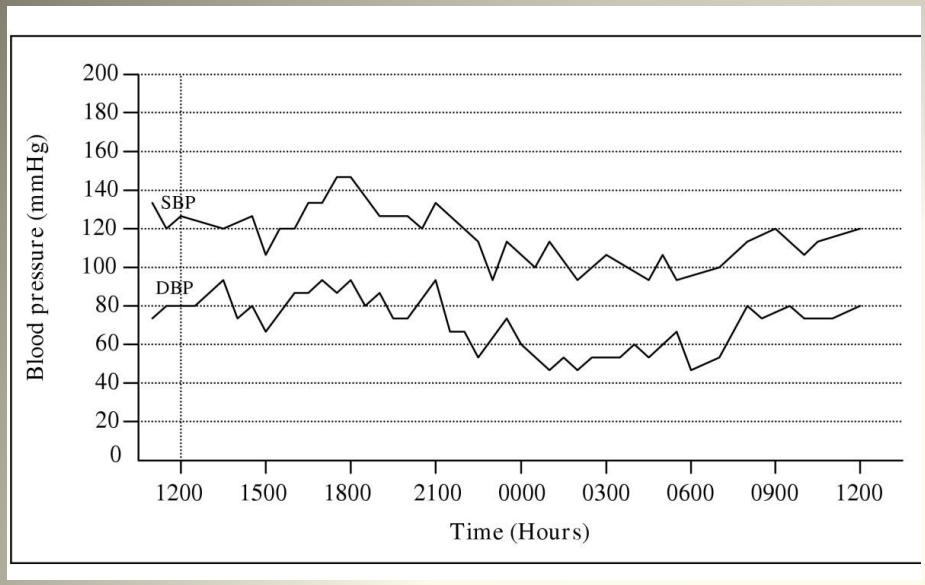
Automated Blood Pressure Tru Device (Automated Office Blood pressure)



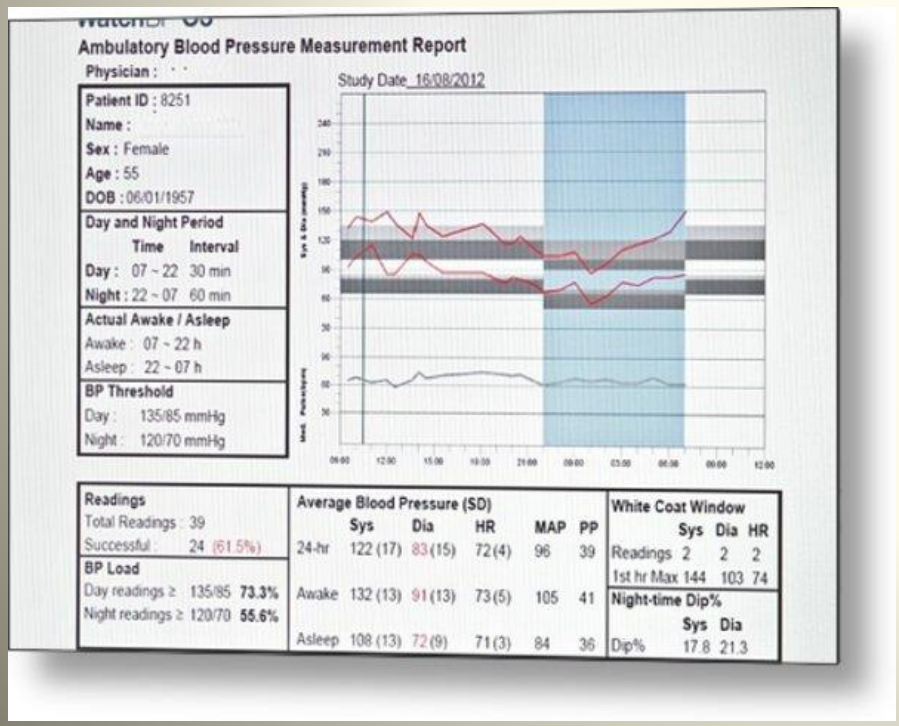
AOBP ≥135 or more than 85

Ambulatory Pressure Monitoring





Number	Date	Time	Systole	MAP	Diastole	Heart rate	Comment
1	11/15/2016	14:26	151 ♂	122	102 ♂	83	Manual
2	11/15/2016	14:30	150 ♂	110	83	87	
3	11/15/2016	14:45	145 ♂	116	97 ♂	84	
4	11/15/2016	15:00	143 ♂	117	96 ♂	77	
(5)	11/15/2016	15:18					Failure (E3)
(6)	11/15/2016	15:33					Failure (E3)
7	11/15/2016	15:48	149 ♂	116	93 ♂	91	
8	11/15/2016	16:00	148 ♂	122	101 ♂	83	
9	11/15/2016	16:15	142 ♂	115	93 ♂	74	
(10)	11/15/2016	16:33					Failure (E3)
11	11/15/2016	16:48	150 ♂	127	109 ♂	100	
12	11/15/2016	17:00	128	112	98 ♂	127	
(13)	11/15/2016	17:18					Failure (E1)
(14)	11/15/2016	17:33					Failure (E1)
15	11/15/2016	17:45	145 ♂	108	81	86	
16	11/15/2016	18:00	155 ♂	120	96 ♂	93	
17	11/15/2016	18:15	172 ♂	110	70	98	
18	11/15/2016	18:30	141 ♂	96	71	112	
19	11/15/2016	18:45	153 ♂	106	70	101	
20	11/15/2016	19:00	149 ♂	118	98 ♂	90	
21	11/15/2016	19:15	148 ♂	119	101 ♂	91	
22	11/15/2016	19:30	149 ♂	120	99 ♂	105	
23	11/15/2016	19:45	178 ♂	116	76	94	
24	11/15/2016	20:00	161 ♂	134	112 ♂	91	
25	11/15/2016	20:19	152 ♂	123	101 ♂	79	
26	11/15/2016	20:33	147 ♂	118	98 ♂	74	
27	11/15/2016	20:48	137	105	84	60	
28	11/15/2016	21:00	130	102	83	60	
29	11/15/2016	21:15	126	93	71	54	
30	11/15/2016	21:30	126	96	76	57	
31	11/15/2016	21:45	102	76	58	63	
32	11/15/2016	22:03	126	99	78	59	
33	11/15/2016	22:15	124	101	83	58	
34	11/15/2016	22:30	116	97	81	59	
35	11/15/2016	22:45	98	72	53	57	
36	11/15/2016	23:00	105	87	72	59	
37	11/15/2016	23:15	111	86	68	54	
38	11/15/2016	23:30	110	87	67	61	
39	11/15/2016	23:45	113	86	68	65	
40	11/16/2016	00:00	108	82	63	64	
41	11/16/2016	00:30	112	96	84 ♂	79	
42	11/16/2016	01:00	118	91	73	61	
43	11/16/2016	01:30	112	86	65	63	
44	11/16/2016	02:00	106	80	62	56	
45	11/16/2016	02:30	112	84	65	57	
46	11/16/2016	03:00	122	100	83 ♂	47	
47	11/16/2016	03:30	121	96	78	58	


Ambulatory Blood Pressure Measurement Report

Physician :

Patient ID : 8251
Name :
Sex : Female
Age : 55
DOB : 06/01/1957

Day and Night Period
Time Interval
Day : 07 ~ 22 30 min
Night : 22 ~ 07 60 min

Actual Awake / Asleep
Awake : 07 ~ 22 h
Asleep : 22 ~ 07 h

BP Threshold
Day : 135/85 mmHg
Night : 120/70 mmHg

Study Date 16/08/2012

Readings
Total Readings : 39
Successful : 24 (61.5%)

