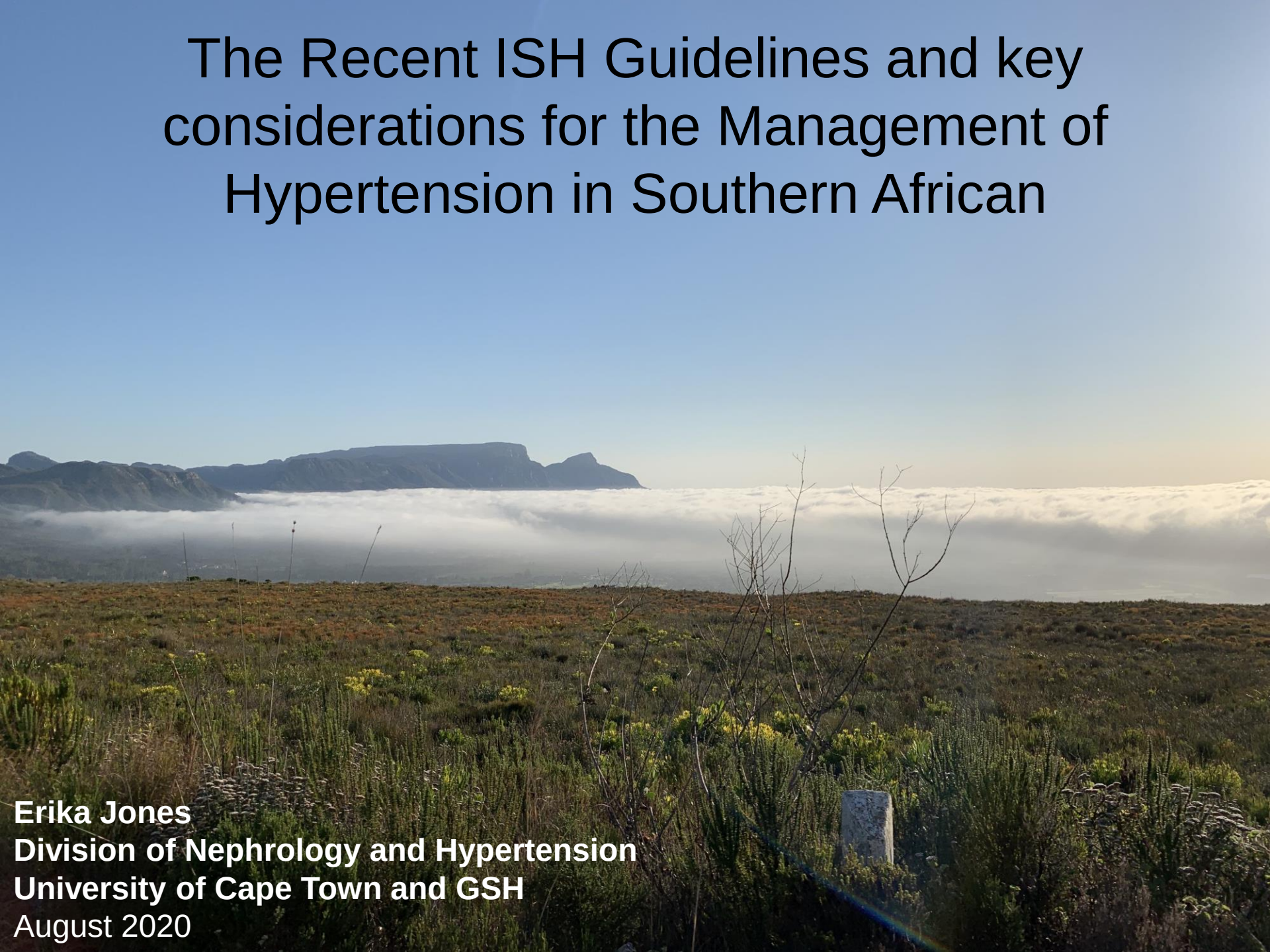
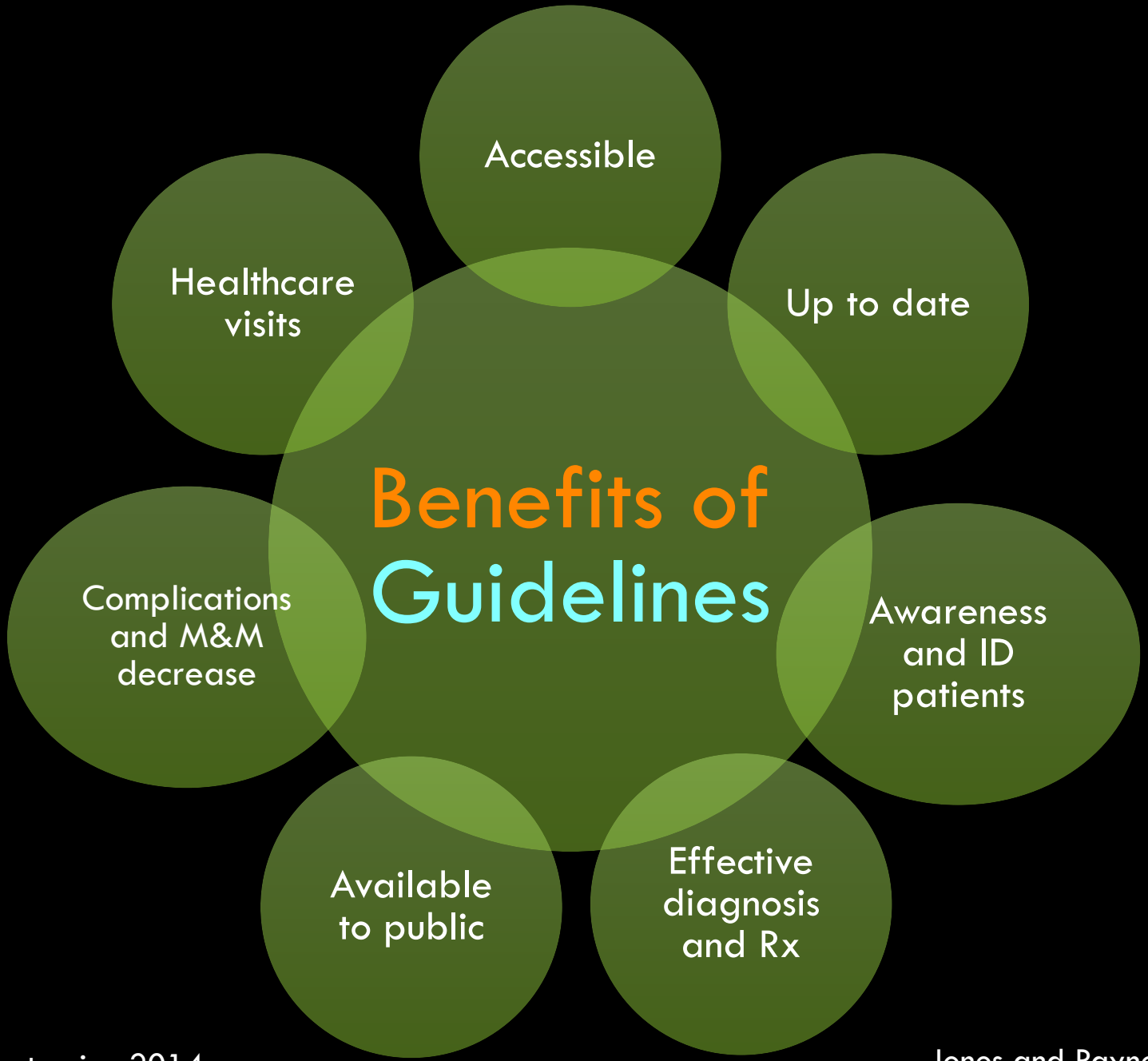
The Recent ISH Guidelines and key considerations for the Management of Hypertension in Southern African



Erika Jones
Division of Nephrology and Hypertension
University of Cape Town and GSH
August 2020

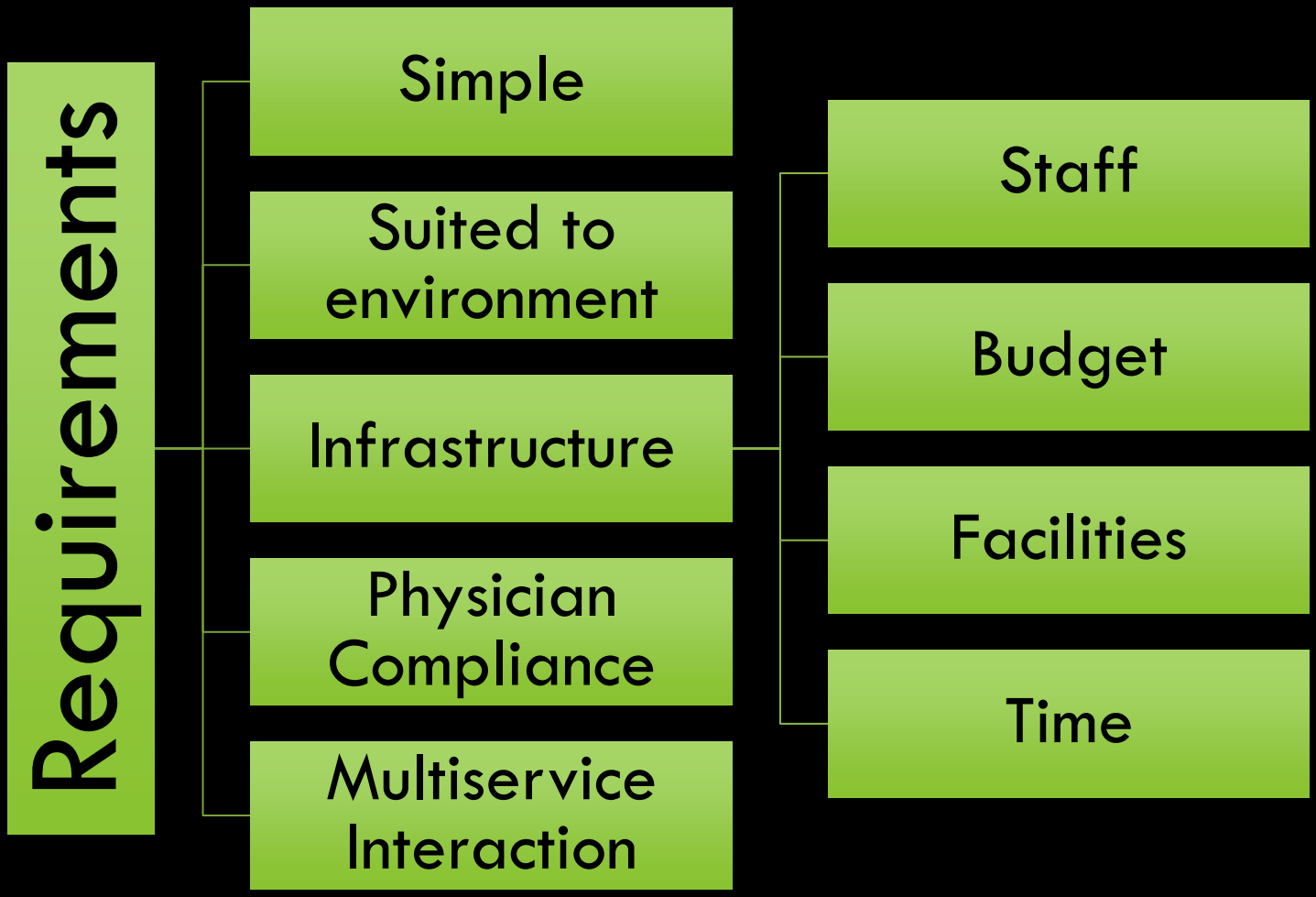
OUTLINE DISCUSSING THE ISH GLOBAL GUIDELINES

- Definition of Hypertension
- Diagnosis
- Investigation
- Non-pharmacological measures
- Treatment initiation
- Stepwise drug choices/ combinations
- Goal of treatment
- When to refer
- Long term follow up



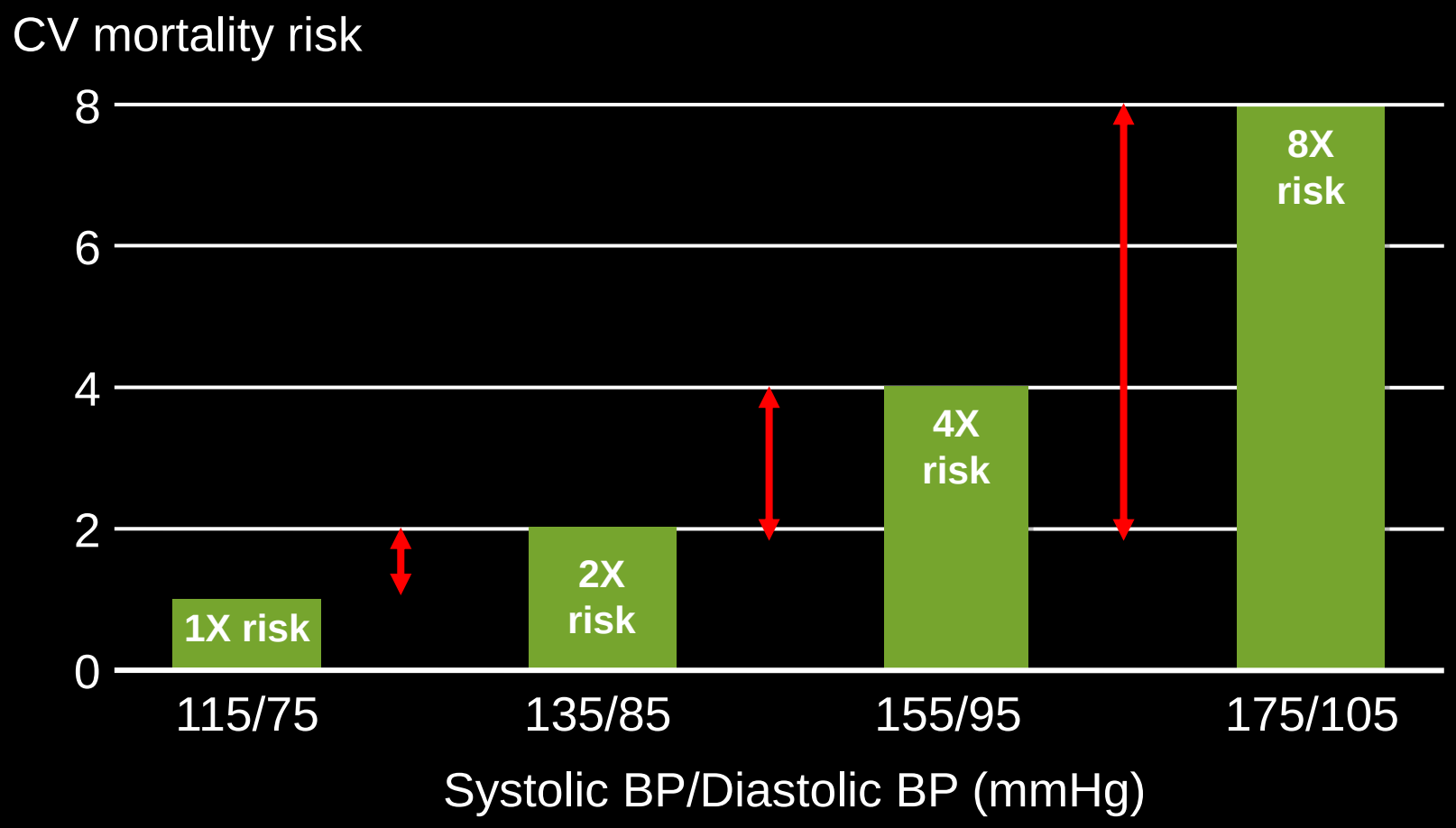
Go *et al.*, Hypertension 2014

Jones and Rayner, 2017



Jones and Rayner, 2017

CARDIOVASCULAR MORTALITY RISK DOUBLES WITH EACH 20/10 MMHG INCREMENT IN SYSTOLIC/DIASTOLIC BLOOD PRESSURE*



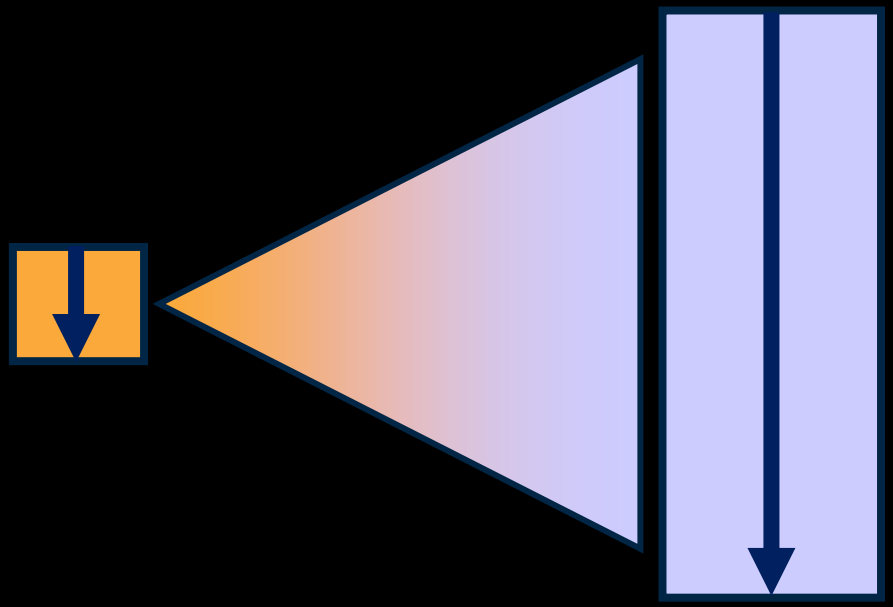
*Individuals aged 40–69 years

Lewington et al. *Lancet* 2002;360:1903-1913.