BP Load
Day readings ≥ 135/85 73.3%
Night readings ≥ 120/70 55.6%

Average Blood Pressure (SD)

	Sys	Dia	HR	MAP	PP
24-hr	122 (17)	83 (15)	72 (4)	96	39
Awake	132 (13)	91 (13)	73 (5)	105	41
Asleep	108 (13)	72 (9)	71 (3)	84	36

White Coat Window

	Sys	Dia	HR
Readings	2	2	2
1st hr Max	144	103	74

Night-time Dip%

	Sys	Dia
Dip%	17.8	21.3

normal 24-hour ambulatory BP is less than 130/80 mm Hg.

normal day time **BP** levels less than 135/85

Normal night time BP less than 120/70 mm Hg

Choosing the correct blood pressure cuff size

Measure the circumference of your upper arm with a cloth measuring tape midway between the elbow and shoulder. Choose a cuff size that includes this measurement.

Position for taking your blood pressure at home

1. Rest for 5 minutes before measuring your blood pressure.
2. Sit in a chair with both feet flat on the ground and back straight.
3. Place your arm at the level of your heart or chest.
4. Stay still and do not talk as your blood pressure machine operates.

Measure your blood pressure in the morning right after you wake up or in the evening before you go to bed.

Try to measure your blood pressure at the same time every day.

Choosing the correct blood pressure cuff size

Measure the circumference of your upper arm with a cloth measuring tape midway between the elbow and shoulder. Choose a cuff size that includes this measurement.

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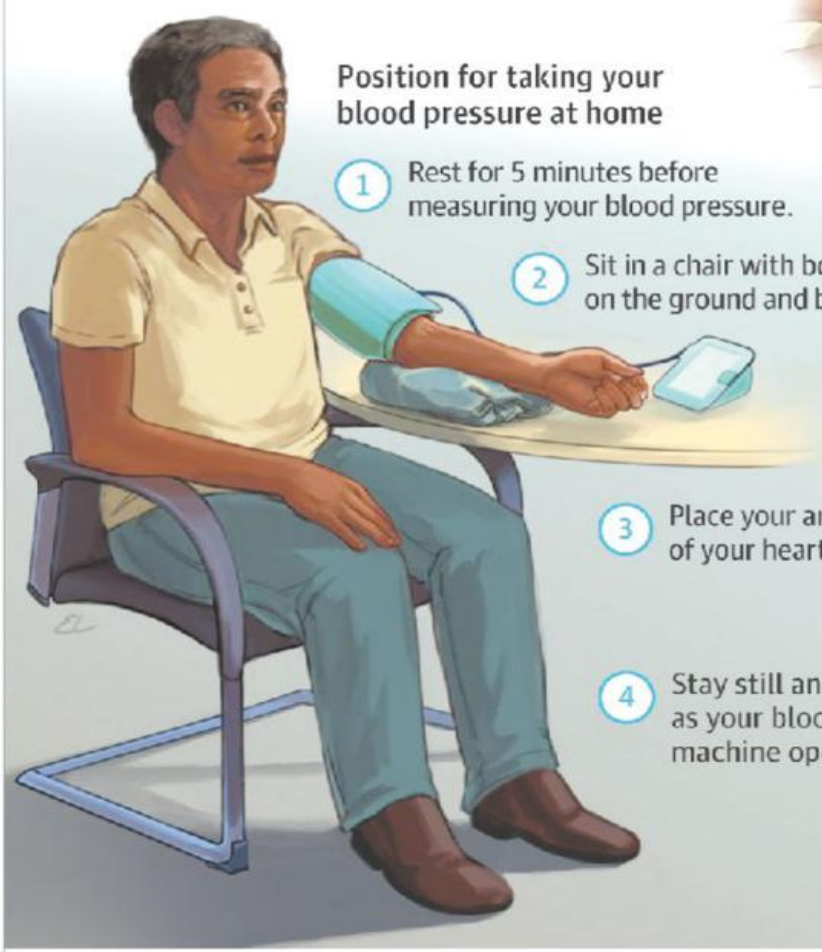

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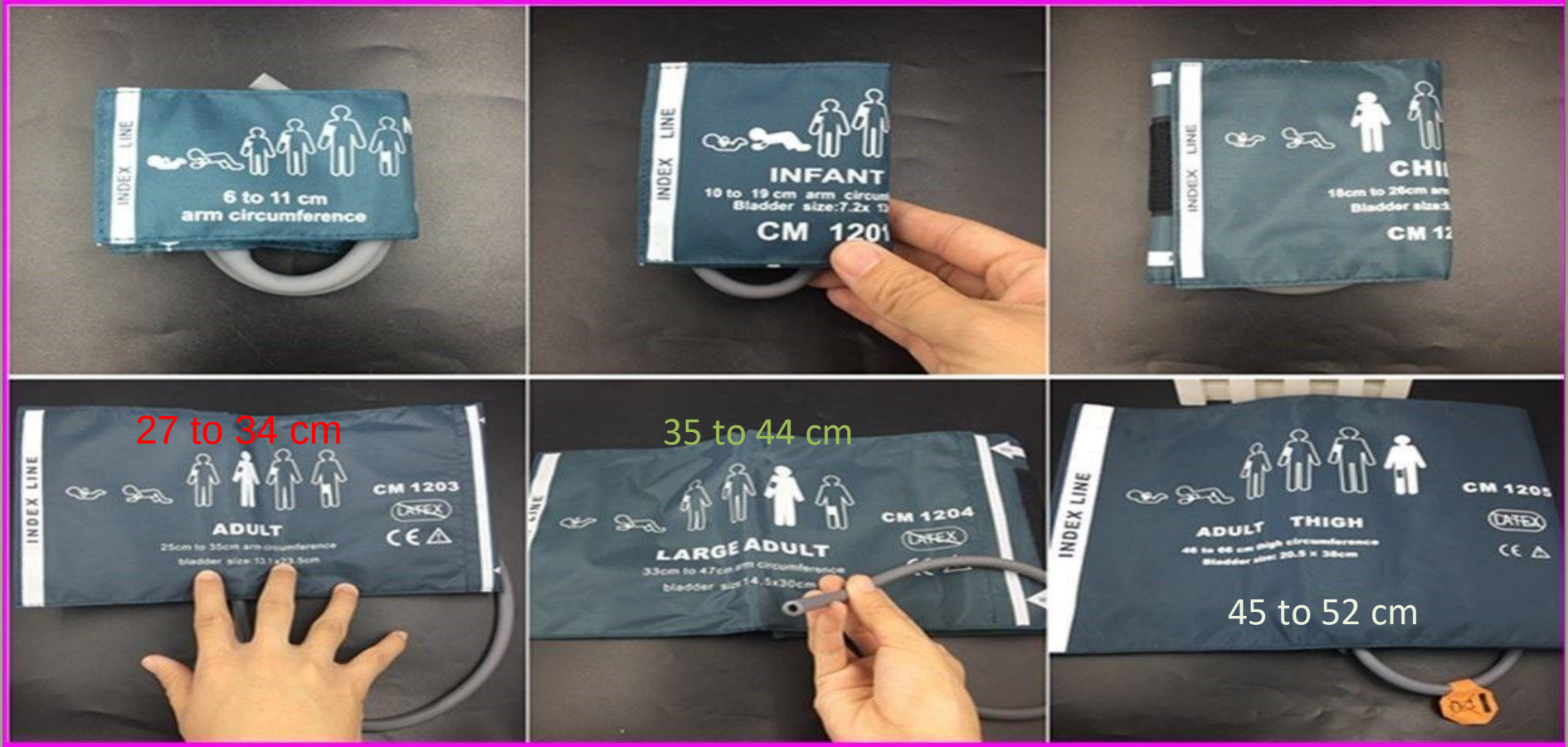
Blood Pressure

- Apply to adults on no antihypertensive medications and who are not acutely ill.
- If there is a disparity in category between the systolic and diastolic pressures, the higher value determines the severity of the hypertension.
- Measure blood pressure to arm the high reading.