LOWERING BP REDUCES CVS RISK

Metanalysis of 61 prospective, observational studies
1m adults, 12.7m person years

2 mmHg decrease in mean SBP

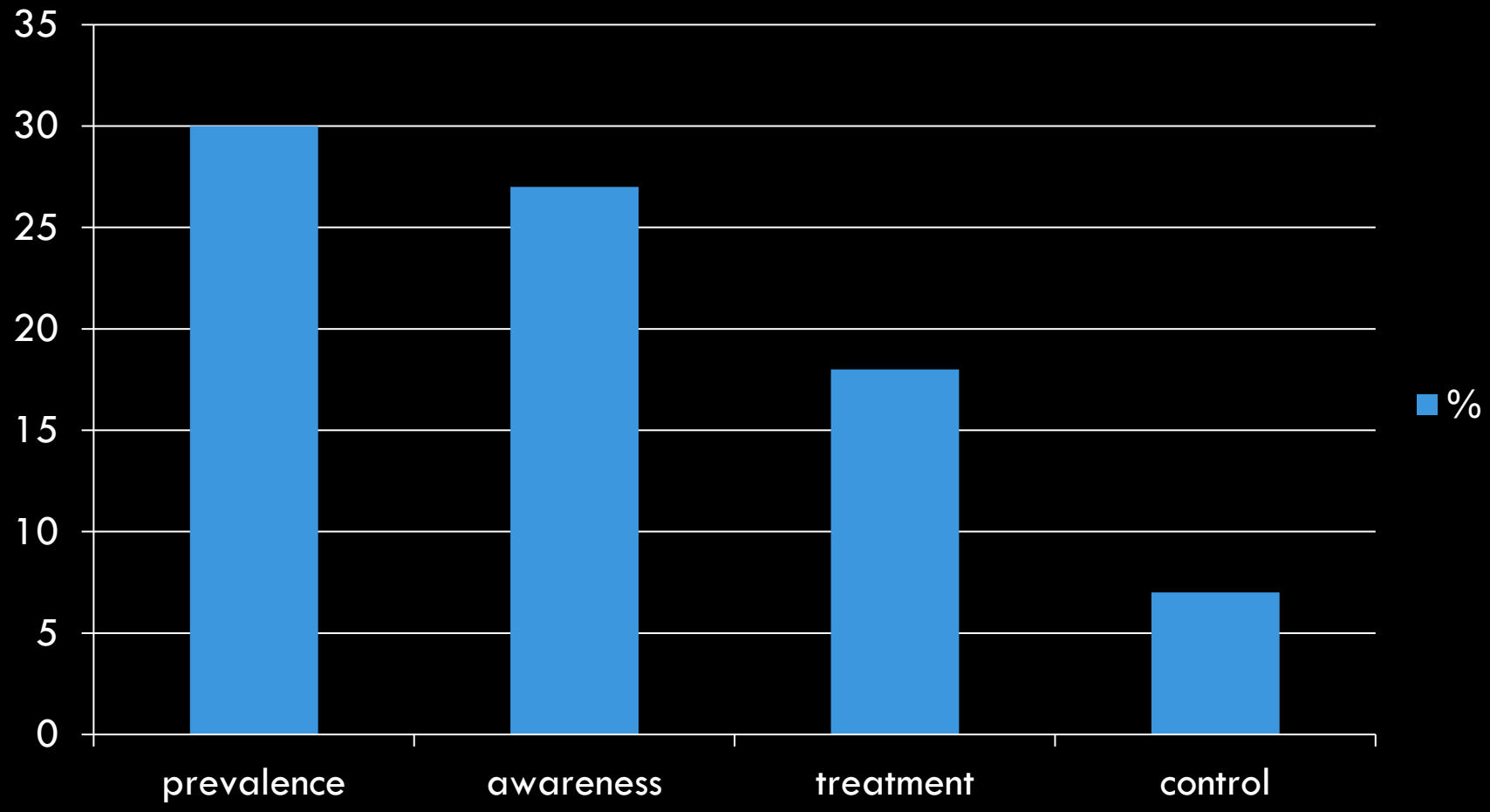


7% reduction in risk of ischaemic heart disease mortality

10% reduction in risk of stroke mortality

Lewington et al. *Lancet*. 2002;360:1903–1913

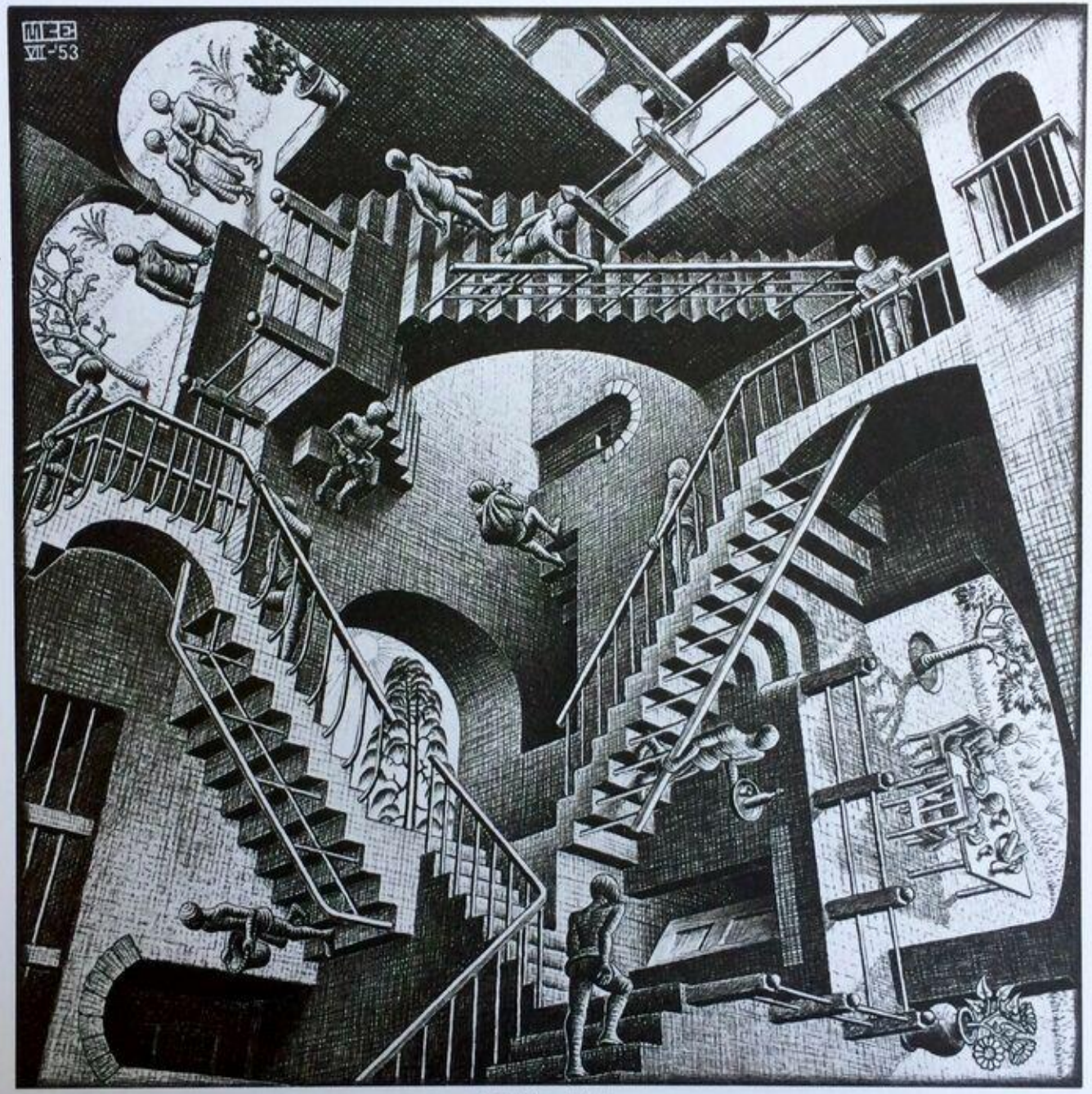
PREVALENCE, AWARENESS, TREATMENT AND CONTROL IN SSA



Pooled data from 33 surveys involving over 110 414 participants of mean age 40 years

Ataklte *et al*., Hypertension, 2014

The Problem with Guidelines



M. C. Escher · Relativity

DIFFERENCES BETWEEN ESH AND ASH GUIDELINES

	Systolic		Diastolic
Normal	<120	And	<80
Elevated	120-129	And	<80
Stage 1	130-139	Or	80-89
Stage 2	>140		>90

	Systolic		Diastolic
Optimal	<120		<80
Normal	120-129	And / Or	80-84
High Normal	130-139	And / Or	85-89
Grade 1	140-159	And / Or	90-99
Grade 2	160-179	And / Or	100-109
Grade 3	>180	And / Or	>110

Williams B et al. European Heart Journal. 2018;39:3021–3104

BP MEASUREMENT

- Proper measurement
- (Average of 2 readings and at least 2 occasions)
- HBPM (always if on 3 or more agents)
- ABPM

- Proper measurement
- (3 readings, 2 occasions)
- Except if very high
- HBPM
- ABPM

Screening programs should be developed for all adults over 18

Williams B et al. European Heart Journal. 2018;39:3021–3104

NEW GUIDANCE: MONITORING ADHERENCE

Monitoring Adhere e

Indirect
Poorly reliab
Pr ide littl nformation
on d ing story

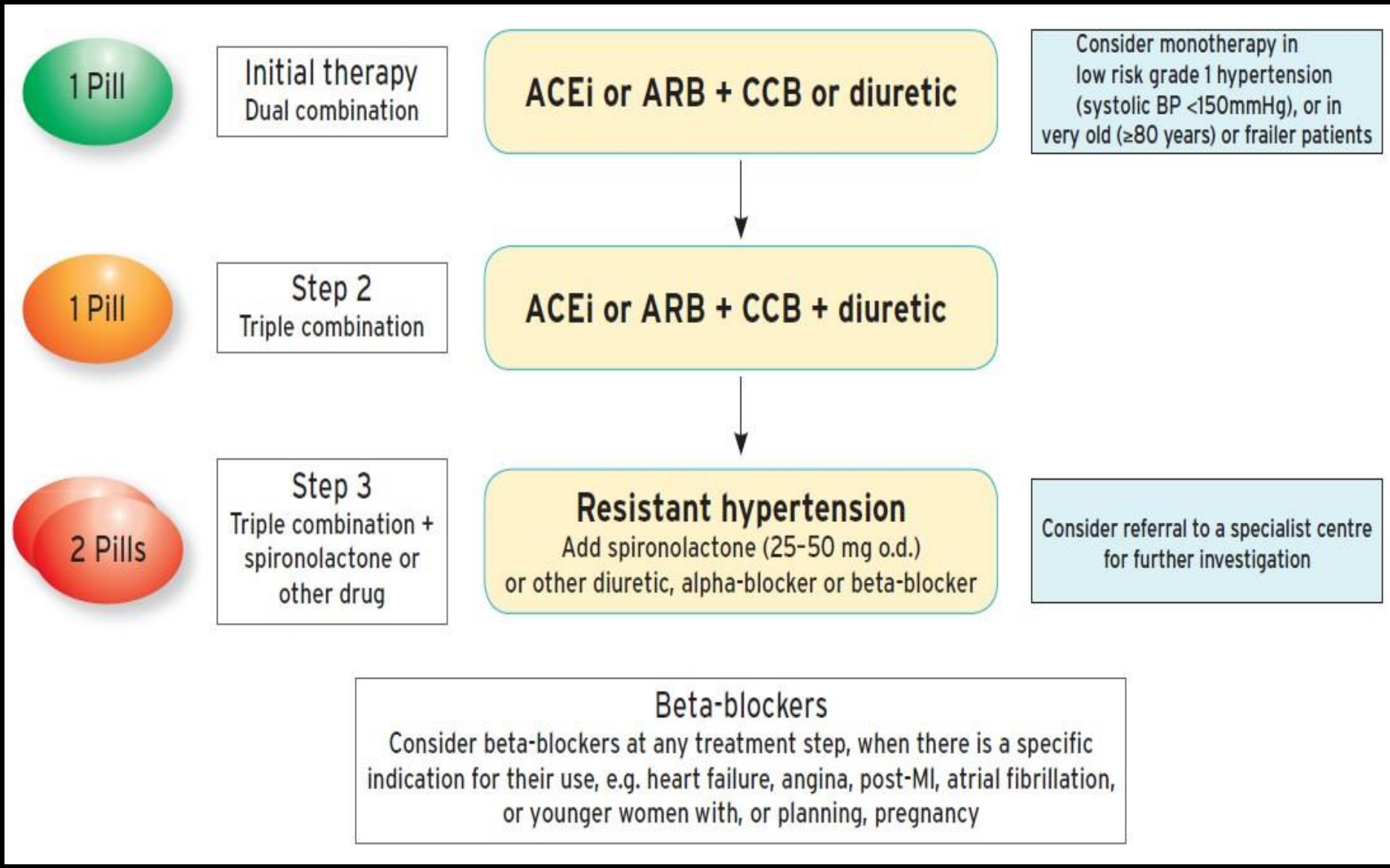
Williams B et al. European Heart Journal. 2018;39:3021–3104

TARGETS

Age	Office SBP target ranges (mmHg)					DBP
	HPT	+ DM	+CKD	+ CAD	+ CVA/TIA	
18-65	<130 or lower*, not <120	<130 or lower*, not <120	<140 or lower*, not <130	<130 or lower*, not <120	<130 or lower*, not <120	70-79
65-79	130-139*	130-139*	130-139*	130-139*	130-139*	70-79
>80	130-139*	130-139*	130-139*	130-139*	130-139*	70-79
DBP	70-79	70-79	70-79	70-79	70-79	

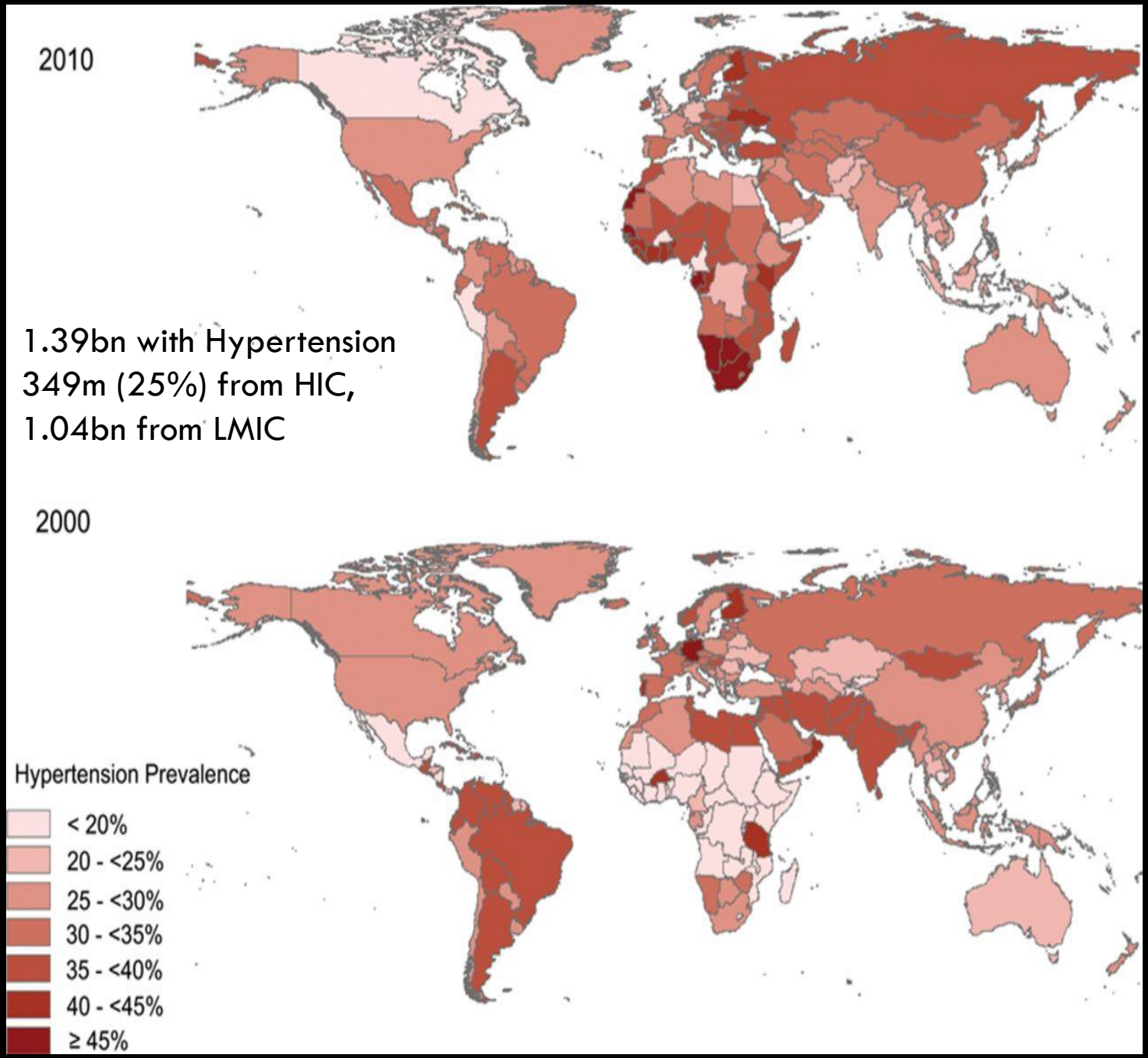
*** If TOLERATED**

Williams *et al.*, European Heart Journal, 2018; 39(33):3021-104



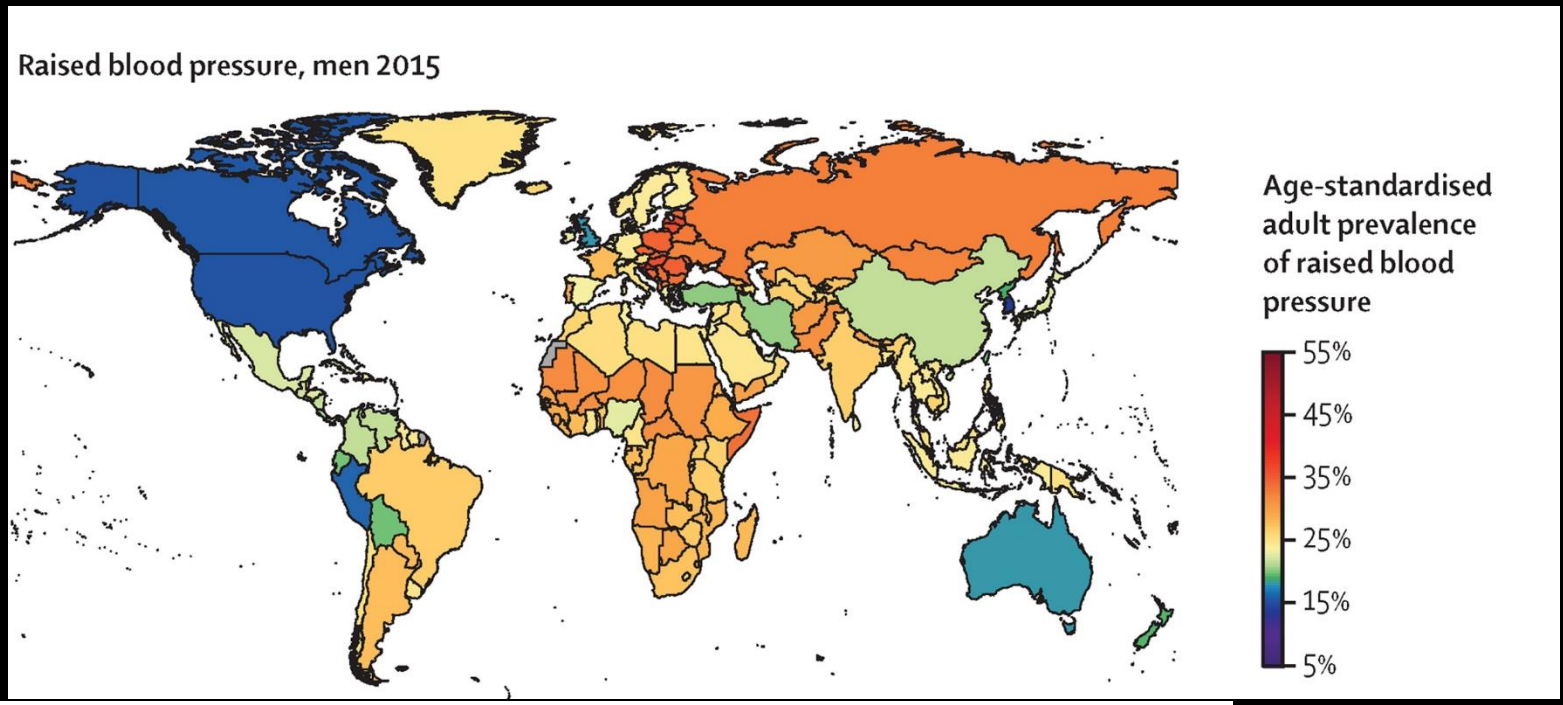
Williams B et al. European Heart Journal. 2018;39:3021–3104

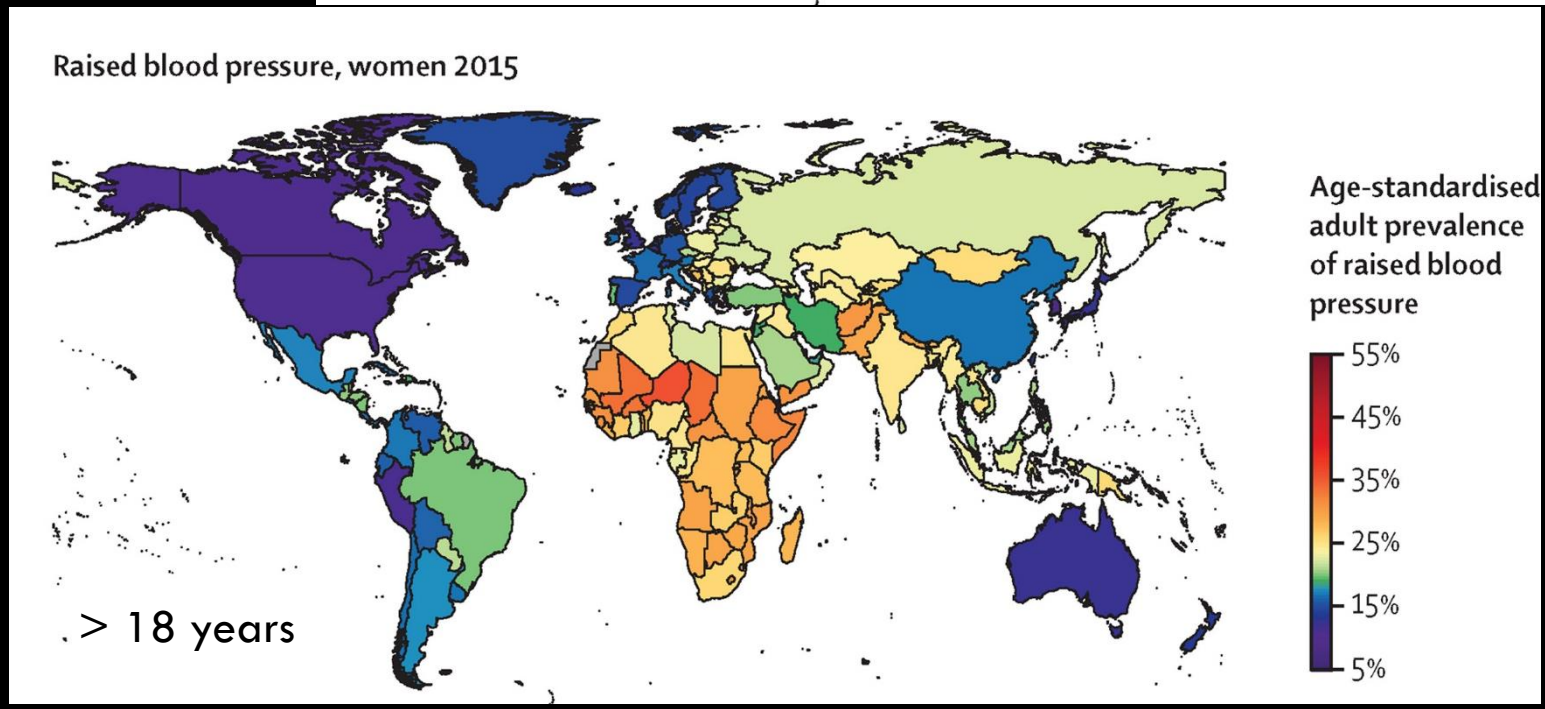
Prevalence of hypertension in adults



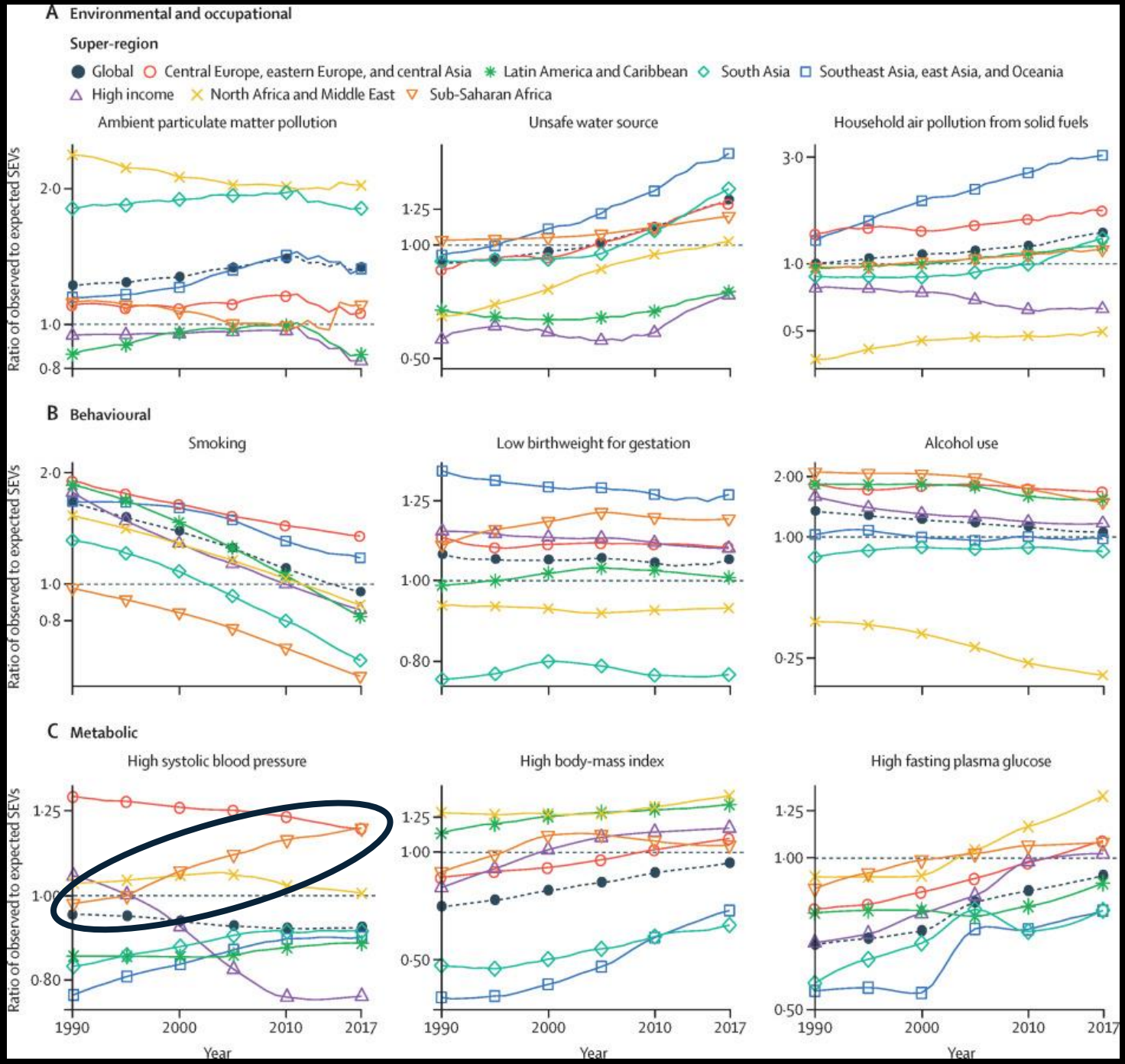
1.39bn with Hypertension
349m (25%) from HIC,
1.04bn from LMIC

Mills *et al*.
Circulation
2016;134:441-450

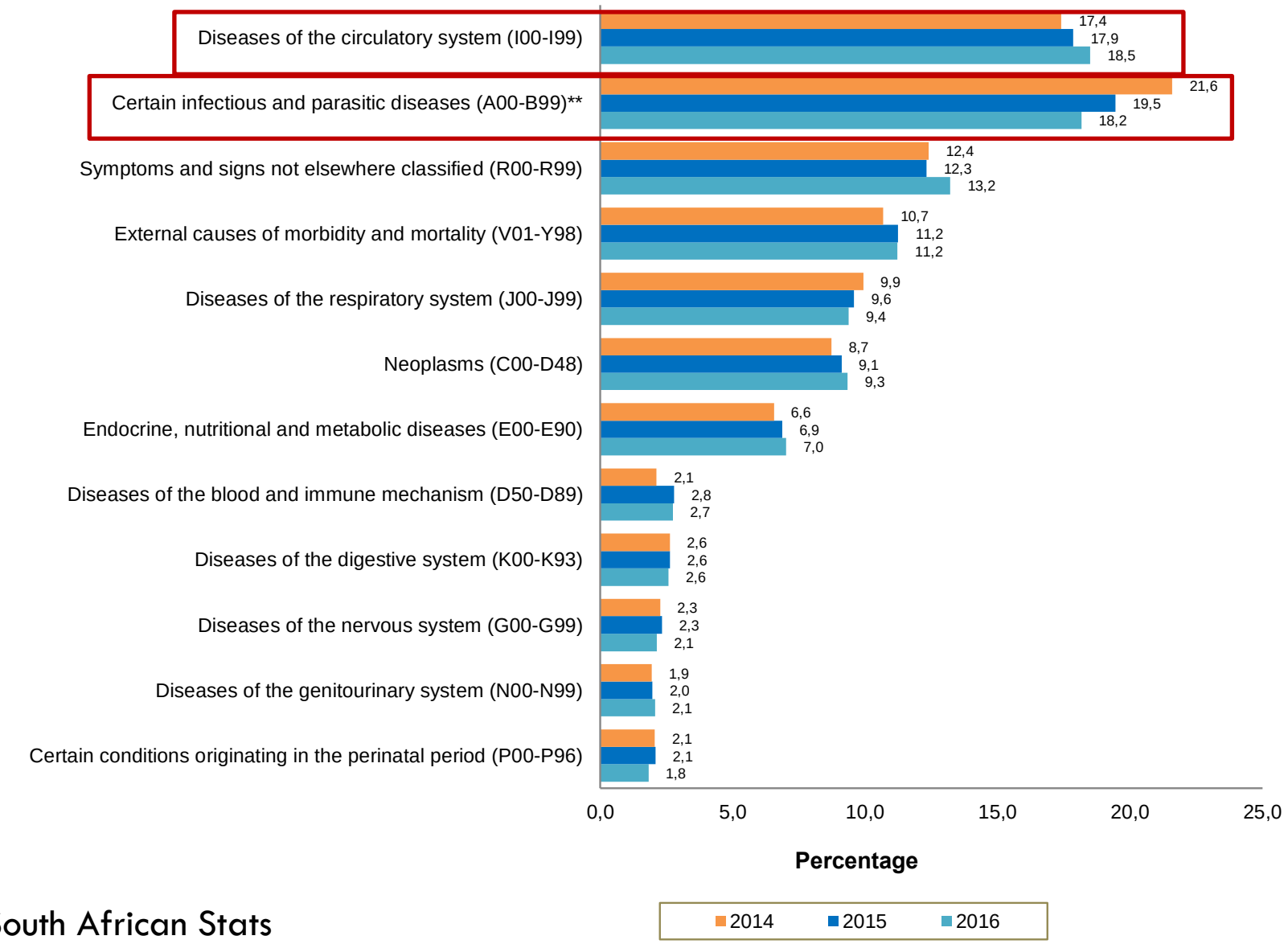




NCD Risk Factor Collaboration Lancet 2017; 389: 37-55



NCD Risk Factor Collaboration Lancet 2017; 389: 37-55



South African Stats

Guidelines

2020 International Society of Hypertension global hypertension practice guidelines

Thomas Unger[a], Claudio Borghi[b], Fadi Charchar[c,d,e], Nadia A. Khan[f,g], Neil R. Poulter[h], Dorairaj Prabhakaran[i,j,k], Agustin Ramirez[l], Markus Schlaich[m,n], George S. Stergiou[o], Maciej Tomaszewski[p,q], Richard D. Wainford[r,s,t], Bryan Williams[u], and Aletta E. Schutte[v,w]