Office blood pressure measurement

- To allow the patients to sit for 3–5 minutes before beginning BP measurements
- Back straight and arm supported at heart level
- Take at least two BP measurements, spaced 1–2 min apart, and additional measurements if the first two are quite different.
- Consider the average BP if deemed appropriate.
- To use a standard bladder (12–13 cm wide and 35 cm long)
- A larger bladder for larger arm (circumference >32 cm)
- The bladder of the pressure cuff should encircle at least 80% of the upper arm

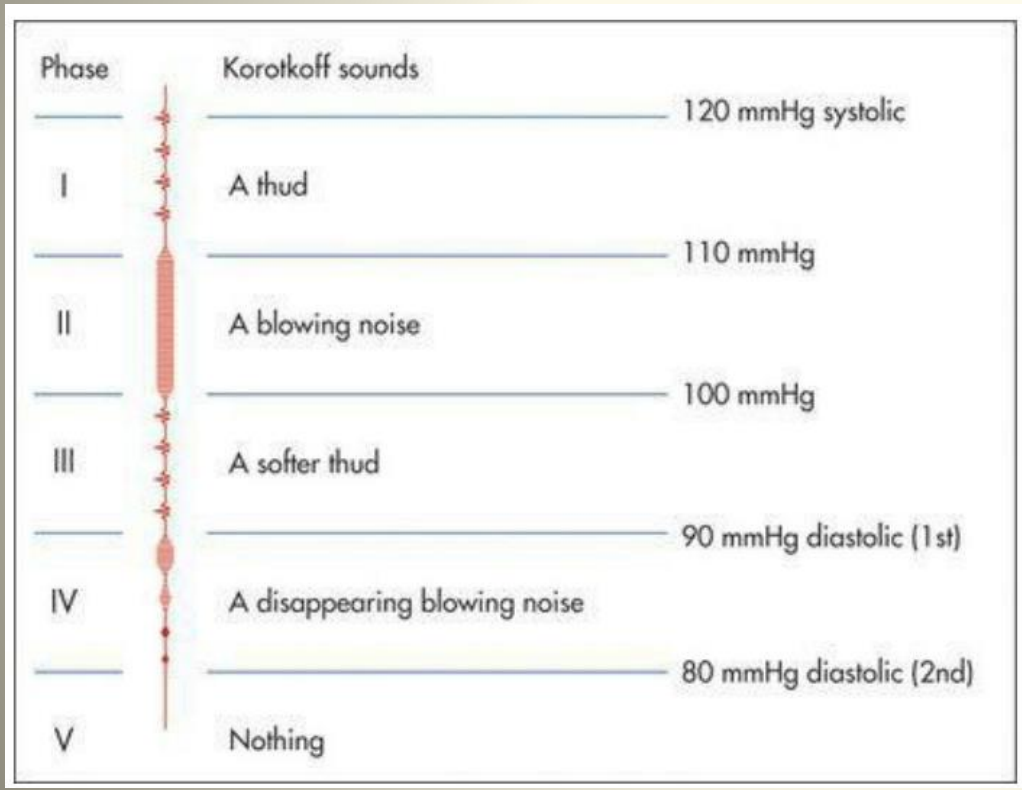


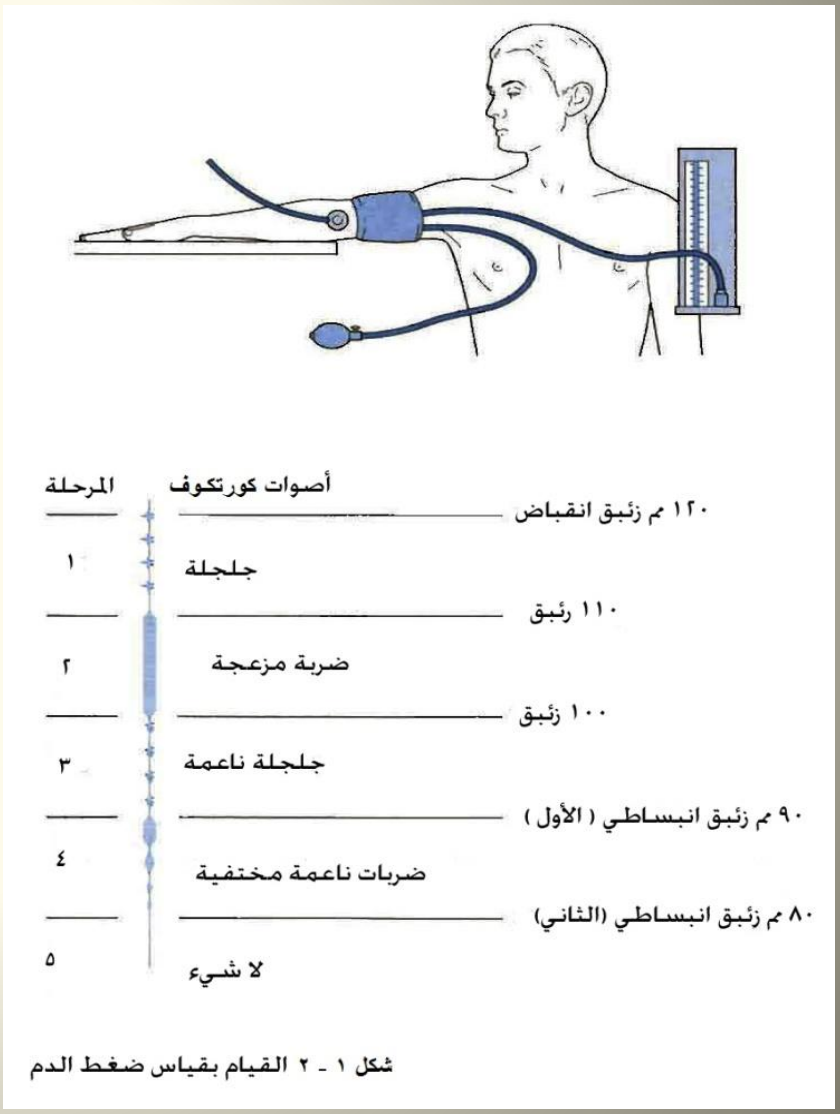
6 differents size

Office blood pressure measurement

- **Place the cuff at the heart level, whatever the position of the patient.**
- **Measure BP in both arms at first visit to detect possible differences. In this instance, take the arm with the higher value as the reference.**
- **Measure BP in sitting and standing position in elderly subjects and diabetic patients**
- **Use phase I and V (disappearance) Korotkoff sounds to identify systolic and diastolic BP, respectively.**

Korotkoff sounds





شكل ١ - ٢ القيام بقياس ضغط الدم

- The diagnosis of mild hypertension should not be made until the blood pressure has been measured on at least two time in three visits

- Average of 10 to 15 mmHg decrease between visits 1 and three

White Coat Hypertension

- a phenomenon in which patients exhibit a blood pressure level above the normal range, in a clinical setting, though they do not exhibit it in other settings
- Approximately 20 to 25% of patients with mild office hypertension
- More common in elderly

European Society of Nephrology Classification of Blood Pressure Levels

Category	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Optimal blood pressure	<120	<80
Normal blood pressure	<130	<85
High-normal blood pressure	130-139	85-89
Grade 1 hypertension (mild)	140-159	90-99
Grade 2 hypertension (moderate)	160-179	100-109
Grade 3 hypertension (severe)	>/= 180	>/= 110
Isolated systolic hypertension	>140	<90

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.

AMERICAN COLLEGE of CARDIOLOGY

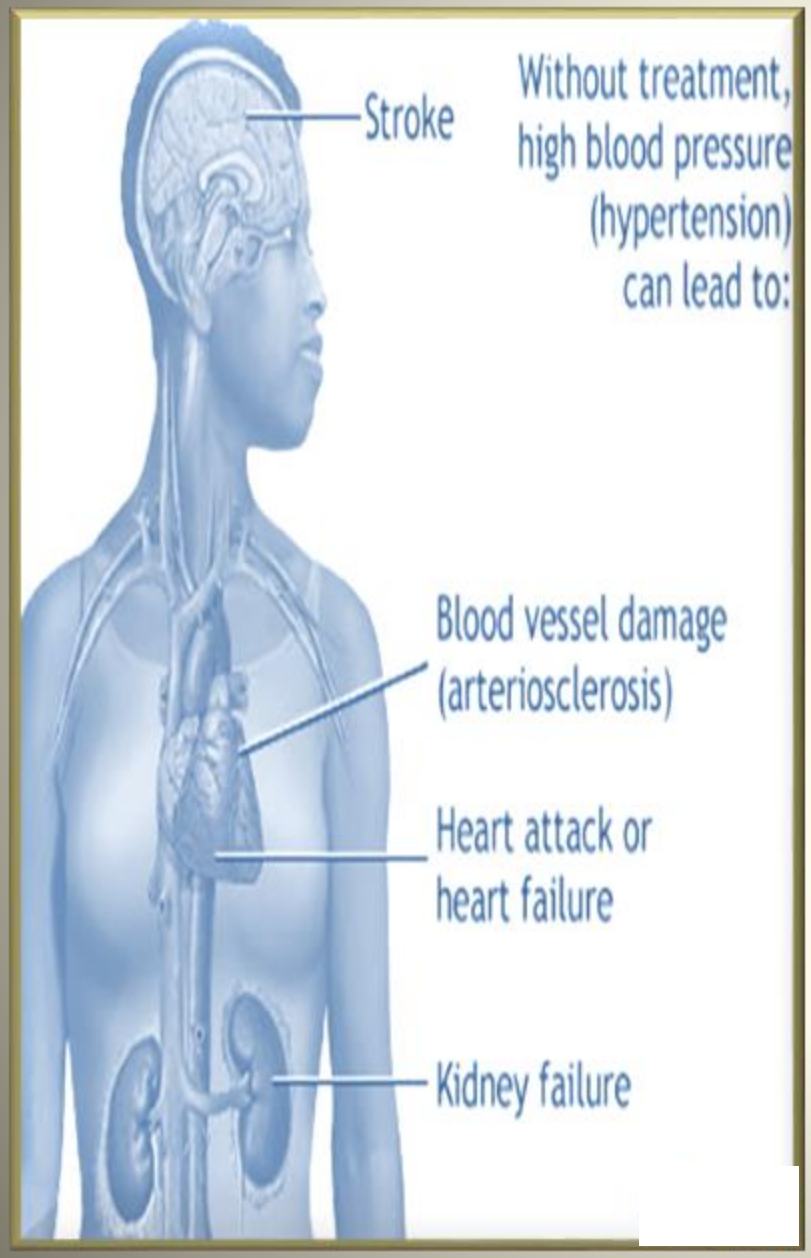
American Heart Association.
life is why

Definitions of hypertension by office and out-of-office blood pressure levels

Category	Systolic BP (mmHg)		Diastolic (mmHg)
Office BP	≥140	and/or	≥90
Ambulatory BP			
Daytime (or awake)	≥135	and/or	≥85
Nighttime (or sleep)	≥120	and/or	≥70
24 h	≥ 130	and/or	≥80
Home BP	≥135	and/or	≥85

2013 ESH and ESC Guidelines

COMPLICATIONS



Stroke, Ischemia, Hemorrhage, Alzheimer's Disease, Cognitive, retinal hemorrhage

CAD, ECG, Arrthymia, Sudden Death

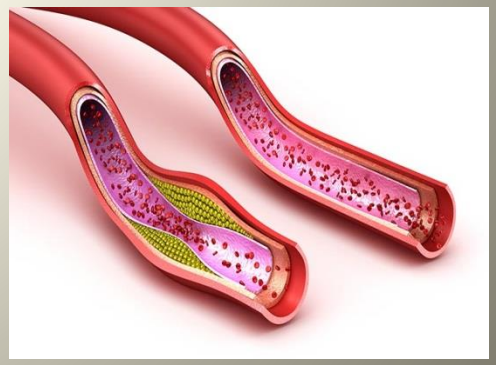
CHF
LVH
Aortic Dissection

Renal Disease

Peripheral Vascular Disease

Hypertensive cries urgency&Emergency

Hypertension



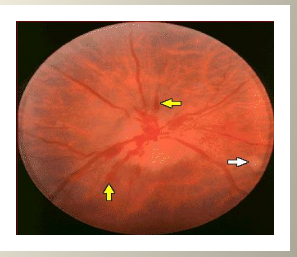
Hypertensive crises

Hypertensive Emergency

Severe hypertension (systolic BP >180-220 mm Hg or **diastolic blood pressure above 120 mmHg) with + end organ damage (MI,STROKE,AKI,CHF)**

Malignant (Accelerated) Hypertension

- **hypertensive emergency**
- **systolic BP >180-220 mm Hg or diastolic blood pressure above 110-120 mmHg**
- **+ with encephapapathy&**



- **+ retinal hemorrhages, exudates, or papilledema**

Hypertensive Crises necessitate immediate therapy to decrease BP within minutes to hours

usually admitted to an intensive care unit for continuous cardiac monitoring

Hypertensive Urgency

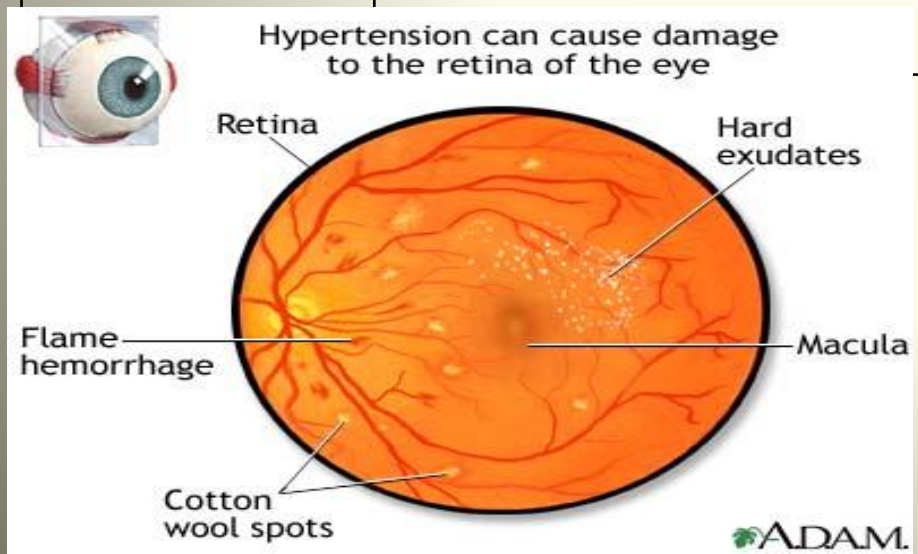
(Marked elevated BL Pressure)