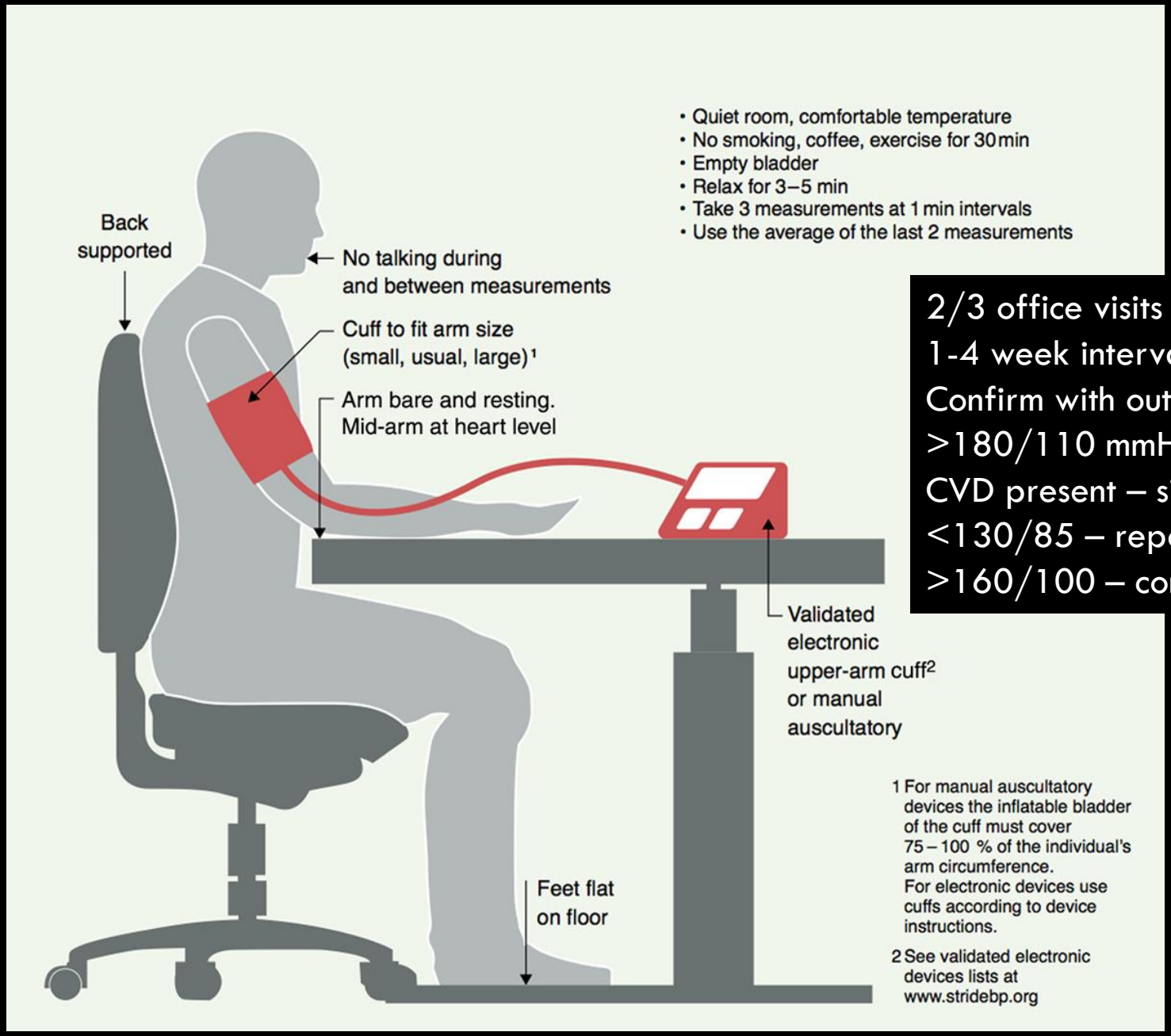
essential

optimal

CLASSIFICATION OF HYPERTENSION

- Normal BP <130 and < 85 mmHg
- High-normal 130-139 ± 85-89 mmHg
- Grade 1 HPT 140-159 ± 90-99 mmHg
- Grade 2 HPT >=160 ± >=100 mmHg

Unger et al., 2020, Journal of Hypertension, 38(6)



2/3 office visits
1-4 week intervals
Confirm with out-of office BP
>180/110 mmHg – single visit
CVD present – single visit
<130/85 – repeat within 3y
>160/100 – confirm within days

Unger et al., 2020, Journal of Hypertension, 38(6)

ESSENTIAL

Hypertension diagnosis: office blood pressure measurement

- The measurement of BP in the office or clin
  hypertension diagnosis and follow-up.
  according to recommendations shown in
- Whenever possible, the diagnosis should n
  Usually two to three office visits at 1–4-we
  level) are required to confirm the diagnos
  might be made on a single visit, if BP i
  evidence of cardiovascular disease (CVD)
- The recommended patient management
  presented in Table 4.
- If possible and available, the diagnosis of h
  by out-of-office BP measurement (see bel

OPTIMAL

Hypertension diagnosis: office blood pressure measurement

- **Initial evaluation**: measure BP in both arms, preferably simultaneously. If there is a consistent difference between arms >10 mmHg in repeated measurements, use the arm with the higher BP. If the difference is >20 mmHg consider further investigation.
- **Standing blood pressure**: measure in treated hypertensive patients after 1 min and again after 3 min when there are symptoms suggesting postural hypotension and at the first visit in the elderly and people with diabetes.
- **Unattended office blood pressure**: multiple automated BP measurements taken while the patient remains alone in the office provide more standardized evaluation but also lower BP levels than usual office measurements with uncertain threshold for hypertension diagnosis [17,18,23,24]. Confirmation with out-of-office BP is again needed for most treatment decisions.

Hypertension diagnosis: out-of-office blood pressure measurement

- Out-of-office BP measurements [by patients at home or with 24-h ambulatory blood pressure monitoring (ABPM)] are more reproducible than office measurements, more closely associated with hypertension-induced organ damage and the risk of cardiovascular events and identify the white-coat and masked hypertension phenomena (see below).
- Out-of-office BP measurement is often necessary for the accurate diagnosis of hypertension and for treatment decisions. In untreated or treated subjects with office BP classified as high-normal BP or grade 1 hypertension (systolic 130–159 mmHg and/or diastolic 85–99 mmHg), the BP level needs to be confirmed using home or ambulatory BP monitoring (Table 5) [1,2,17–21].
- Recommendations for performing home and ambulatory BP measurement are presented in Table 5.

Unger et al., 2020, Journal of Hypertension, 38(6)

AUTOMATED OFFICE BP PREFERRED

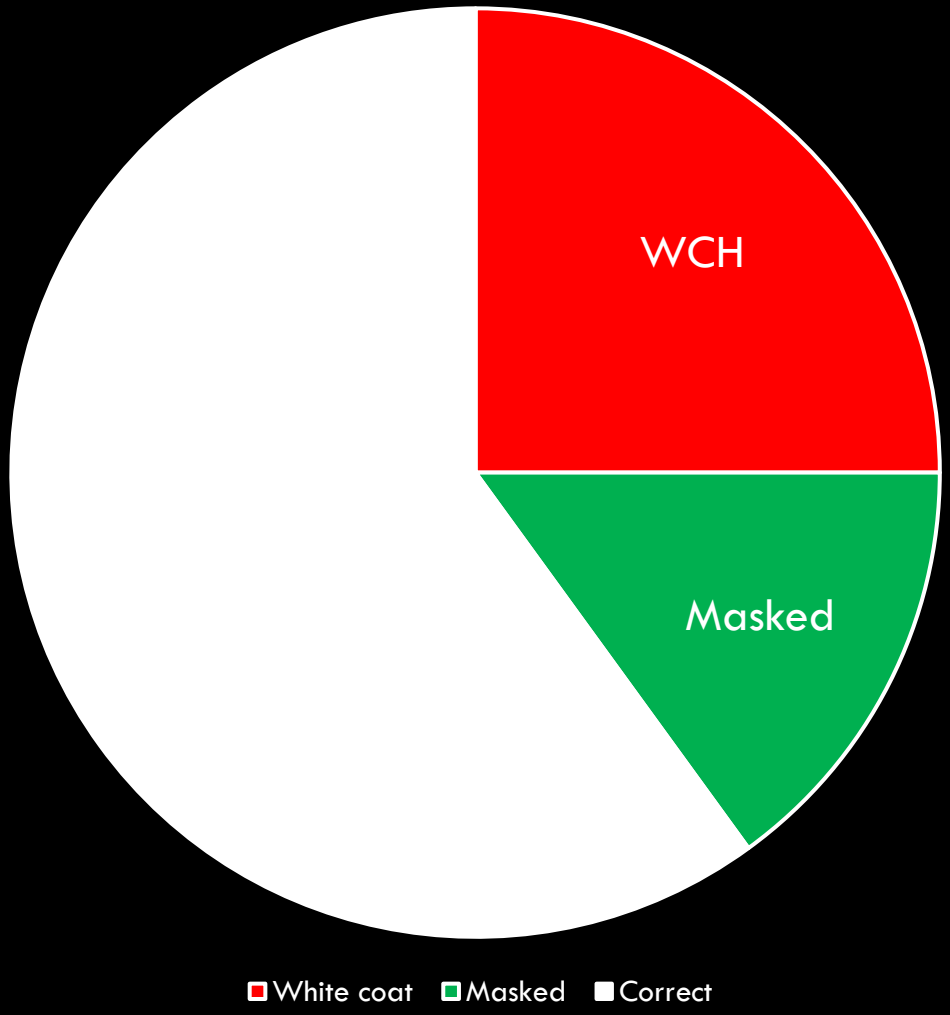
- Approximates ABPM
- Decreases white coat effect
- More predictive of end organ damage

Automated Office (unattended, AOBP)
Oscillometric (electronic)

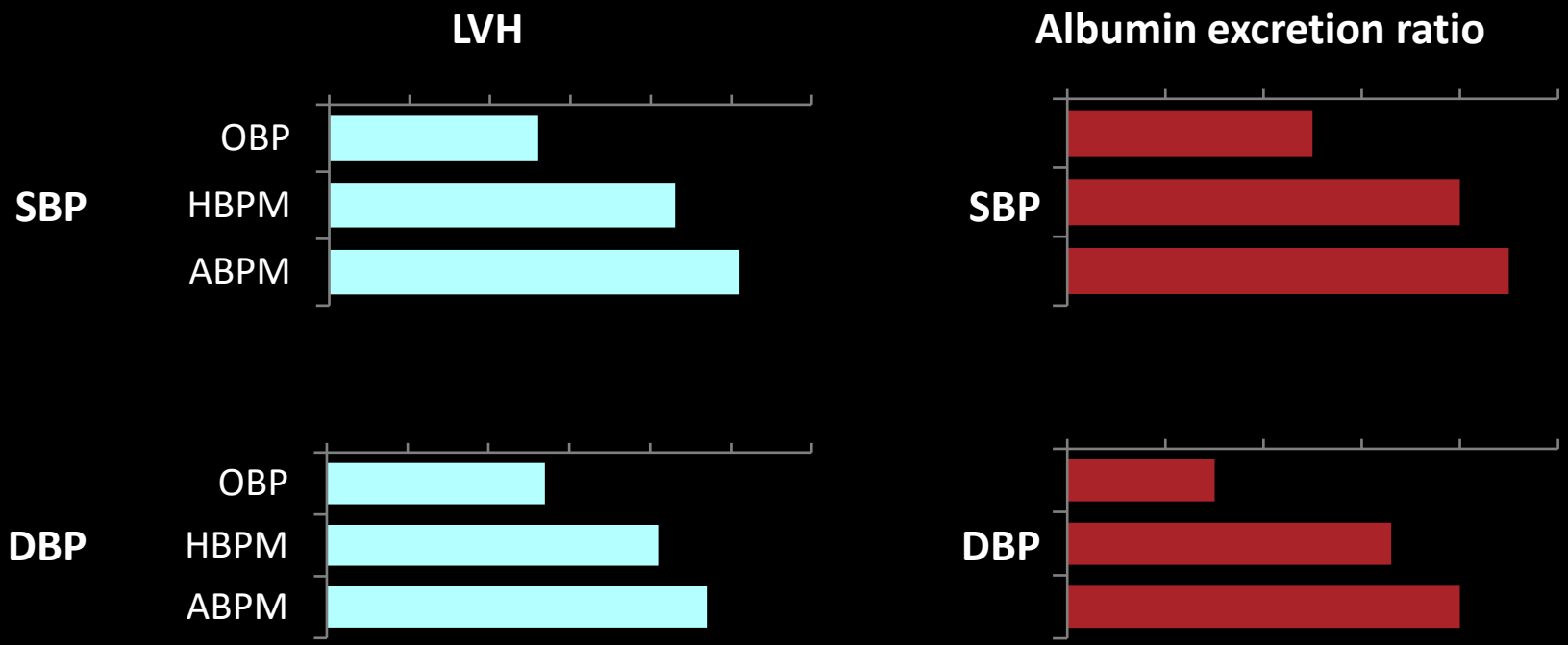
Beckett L, et al. *BMC Cardiovasc Disord* 2005;5:18; Myers MG, et al. *J Hypertens* 2009;27:280-6; Myers MG, et al. *BMJ* 2011;342;d286; Campbell NRC, et al. *J Hum Hypertens* 2007;21:588-90; Andreadis EA, et al. *Am J Hypertens* 2011;24:661-6; Andreadis EA, et al. *Am J Hypertens* 2012;25:969-73.

Applicable mainly to patients with high normal or stage 1-2 HT

If BP > 160/110 HPT highly likely, BP < 120/80 normotension



OUT-OF-OFFICE BP MEASUREMENTS AND TOD



The practicalities of
Performing out-of-office
BP are described

Lowers the BP
Titrate medications
Acceptable to patients

Mulè G, et al. *J Cardiovasc Risk* 2002;9:123-9.

YK Seedat, BL Rayner, Y Veriava. CVJA 2014;25(6):288-297
McManus RJ et al., Lancet 2018;391:949-959

COMPARING BP MEASUREMENTS

	Office	Automated office	Self	Ambulatory
Predicts outcome	+	++	++	+++
Initial diagnosis	Yes	Yes	Yes	Yes
Cut-off BP (mmHg)	140/90	Mean 135/85	135/85	Mean day 135/85 Mean night 120/70 Mean 24h 130/80
Evaluation of treatment	Yes	Yes	Yes	Limited, but valuable
Assess diurnal variation	No	No	No	Yes

WHAT IS A VALID ABPM?