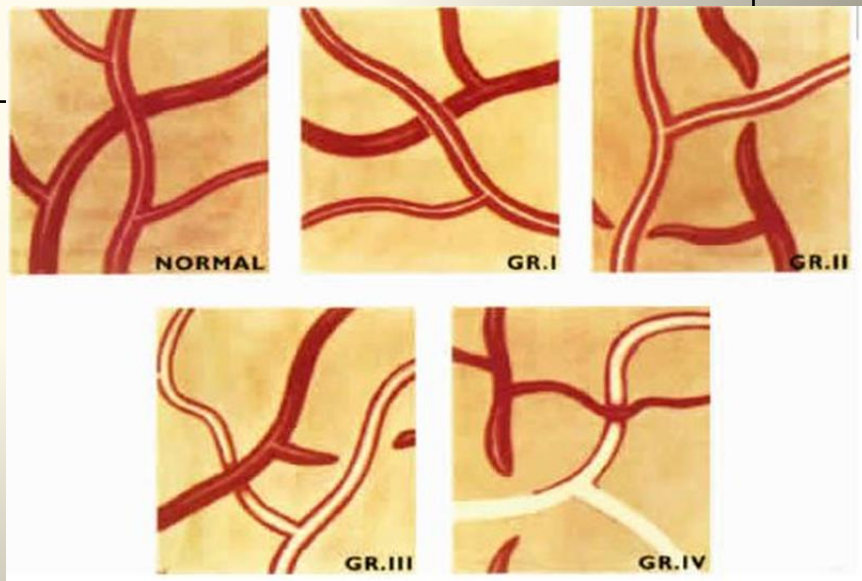
- **Severe hypertension (systolic BP >180-220 mm Hg or diastolic blood pressure above110- 120 mmHg) in asymptomatic patients**
- **no evidence of target organ damage.**
- **There is no proven benefit from rapid reduction in BP in asymptomatic patients who have no evidence of acute end-organ and are little short-term risk.**

- **The goal of therapy is with these cases is to reduce BP within 24 hours.**

HYPERTENSIVE RETINOPATHY

Grade	Description
I	Minimal narrowing of retinal arteries
II	Narrowing of retinal arteries in conjunction with regions of focal narrowing and arterio-venous nipping
III	Abnormalities seen in Grade 1 and II, as well as retinal hemorrhages, hard exudation and cotton wool spots.cupper wiring BL Vessels
IV	Abnormalities encountered in Grades I through III, as well as swelling of the optic nerve head and macular star



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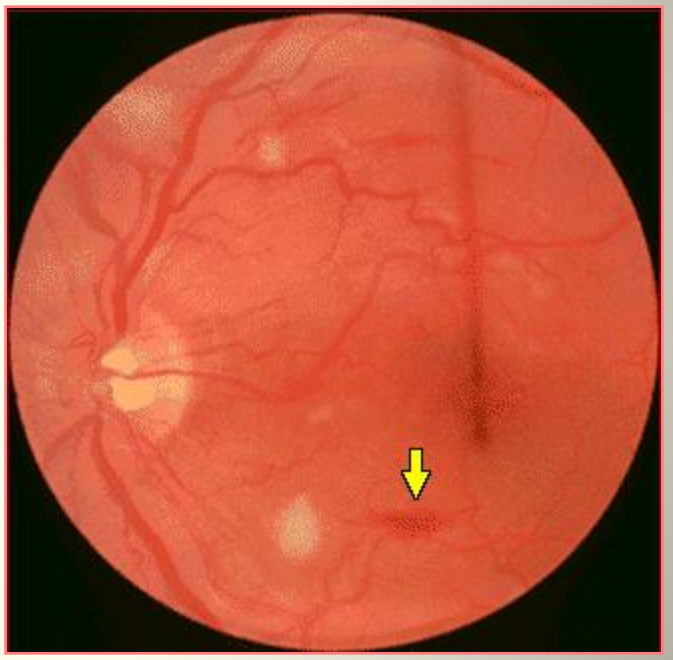
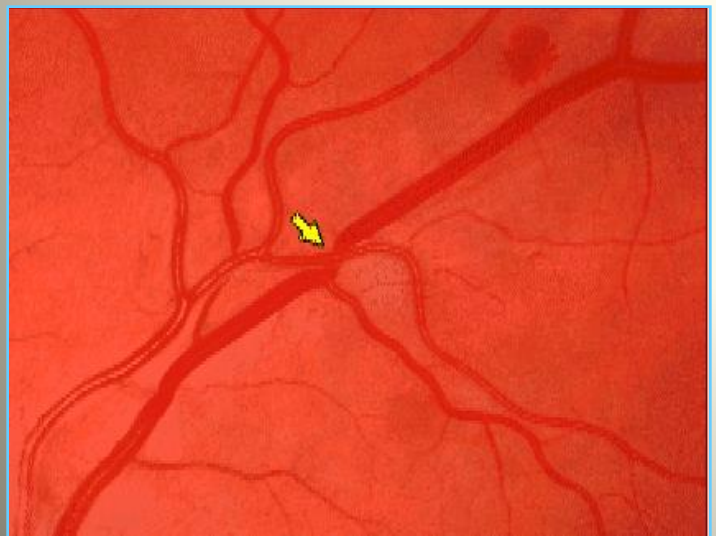
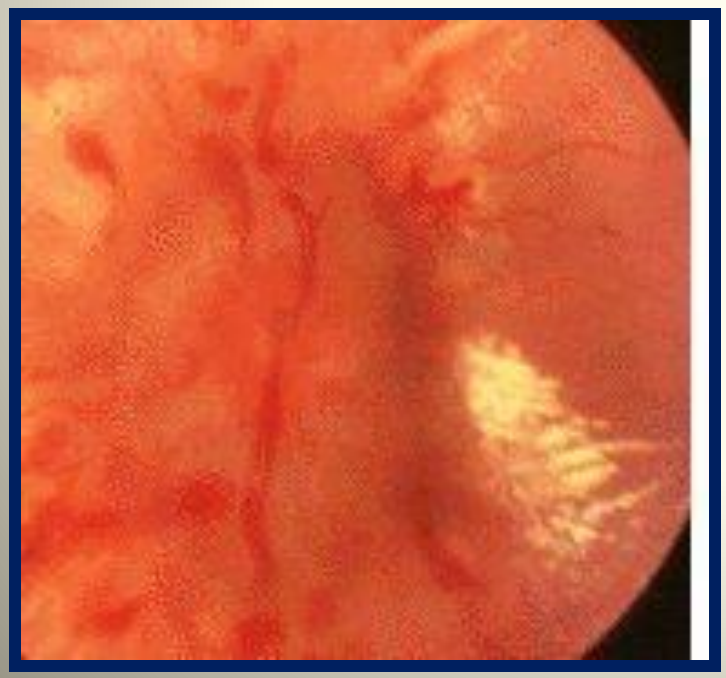
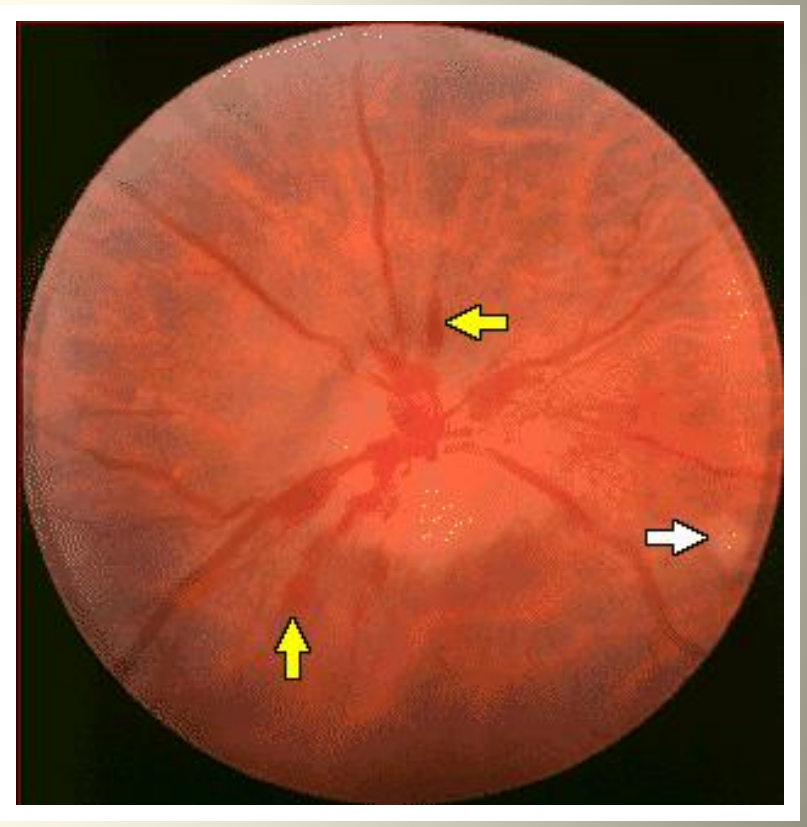