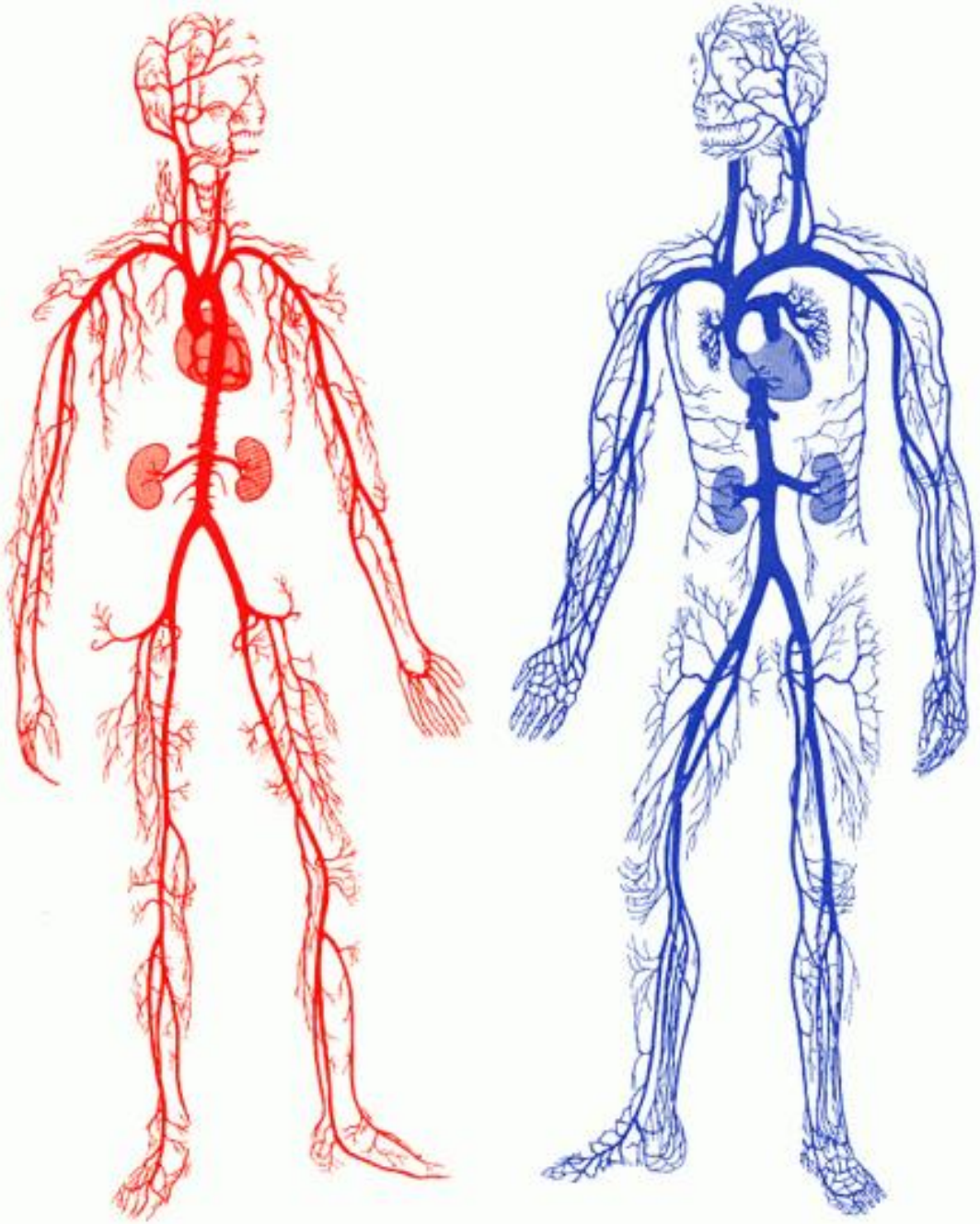
15 readings
13 day
5 night

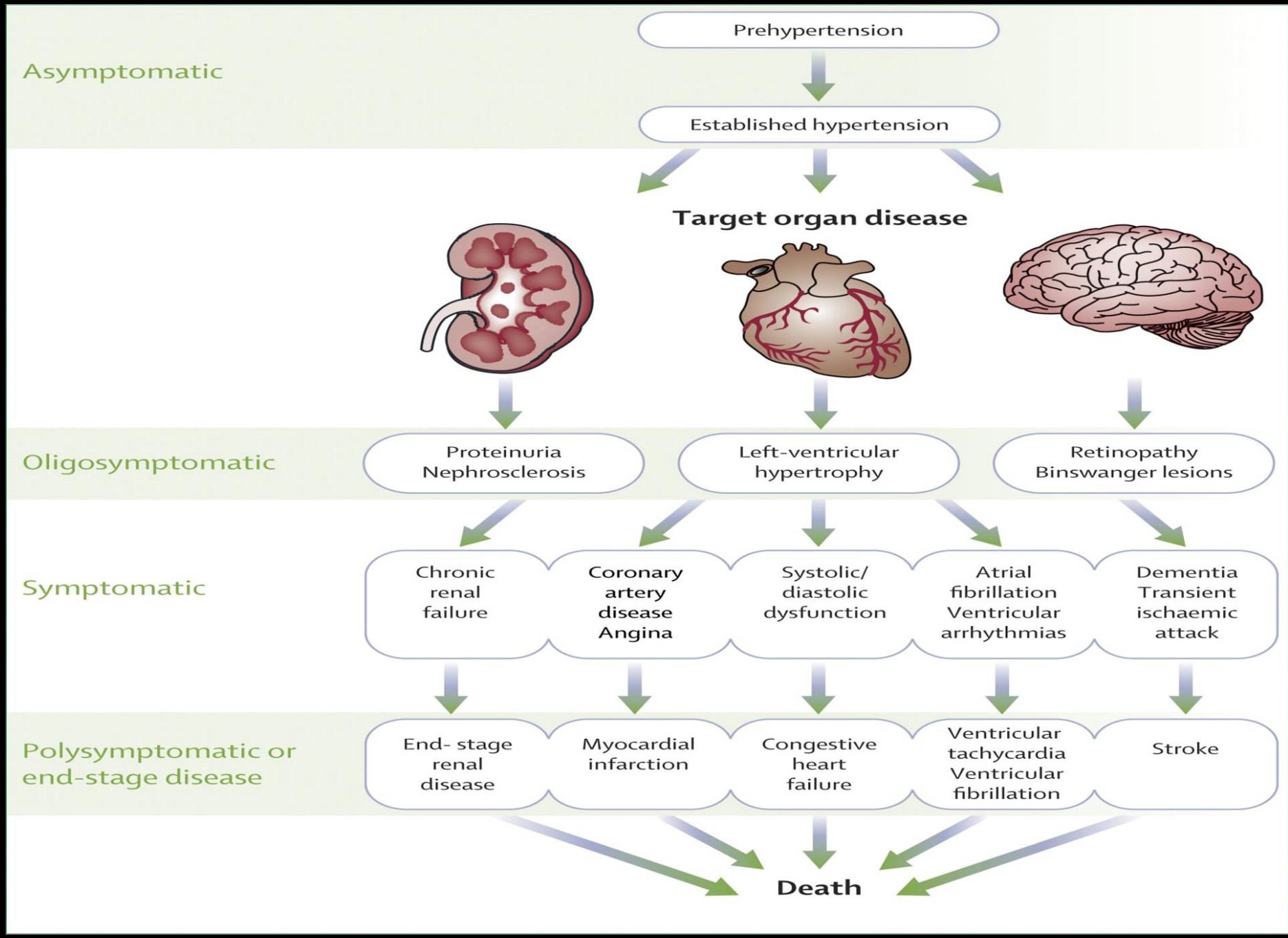
27 readings
20 day
7 night

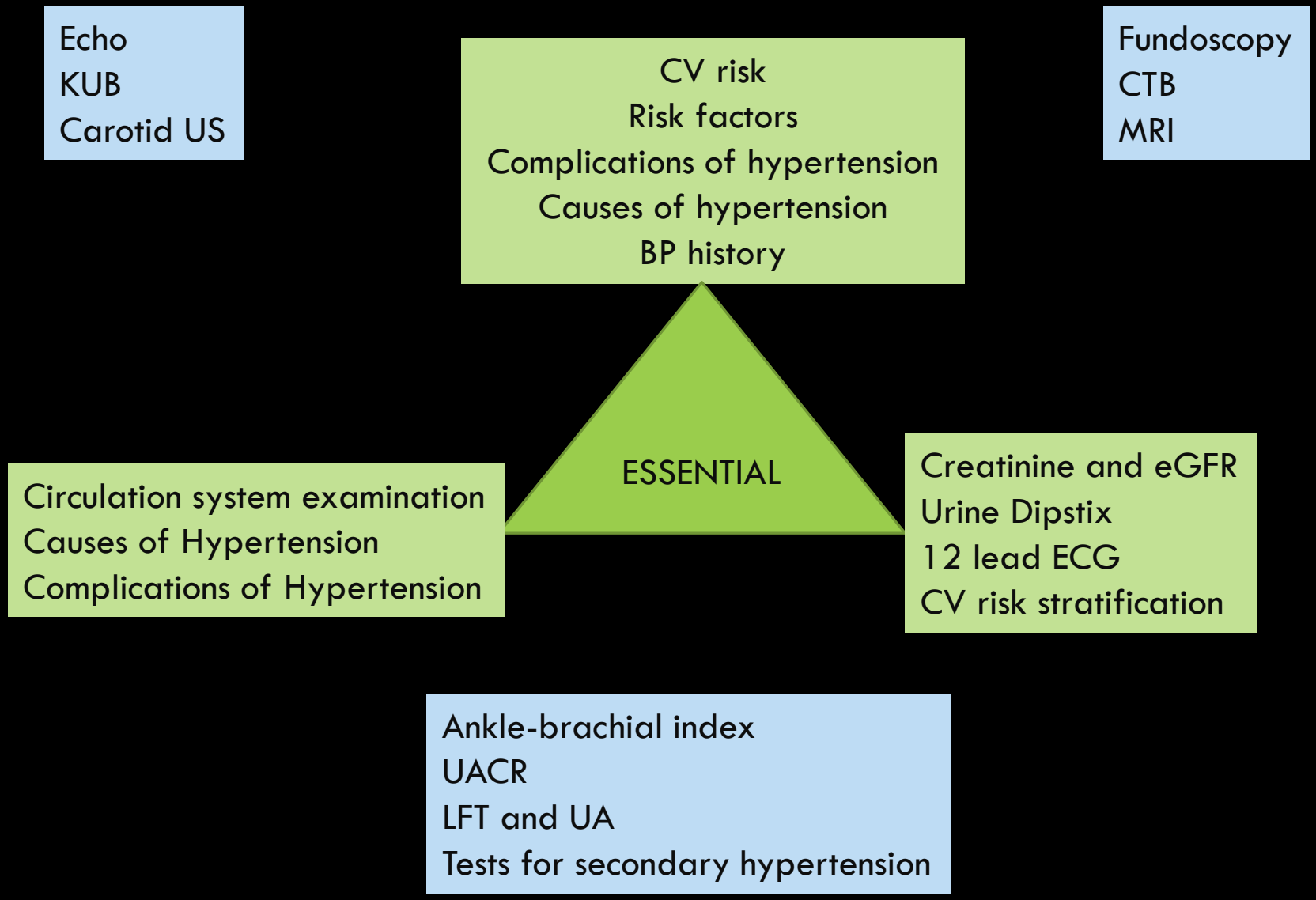
Agarwal and Tu, NEJM
2018;96:1199-1204

Williams B *et al*. European Heart Journal.
2018;39:3021–3104

Investigations




Asymptomatic
Prehypertension
Established hypertension
Target organ disease
Oligosymptomatic
Proteinuria
Nephrosclerosis
Left-ventricular hypertrophy
Retinopathy
Binswanger lesions
Symptomatic
Chronic renal failure
Coronary artery disease
Angina
Systolic/ diastolic dysfunction
Atrial fibrillation
Ventricular arrhythmias
Dementia
Transient ischaemic attack
Polysymptomatic or end-stage disease
End- stage renal disease
Myocardial infarction
Congestive heart failure
Ventricular tachycardia
Ventricular fibrillation
Stroke
Death



Unger et al., 2020, Journal of Hypertension, 38(6)

Other risk factors, HMOD, or disease	High-normal SBP 130–139 DBP 85–89	Grade 1 SBP 140–159 DBP 90–99	Grade 2 SBP ≥160 DBP ≥100
No other risk factors	Low	Low	Moderate – High
1 or 2 risk factors	Low	Moderate	High
≥3 risk factors	Low – Moderate	High	High
HMOD, CKD grade 3, diabetes mellitus, CVD	High	High	High

JOURNAL OF HYPERTENSION

- **Cardiovascular Risk Scores:** Several scoring systems are available. Some are based only on European populations, for example, SCORE.
  a. **SCORE:** http://www.heartscore.org/en_GB/access
  The following scores also take ethnicity into account.
  b. **QRISK2:** https://qrisk.org/2017/index.php
  c. **ASCVD:** https://tools.acc.org/ldl/ascvd_risk_estimator/index.html#!/calulate/estimator/

Unger et al., 2020, Journal of Hypertension, 38(6)

TREATMENT: BALANCING HARM VS GOOD

>140/90

Too high

1. Stroke
2. CCF
3. CKD
4. IHD
5. PVD

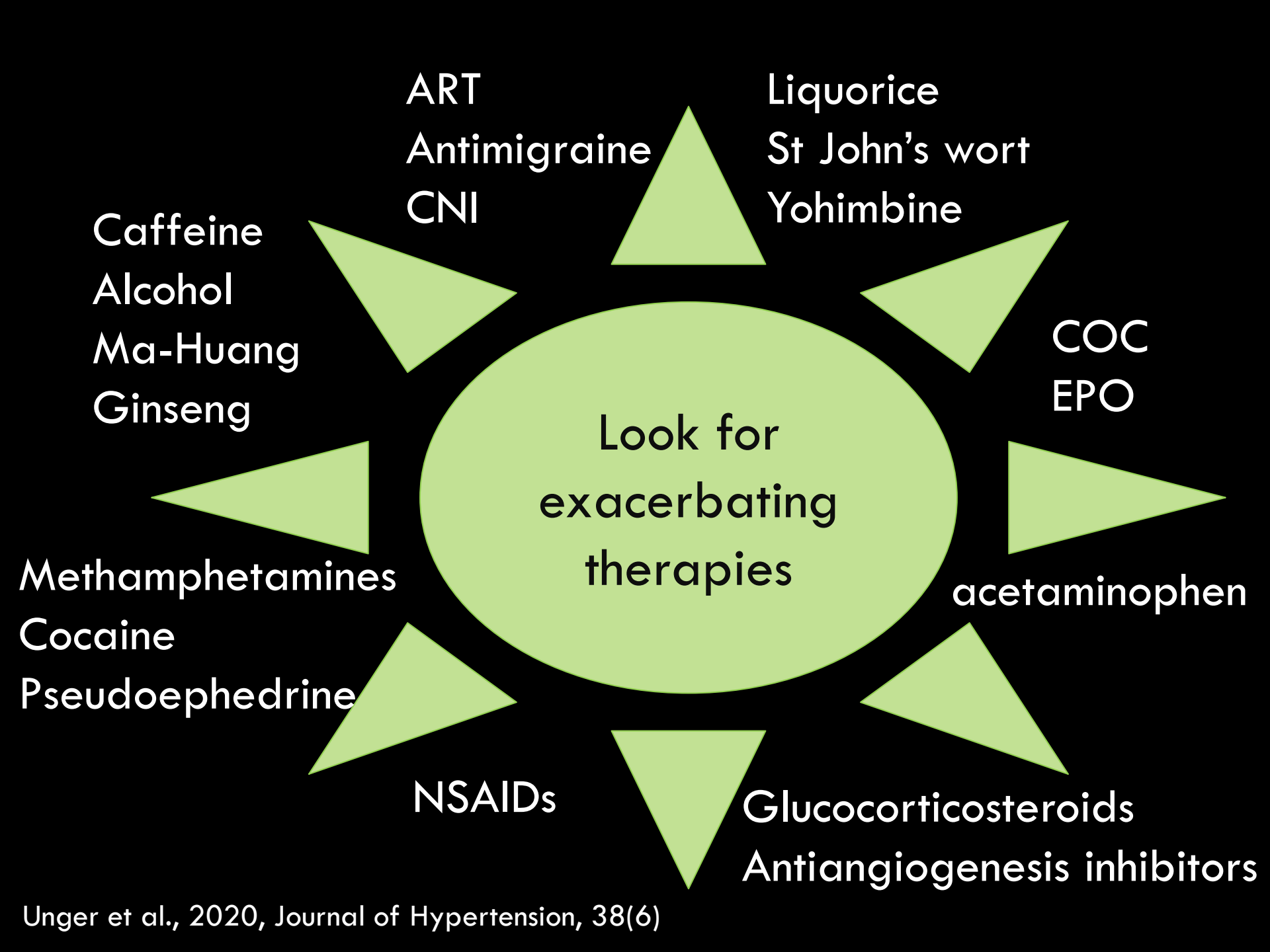
<120/70 or lower

Low target

1. Dizziness, falls
2. ? ↑ CV events
3. Other adverse effects

Does it meet the pragmatic definition proposed by Geoffrey Rose decades ago should perhaps be considered—viz: **"that level of BP above which investigation and management does more good than harm."**