Hypertensive Retinopathy Grade 4

Papilledema from malignant hypertension. There is blurring of the borders of the optic disk with hemorrhages (yellow arrows) and exudates (white arrow)





Diagnosis Hypertension

Clinical Presentations:

- Asymptomatic
- Headache
- Epistaxis
- Chest discomfort
- Symptom of complications

Screening:

- Every one years for persons with systolic and diastolic pressures below< 120 mmHg and 80 mmHg
- Every 3-6months for persons with systolic and diastolic pressures higher >120 mmHg and 80 mmHg

Physical Examination

1. Confirm the diagnosis of hypertension
2. Detect causes of secondary hypertension
3. Assess CV risk
4. Organ damage
5. Concomitant clinical conditions.

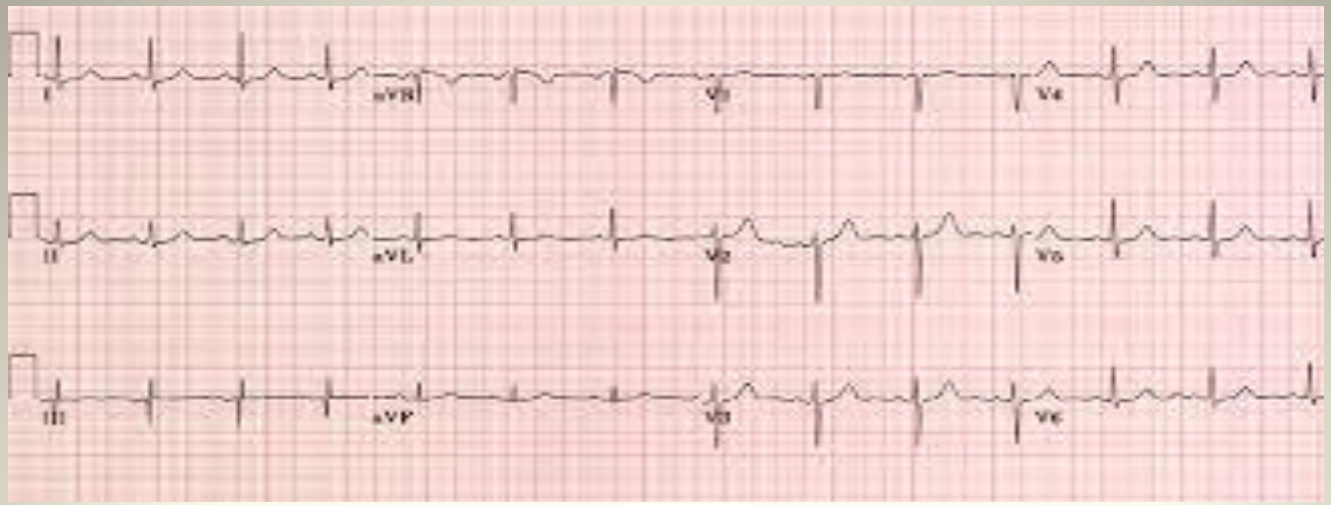
Important aspects of the physical examination in the hypertensive patient
Accurate measurement of blood pressure
General appearance
Distribution of body fat
Skin lesions
Muscle strength
Alertness
Fundoscopy
Hemorrhage
Papilledema
Cotton-wool spots
Neck
Palpation and auscultation of carotids
Thyroid
Heart
Size
Rhythm
Sounds
Lungs
Rhonchi
Rales
Abdomen
Renal masses
Bruits over aorta or renal arteries
Femoral pulses
Extremities
Peripheral pulses
Edema
Neurologic assessment
Visual disturbance
Focal weakness
Confusion