Poulter NR, Prabhakaran D, Caulfield M. Seminars in Hypertension. Lancet. 2015;386:801–812



Unger et al., 2020, Journal of Hypertension, 38(6)

LIFESTYLE CHANGES

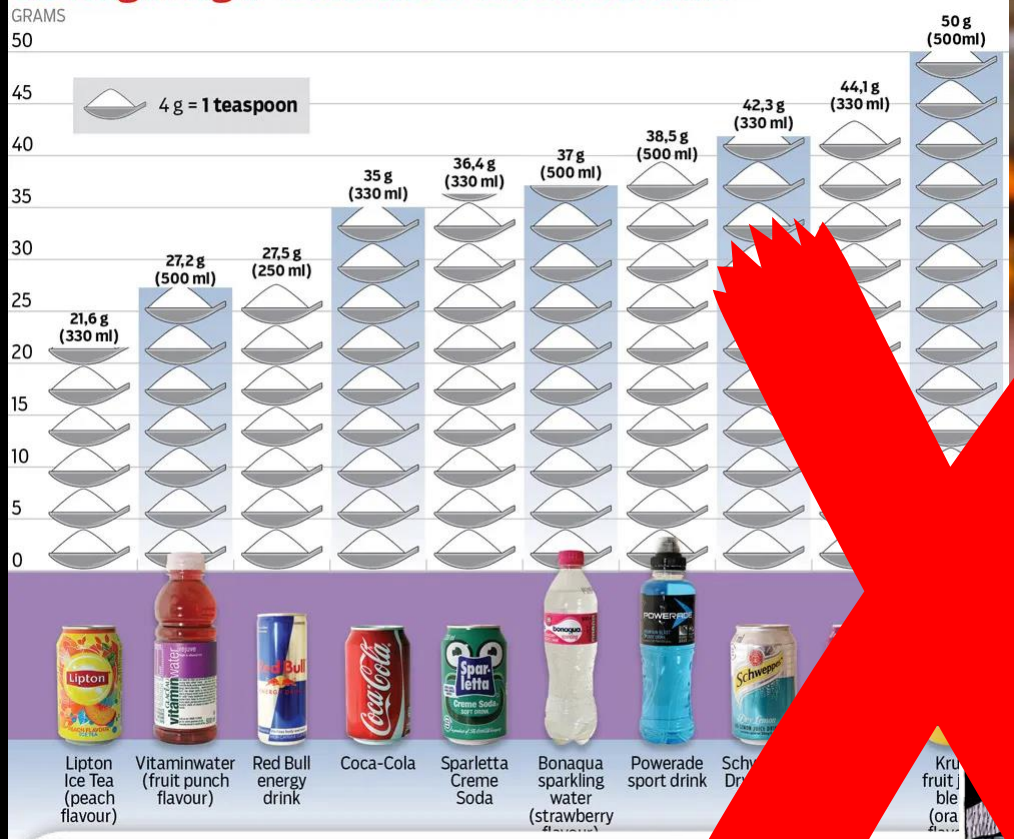
Salt reduction	There is strong evidence for a relationship between high salt intake and increased blood pressure [47]. Reduce salt added when preparing foods, and at the table. Avoid or limit consumption of high salt foods, such as soy sauce, fast foods, and processed food including breads and cereals high in salt.
Healthy diet	Eating a diet that is rich in whole grains, fruits, vegetables, polyunsaturated fats and dairy products, and reducing food high in sugar, saturated fat and trans fats, such as DASH diet (http://www.dashforhealth.com) [48]. Increase intake of vegetables high in nitrates known to reduce BP, such as leafy vegetables and beetroot. Other beneficial foods and nutrients include those high in magnesium, calcium, and potassium, such as avocados, nuts, seeds, legumes, and tofu [49].
Healthy drinks	Moderate consumption of coffee, green, and black tea [50]. Other beverages that can be beneficial include Karkadé (Hibiscus) tea, pomegranate juice, beetroot juice, and cocoa [49].
Moderation of alcohol consumption	Positive linear association exists between alcohol consumption, blood pressure, the prevalence of hypertension, and CVD risk [51]. The recommended daily limit for alcohol consumptions is two standard drinks for men and 1.5 for women (10 g alcohol/standard drink). Avoid binge drinking.
Weight reduction	Body weight control is indicated to avoid obesity. Particularly abdominal obesity should be managed. Ethnic-specific cut-offs for BMI and waist circumference should be used [52]. Alternatively, a waist-to-height ratio <0.5 is recommended for all populations [53,54].
Smoking cessation	Smoking is a major risk factor for CVD, COPD, and cancer. Smoking cessation and referral to smoking cessation programs are advised [55].
Regular physical activity	Studies suggest that regular aerobic and resistance exercise may be beneficial for both the prevention and treatment of hypertension [56–58]. Moderate intensity aerobic exercise (walking, jogging, cycling, yoga, or swimming) for 30 min on 5–7 days per week or HIIT (high intensity interval training), which involves alternating short bursts of intense activity with subsequent recovery periods of lighter activity. Strength training also can help reduce blood pressure. Performance of resistance/strength exercises on 2–3 days per week.
Reduce stress and induce mindfulness	Chronic stress has been associated to high blood pressure later in life [59]. Although more research is needed to determine the effects of chronic stress on blood pressure, randomized clinical trials examining the effects of Transcendental Meditation/mindfulness on blood pressure suggest that this practice lowers blood pressure [60]. Stress should be reduced and mindfulness or meditation introduced into the daily routine.
Complementary, alternative or traditional medicines	Large proportions of hypertensive patients use complementary, alternative, or traditional medicines (in regions, such as Africa and China) [61,62] yet large-scale and appropriate clinical trials are required to evaluate the efficacy and safety of these medicines. Thus, use of such treatment is not yet supported.
Reduce exposure to air pollution and cold temperature	Evidence from studies support a negative effect of air pollution on blood pressure in the long-term [63,64].

JOURNAL OF HYPERTENSION

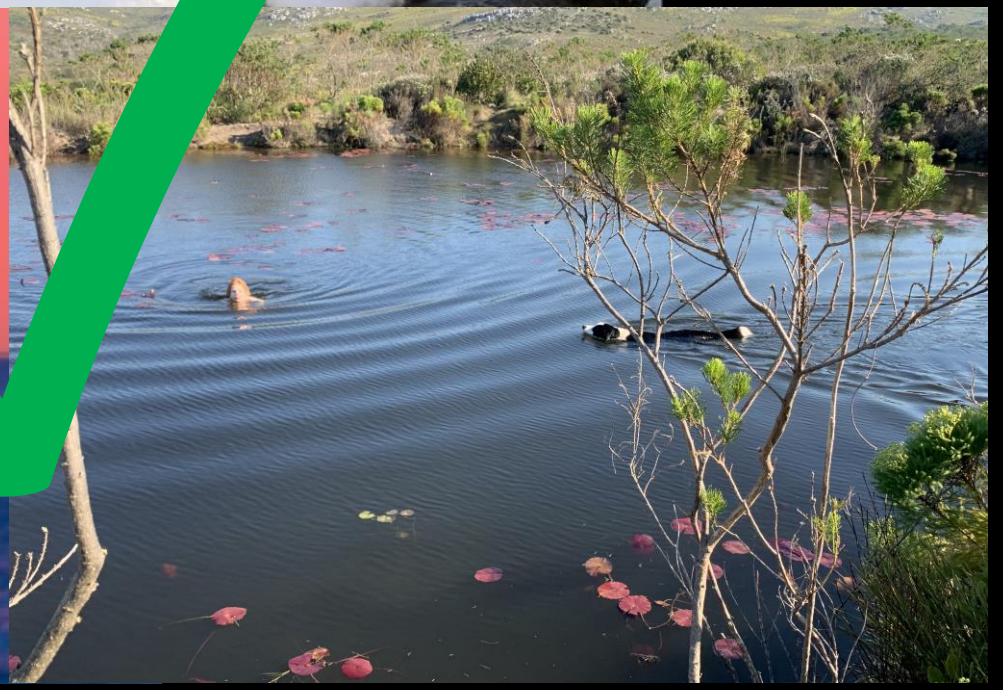
Unger et al., 2020, Journal of Hypertension, 38(6)

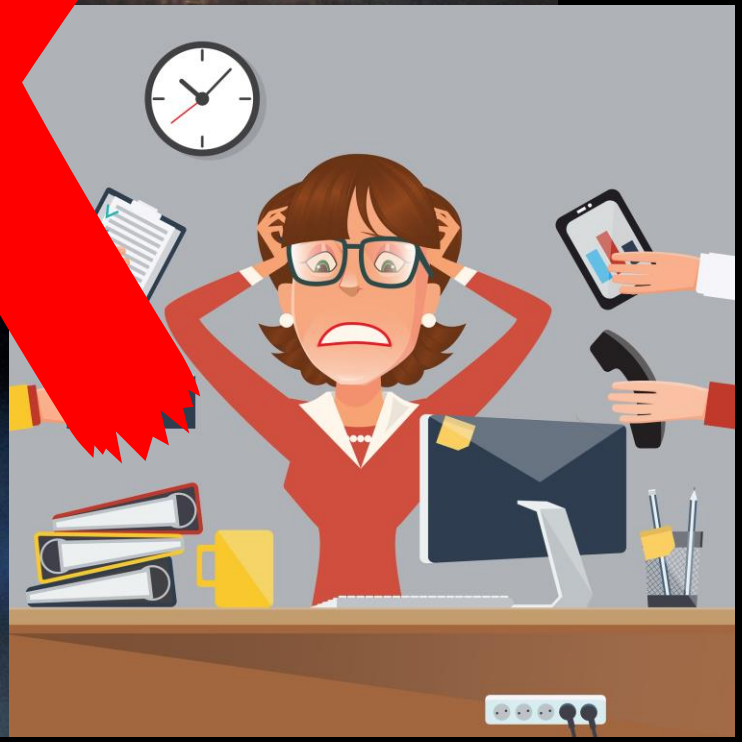
Song et al., Nutrients, 2018
Tovar et al., Br J of Nutrition, 2014
Grasgruber et al., Nutrients, 2018

The high sugar content of our cool drinks



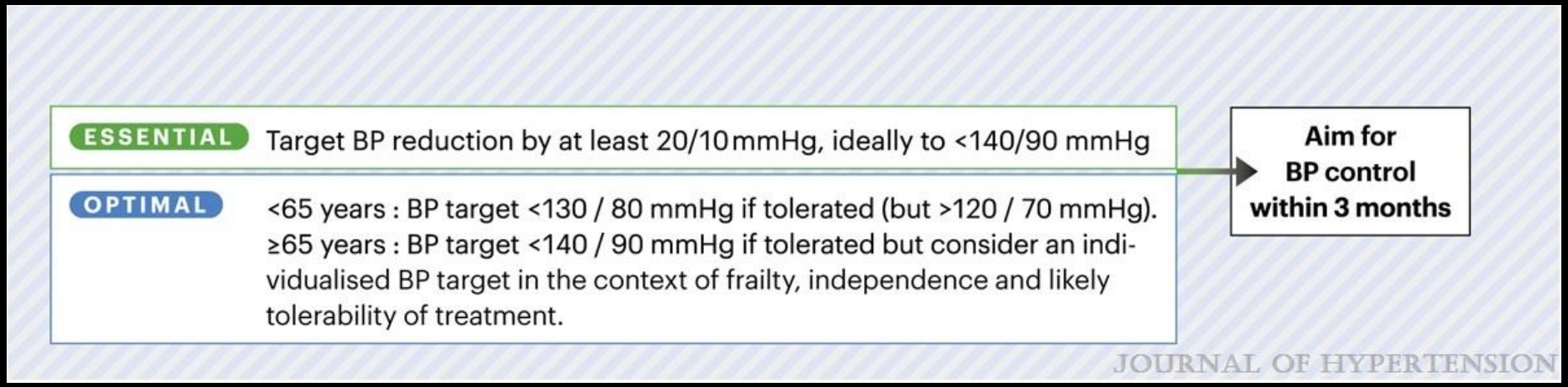
30 minutes
5-7 days/ week



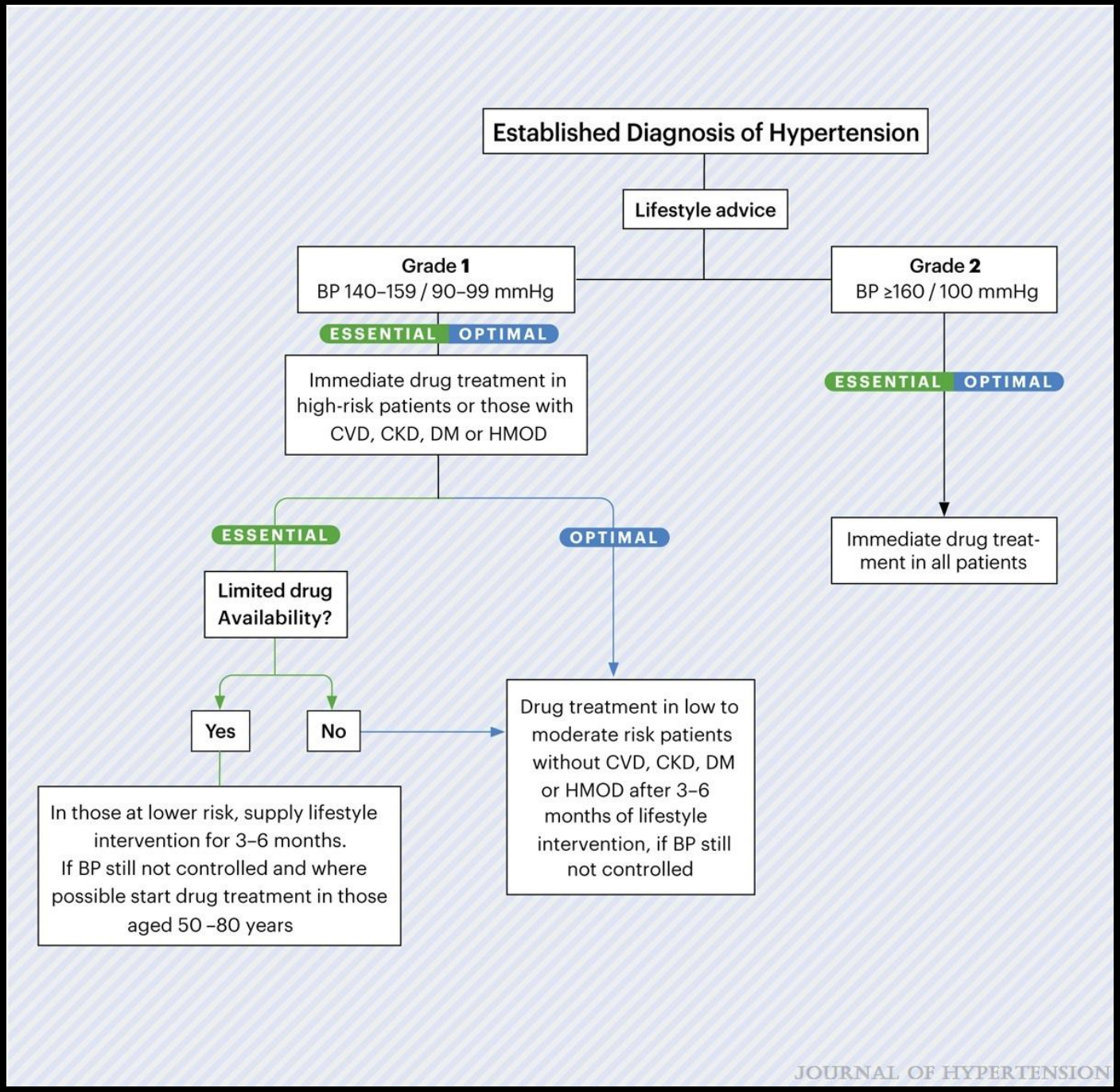


?