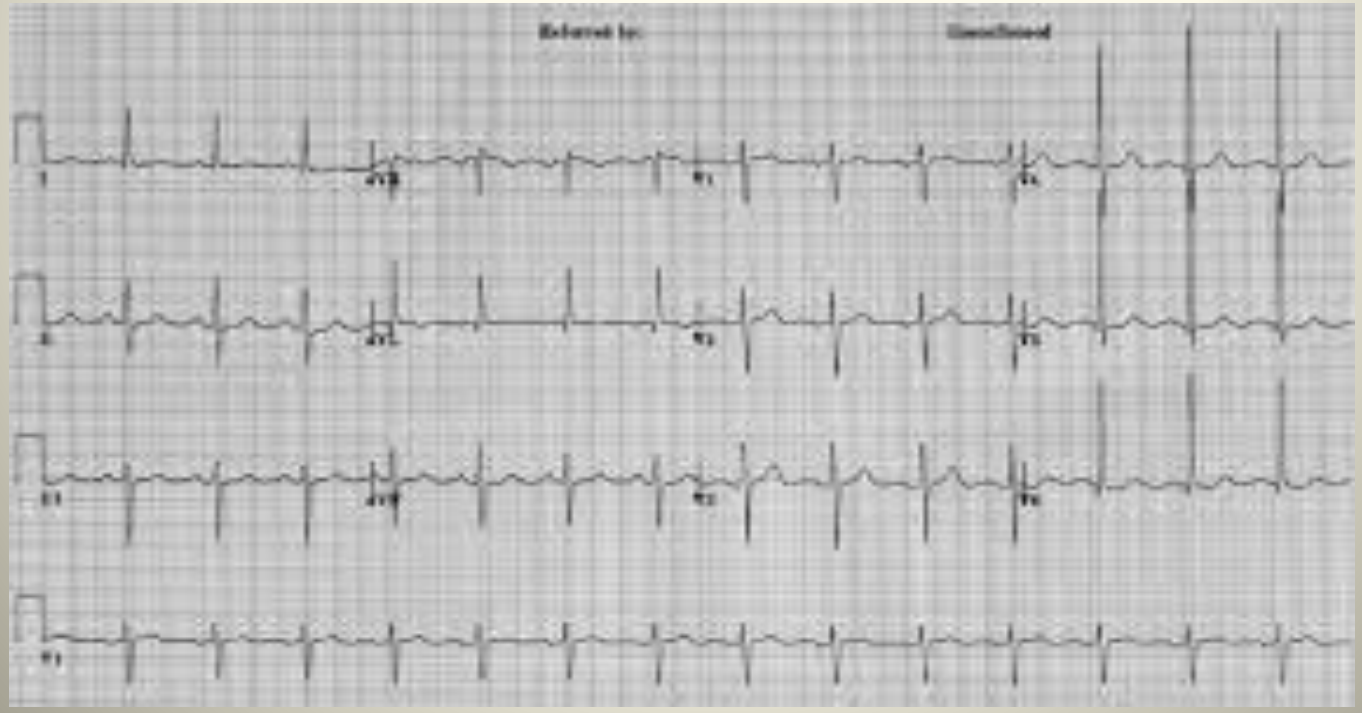
Laboratory Tests

- Routine Tests
  - Electrocardiogram
  - Urinalysis
  - Serum sodium, serum potassium, creatinine, or the corresponding estimated GFR, and calcium
  - Blood glucose, and hematocrit
  - Lipid profile, after 9- to 12-hour fast, that includes high density and low-density lipoprotein cholesterol, and triglycerides

- Optional tests
  - Measurement of urinary albumin excretion or albumin/creatinine ratio

- More extensive testing for identifiable causes is not generally indicated unless BP control is not achieved



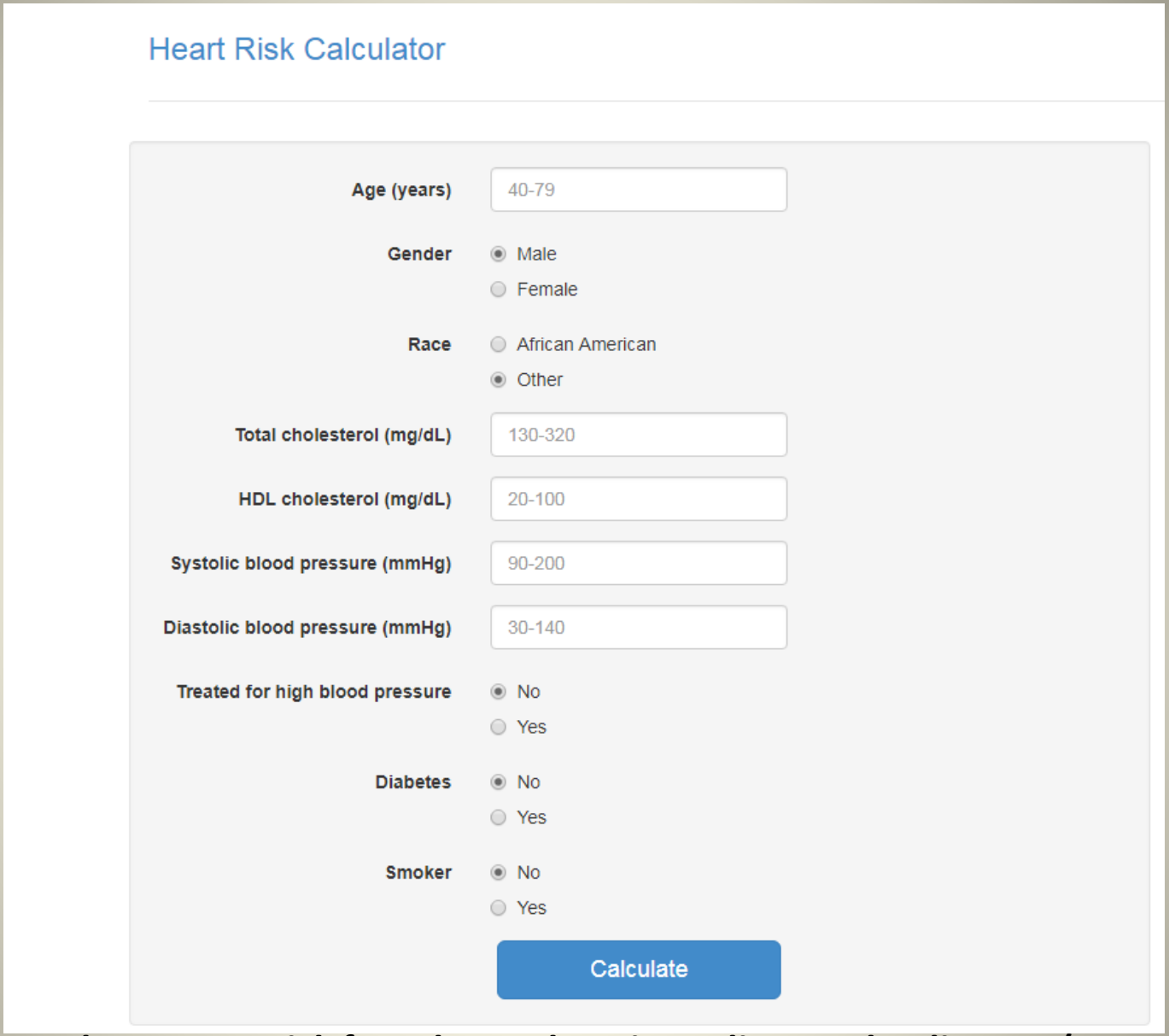


WHEN TO TREAT

BP mmHg	CVD Risk*	Lifestyle modifications	Drug Therapy	Reassess, in months
<120/80	NO	NO	NO	12
120 – 129/<80 Elevated BL pressure	NO	Yes	NO	3 to 6
130 – 139/80-89	< 10%	Yes	NO	3 to 6
130 – 139/80-89	≥ 10%	Yes	Yes	1
≥ 140/90	NO	Yes	Yes (One pill dbls combination)	1

Using the ACC/AHA Pooled Cohort Equations
Age, Race, Sex, BP, Cholesterol, DM, Treatment of HTN, Tobacco use
Patients with DM or CKD = high-risk

Salt Restriction:
Weight Loss
DASS Diet: rich in Fruits, vegetables, low-fat dairy
Exercise
limited Alcohol Intake

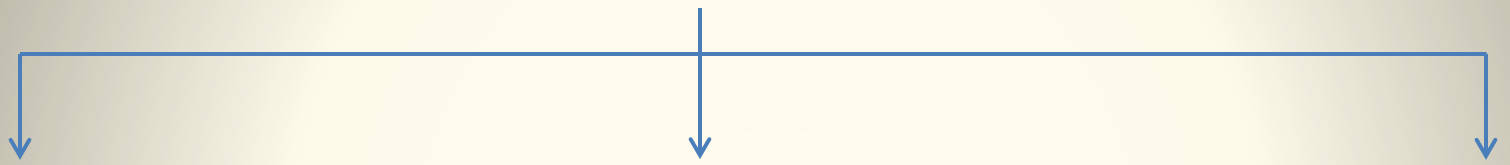


This tool estimates the 10-year risk for atherosclerotic cardiovascular disease (ASCVD) which is defined as coronary death or nonfatal myocardial infarction, or fatal or nonfatal stroke.