TARGETS



Unger et al., 2020, Journal of Hypertension, 38(6)



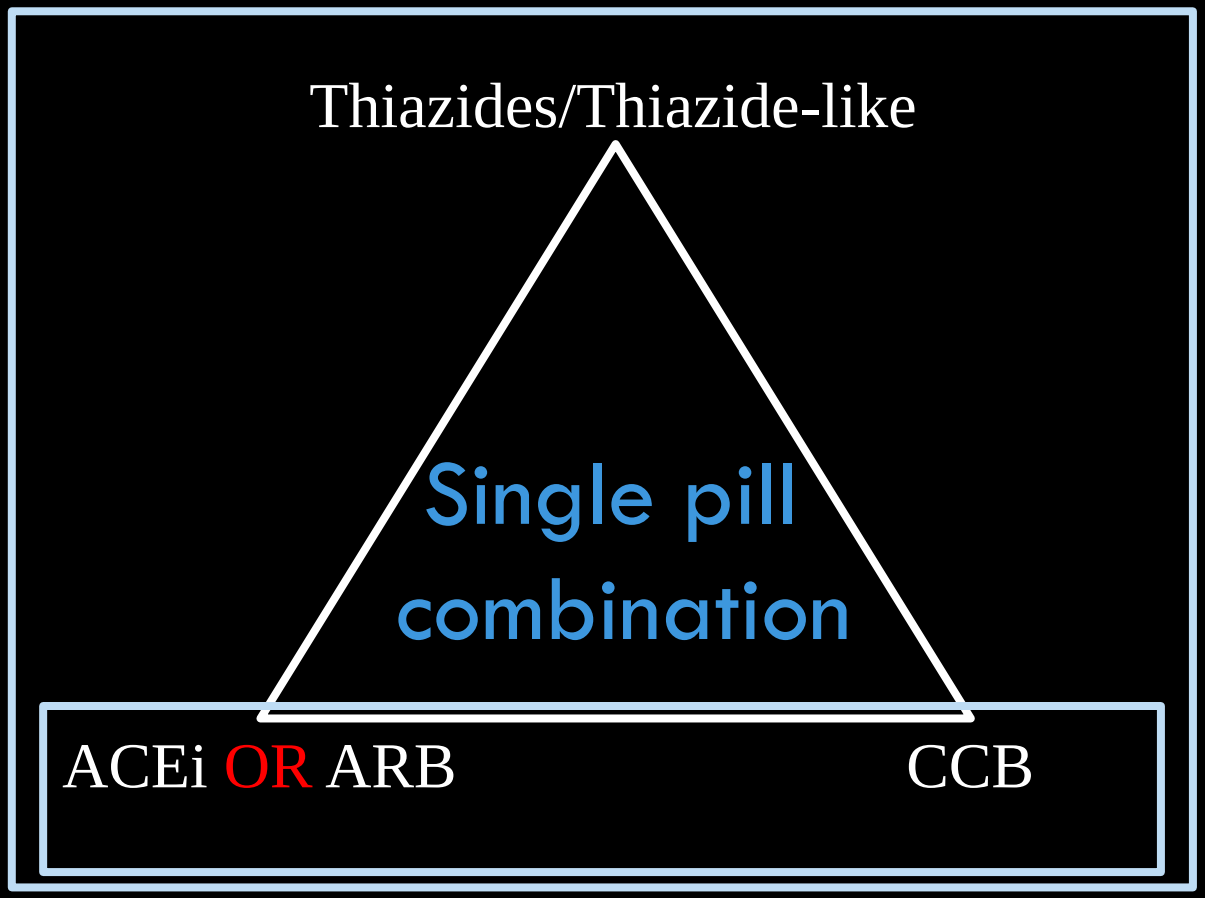
Everyone at high risk MUST be treated

In the setting of limited availability age becomes a deciding factor: 50-80y

Lifestyle interventions Are important in everyone

Unger et al., 2020, JH, 38(6)

DRUG CHOICE



Unger et al., 2020, Journal of Hypertension, 38(6)

ESSENTIAL

- Use whatever drugs are available with as many of the ideal characteristics (see ***Table 9***) as possible.
- Use free combinations if SPCs are not available or unaffordable
- Use thiazide diuretics if thiazide-like diuretics are not available
- Use alternative to DHP-CCBs if these are not available or not tolerated (i.e. Non-DHP-CCBs: diltiazem or verapamil).

OPTIMAL

Ideally Single Pill Combination Therapy (SPC)	**Step 1** Dual low-dose# combination	**A + C** [a, b, c]
	Step 2 Dual full-dose combination	**A + C** [a, b]
	Step 3 Triple combination	**A + C + D**
	Step 4 (Resistant Hypertension) Triple Combination + Spironolactone or other drug*	**A + C +D Add Spironolactone (12.5 – 50 mg o.d.)**[d]

ESSENTIAL **OPTIMAL**

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.

a) Consider monotherapy in low risk grade 1 hypertension or in very old (≥80 yrs) or frailer patients.
b) Consider A + D in post-stroke, very elderly, incipient heart failure or CCB intolerance.
c) Consider A + C or C + D in black patients.
d) Caution with spironolactone or other potassium sparing diuretics when estimated GFR <45 ml/min/1.73m² or K^+ >4.5 mmol/L.

A = ACE-Inhibitor or ARB (Angiotensin Receptor Blocker)
C = DHP-CCB (Dihydropyridine -Calcium Channel Blocker)
D = Thiazide-like diuretic
Supportive references: A + C,[69,70] Spironolactone,[71] Alpha-blocker,[72] C + D[73].

* Alternatives include: Amiloride, doxazosin, eplerenone, clonidine or beta-blocker.

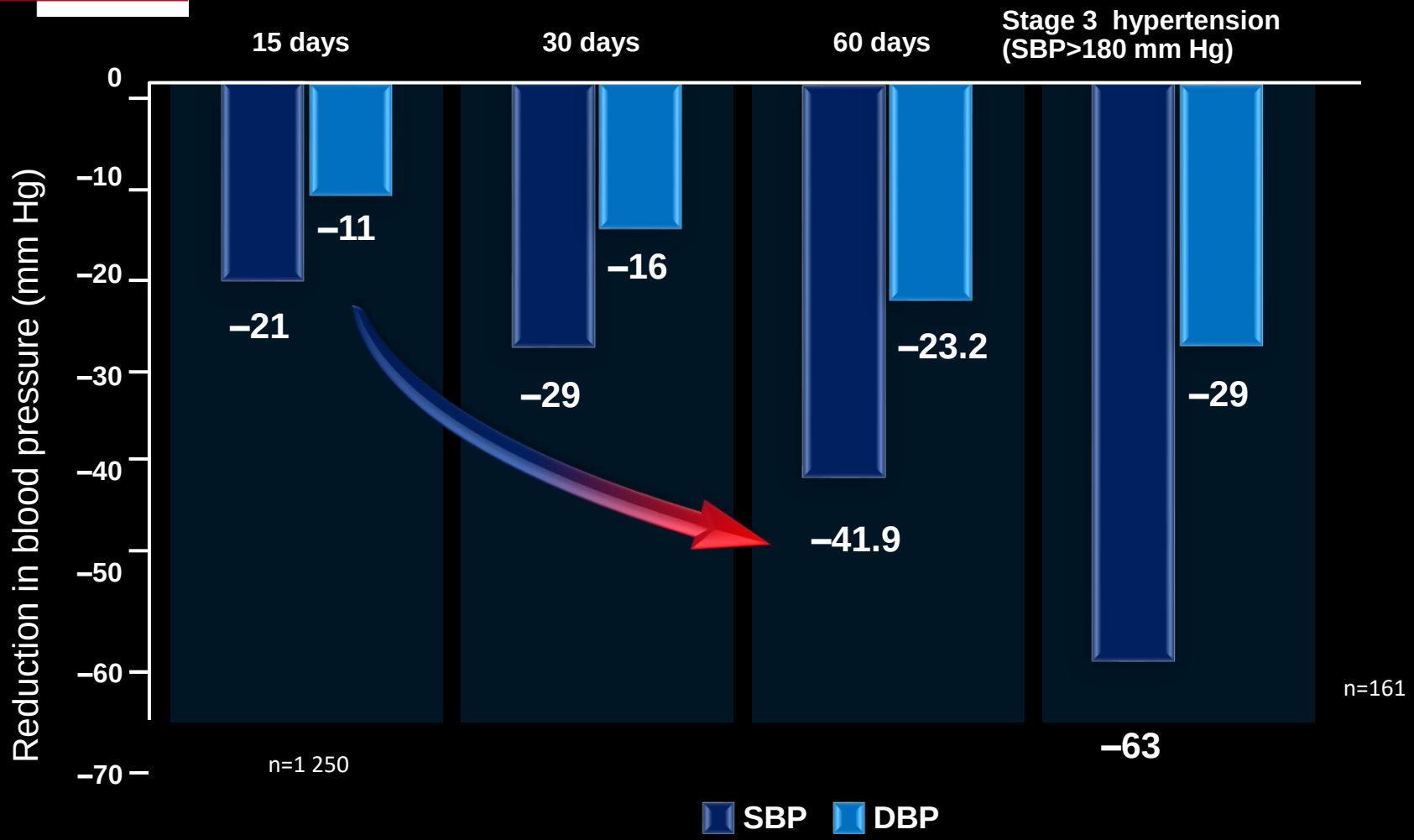
low-dose generally refers to half of the maximum recommended dose

RCT-based benefits between ACE-I's and ARB's were not always identical in different patient populations. Choice between the two classes of RAS-Blockers will depend on patient characteristics, availability, costs and tolerability.

Unger et al., 2020, JH, 38(6)

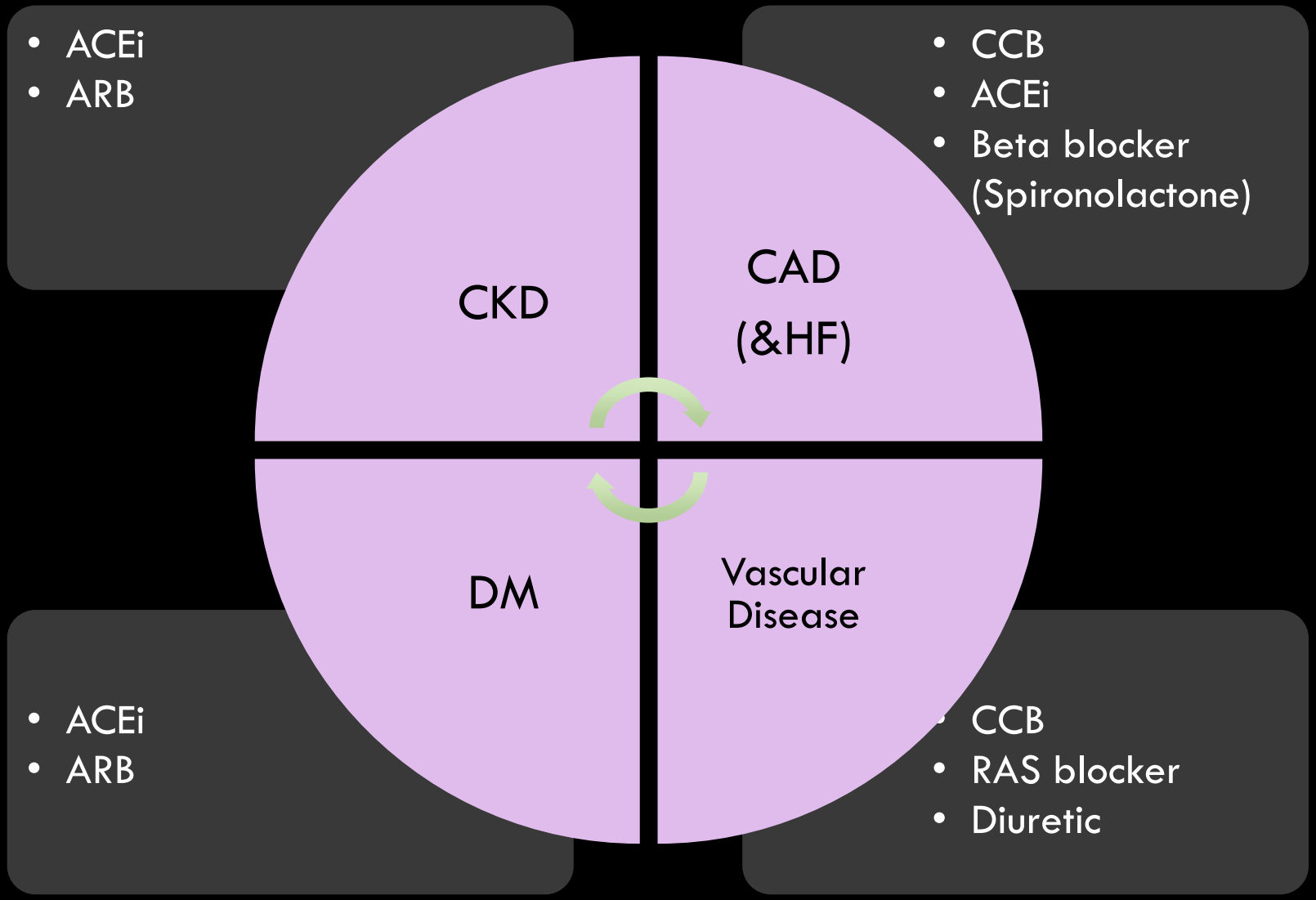
BP lowering Efficacy of perindopril and amlodipine combination

STRONG TRIAL



Bahl VK, *et al*. Am J Cardiovasc Drugs 2009;9:135-142.

COMPELLING INDICATIONS



EBM

benefit

population

SE status

Once daily dosing

Tolerability

Cost

Therapy

Healthcare system

Disease

Patient

Adherence

Unger et al., 2020, Journal of Hypertension, 38(6)

Means to Improve Adherence

- Reduce polypharmacy (SPC)
- Once a day dosing
- Linking adherence behaviour with daily habits
- Empowerment based counselling
- Electronic adherence aids
- Multidisciplinary team approach
- Providing adherence feedback
- Home BP monitoring

Unger et al., 2020, Journal of Hypertension, 38(6)

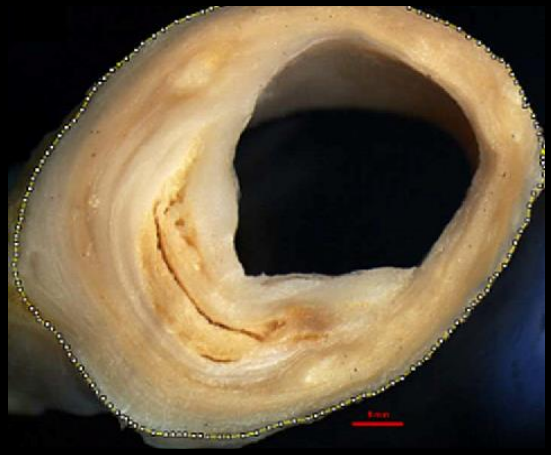
Objective
Indirect and
Direct methods
To diagnose
Non-adherence

Amlodipine level on it's own may be useful
Jones *et al.* 2017

ESSENTIAL OPTIMAL

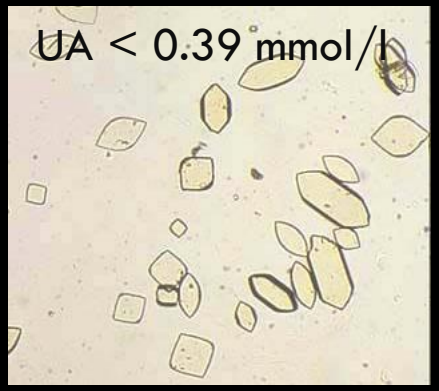
- In addition to BP control, the therapeutic strategy should include lifestyle changes, body weight control and the effective treatment of the other rick factors to reduce the residual cardiovascular risk [1].
- Lifestyle changes as in Table 8.
- LDL-cholesterol should be reduced according to risk profile: 1) >50 % and <70 mg/dl (1.8 mmol/l) in hypertension and CVD, CKD, diabetes mellitus or no CVD and high-risk; 2) >50% and <100 mg/dl (2.6 mmol/l) in high-risk patients; 3) <115 mg/dl (3mmol/l) in moderate-risk patients [1,89].
- Fasting serum glucose levels should be reduced below 126 mg/dl (7 mmol/l) or HbA1c below 7% (53 mmol/mol) [1].
- s-UA should be maintained below 6.5 mg/dl (0.387mmol/l) [<6 mg/dl (0.357 mmol/l) in patients with gout] [94].
- Antiplatelet therapy should be considered in patients with CVD (secondary prevention only) [95].