LIFESTYLE MODIFICATIONS

Weight loss	**1 mm Hg/ 1kg loss**
Dash-type diet	**11 mmHg**
Reduce dietary sodium (1500 mg)	**5-6 mmHg**
Increase dietary potassium (3500 mg)	**4-5 mm Hg**
Aerobic exercise 90 – 150 min/week	**5-8 mm Hg**
Reduce/ stop alcohol intake	**4 mm Hg**

INITIAL CHOICE OF MEDICATION



Thiazide Diuretics(D)

Aged over 55 years or black person of African

ACE Inhibitors (A) or Angiotensin Receptor Blockers(B)

Aged under 55 years

Calcium Channel Blockers (**C**)

Aged over 55 years or black person of African

If BP > 20/10 mmHg above goal (140/90), may start with 2 BP lowering medications

A(B) + C or A(B)+D One pill daul combination

A – ACE inhibitor

B-angiotensin II receptor blocker (ARB)[12]

C – Calcium-channel blocker (CCB)[13]

D – Thiazide-like diuretic

DO NOT USE ACEI(A) +Angiotensen receptor blockers(B) Together

DO NOT START with B-BLOCKER

High Risk Group Therapy

- **CHF – Thiazide, ACE-1, Aldosterone, BB**
- **Post Myocardial Infarction – BB, ACEi**
- **Diabetes Mellitus – proteinuria ACEi, ARB,NO**
- **Nonproteinuria Thiazide, CCB,ARB, ACEi**
- **CKD – ACEi, ABB, Thiazide**
- **Stroke – CCB +ACEi**
- **Pregnancy Aldomet ,labetalol, Ca channel bloocker**
- **Start in >130/80(130 – 139)/(85 – 89) mmHg**

  Lifestyle change +Medication

- BP target of less than 130/80 Hg is recommended

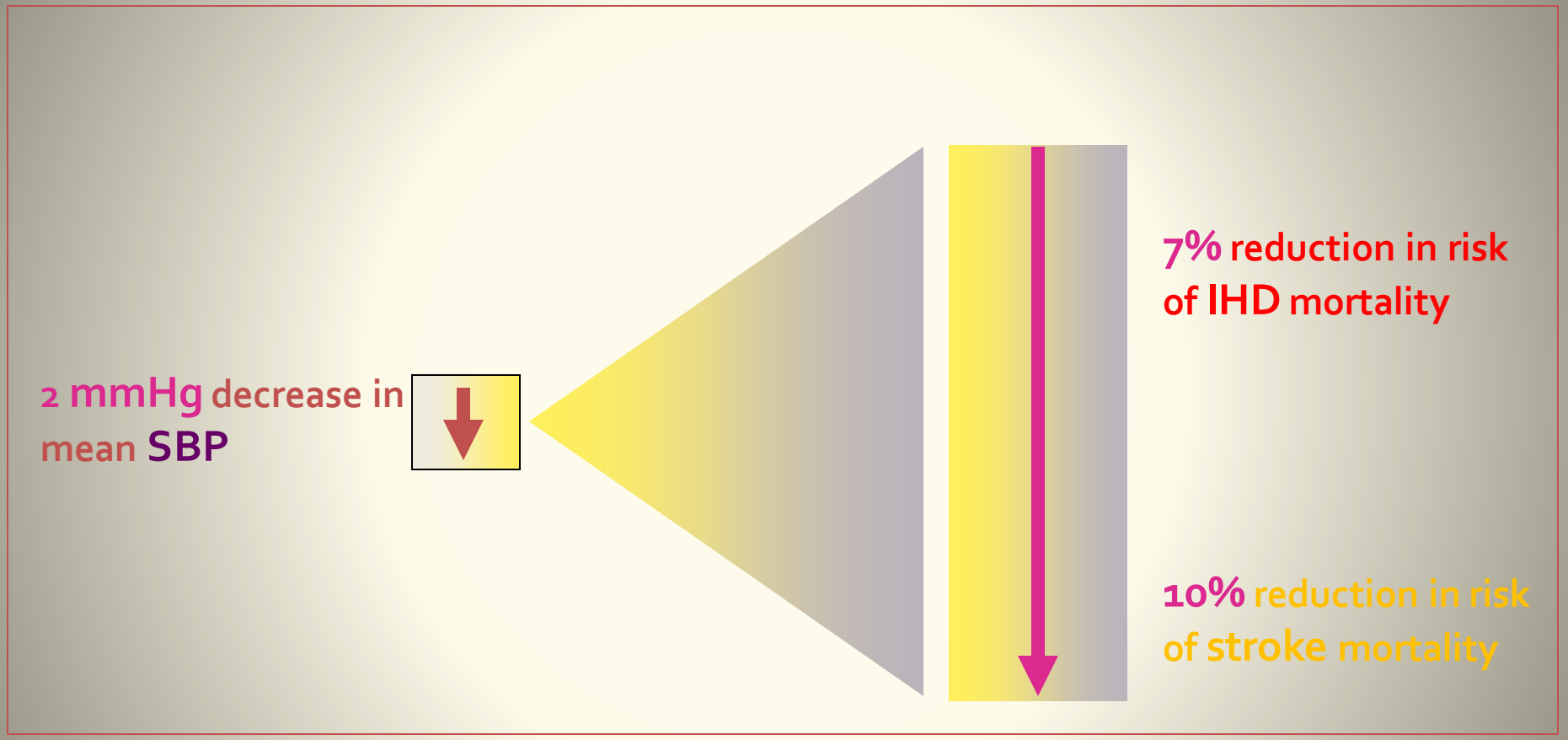
Anti-hypertensive Medications and Complications

- Diuretics → Hypokalemia
- β-Adrenergic Blocking Agents → Bradycardia
- Angiotensin-Converting Enzyme Inhibitors → Hyperkalemia + cough
- Angiotensin II Receptor Blockers → Hyperkalemia
- Calcium Channel Blocking Agents → Edema + Tachycardia + Bradycardia
- α-Adrenoceptor Antagonists → 1st dose hypotension
- Drugs with Central Sympatholytic Action → Drowsiness
- Arteriolar Dilators → Tachycardia + Edema

BP GOAL FOR PATIENTS WITH HYPERTENSION

130/80

Blood Pressure Reductions as Little as 2 *mmHg* Reduce the Risk of Cardiovascular Events by up to 10%



Meta-analysis of 61 prospective, observational studies conducted by Lewington et al involving one million adults with no previous vascular disease at baseline mmHg

Benefits of Lowering BP

Average Percent Reduction	
Stroke incidence	35–40%
Myocardial infarction	20–25%
Heart failure	50%
Renal Failure	35-50%

summary

- The overall prevalence of hypertension in adults is around 30 - 45%
- Need proper technique in measurement
- Lead cause coronary death or myocardial infarction,CHF or fatal or nonfatal stroke,CKD
- Threshold of treatment start 130/80 mm Hg
- Target treatment < 130/80 mm Hg
- nonpharmacological and antihypertensive drug are effective to reduce all complications in all ages

Thank you