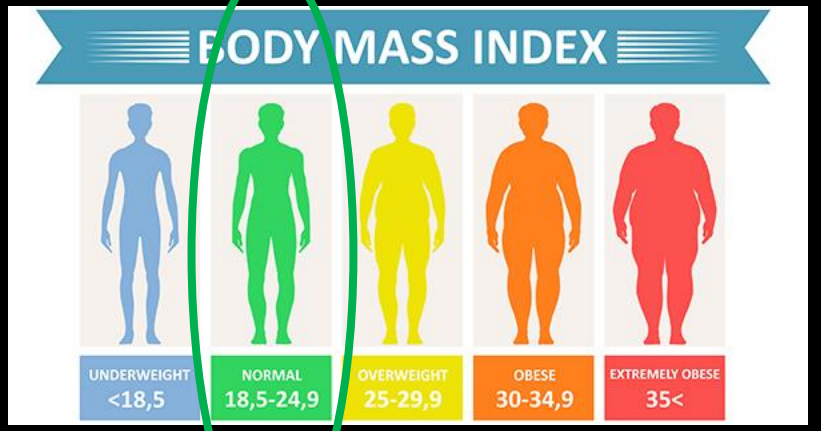
Unger et al., 2020, Journal of Hypertension, 38(6)

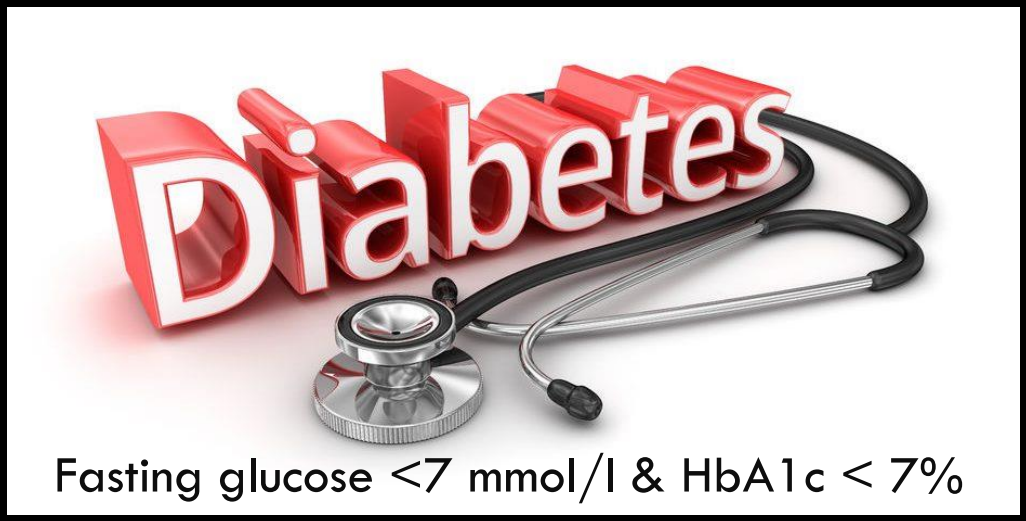


LDL reduction based on risk

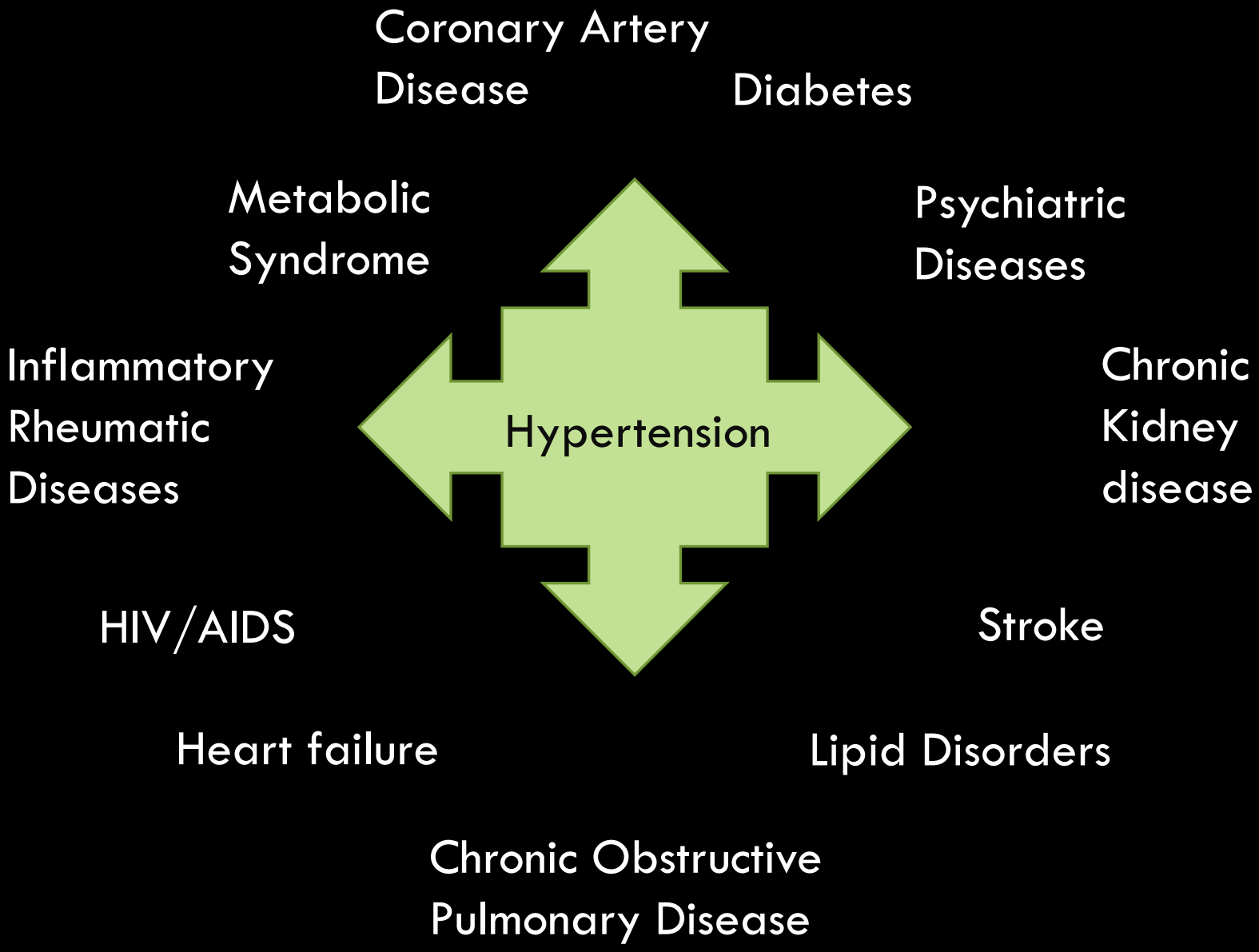
1. >50% & <1.8mmol/l
2. >50% & <2.6mmol/l
3. <3mmol/l







Fasting glucose <7 mmol/l & HbA1c < 7%



Unger et al., 2020, Journal of Hypertension, 38(6)

Resistant Hypertension

ESSENTIAL

- If seated office BP >140/90 mmHg in patients managed with three or more antihypertensive medications at optimal (or maximally tolerated) doses including a diuretic, first exclude causes of pseudoresistance (poor BP measurement technique, white-coat effect, nonadherence, and suboptimal choices in antihypertensive therapy), and substance-induced increases in BP.
- Consider screening patients for secondary causes as appropriate (refer to Section 10.2).
- Optimize the current treatment regimen including health behaviour change and diuretic-based treatment (maximally tolerated doses of diuretics, and optimal choice of diuretic: use of thiazide-like rather than thiazide diuretics, and initiation of loop diuretics for eGFR <30 ml/min/1.73 m^2 or clinical volume overload) [109].
- Add a low dose of spironolactone as the fourth line agent in those whose serum potassium is <4.5 mmol/l and whose eGFR is >45 ml/min/1.73 m^2 to achieve BP targets [8,71,110]. If spironolactone is contraindicated or not tolerated, amiloride, doxazosin, eplerenone, clonidine, and beta-blockers are alternatives, or any available antihypertensive class not already in use [1,111–114].

Secondary Hypertension

ESSENTIAL

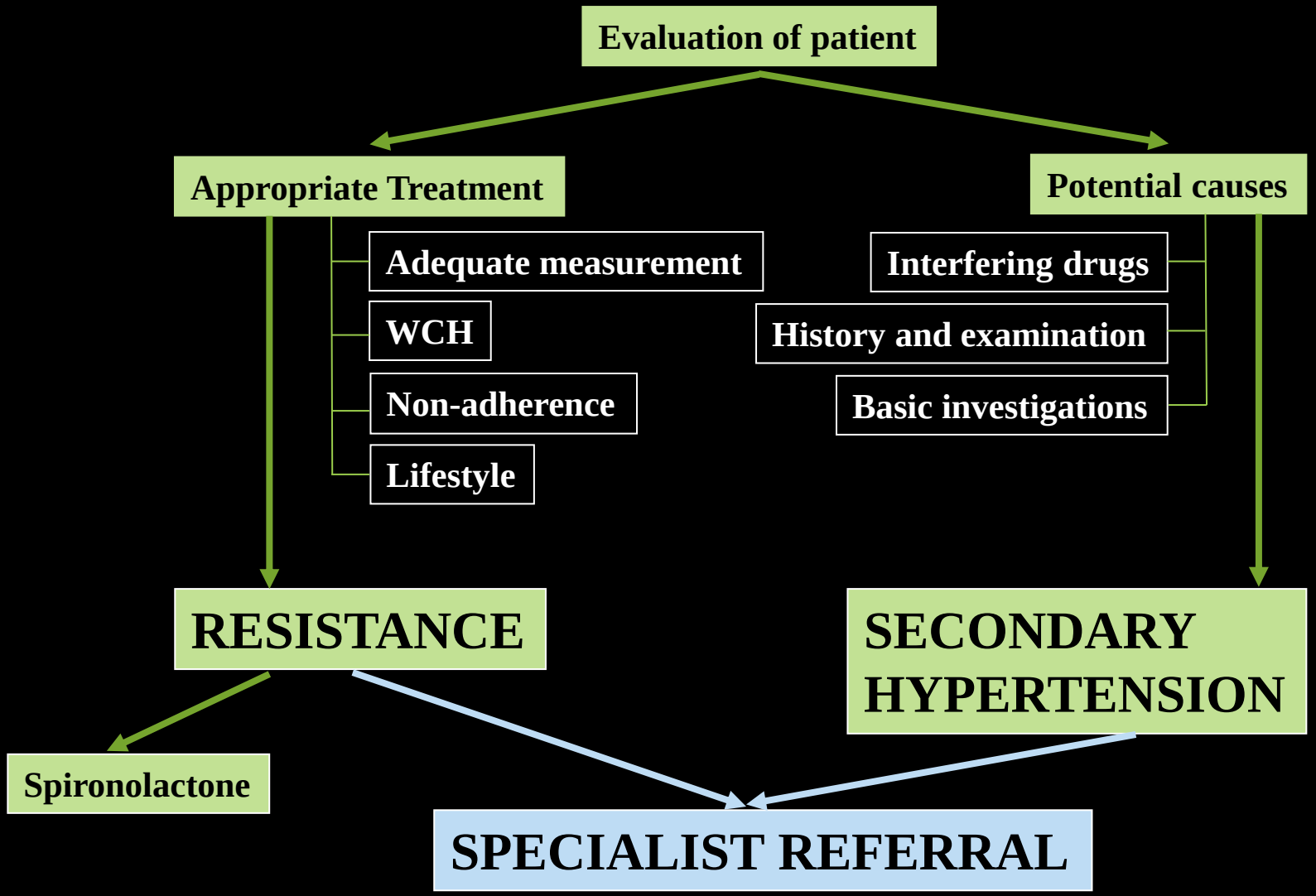
- Consider screening for secondary hypertension in 1) patients with early-onset hypertension (<30 years of age) in particular in the absence of hypertension risk factors (obesity, metabolic syndrome, familial history, etc.), 2) those with resistant hypertension, 3) individuals with sudden deterioration in BP control, 4) hypertensive urgency and emergency, 5) those presenting with high probability of secondary hypertension based on strong clinical clues.
- In patients with resistant hypertension, investigations for secondary hypertension should generally be preceded by exclusion of pseudoresistant hypertension and drug/substance-induced hypertension.
- Basic screening for secondary hypertension should include a thorough assessment of history, physical examination (see clinical clues), basic blood biochemistry (including serum sodium, potassium, eGFR, TSH) and dipstick urine analysis.

OPTIMAL

- Further investigations for secondary hypertension (additional biochemistry/imaging/others) should be carefully chosen based on information from history, physical examination, and basic clinical investigations.
- Consider referring for further investigation and management of suspected secondary hypertension to a specialist centre with access to appropriate expertise and resources.

Unger et al., 2020, Journal of Hypertension, 38(6)

BP >140/90 ON 3 AGENTS (INC. DIURETIC)



Unger et al., 2020, Journal of Hypertension, 38(6)

The Lancet 386, 2059-2068 Williams et al., 2015

Secondary hypertension	Clinical history and physical examination	Basic biochemistry and urine analysis	Further diagnostic tests
Renal parenchymal disease	• Personal/familial history of CKD	• Proteinuria, hematuria, leukocyturia on dipstick urine analysis • Decreased estimated GFR	• Kidney ultrasound
Primary aldosteronism	• Symptoms of hypokalemia (muscle weakness, muscle cramps, tetany)	• Spontaneous hypokalemia or diuretic-induced hypokalemia on blood biochemistry (50–60% of patients are normokalemic). • Elevated plasma aldosterone–renin activity ratio	• Confirmatory testing (e.g. intravenous saline suppression test) • Imaging of adrenals (adrenal computed tomography) • Adrenal vein sampling
Renal artery stenosis	• Abdominal bruit • Bruits over other arteries (i.e. carotid and femoral arteries) • Drop in estimated GFR >30% after exposure to ACE-inhibitors/ARBs • For suspected atherosclerotic RAS, history of flash pulmonary edema or history of atherosclerotic disease or presence of cardiovascular risk factors • For suspected fibromuscular dysplasia, young women with onset of hypertension <30 years	• Decrease in estimated GFR	• Imaging of renal arteries (duplex ultrasound, abdominal computed tomography or magnetic resonance angiograms depending on availability and patient's level of renal function)
Pheochromocytoma	• Headaches • Palpitations • Perspiration • Pallor • History of labile hypertension	• Increased plasma levels of metanephrines • Increased 24-h urinary fractional excretion of metanephrines and catecholamines	• Abdominal/pelvic computational tomography or MRI
Cushing's syndrome and disease	• Central obesity • Purple striae • Facial rubor • Signs of skin atrophy • Easy bruising • Dorsal and supraclavicular fat pad • Proximal muscle weakness	• Hypokalemia • Increased late night salivary cortisol	• Dexamethasone suppression tests [118] • 24 h urinary free cortisol • Abdominal/pituitary imaging
Coarctation of the aorta	• Higher blood pressure in upper than lower extremities • Delayed or absent femoral pulses		• Echocardiogram • Computational tomography angiogram • Magnetic resonance angiogram
Obstructive sleep apnea	• Increased BMI • Snoring • Daytime sleepiness • Gasping or choking at night • Witnessed apneas during sleep • Nocturia		• Home sleep apnea testing (e.g. level 3 sleep study) • Overnight polysomnography testing
Thyroid disease	• Symptoms of hyperthyroidism: heat intolerance, weight loss, tremor, palpitations • Symptoms of hypothyroidism: cold intolerance, weight gain, dry brittle hair	• TSH, Free T4	

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Unger et al., 2020, Journal of Hypertension, 38(6)

Hypertensive Emergencies

Clinical presentation	Timeline and target BP	First line treatment	Alternative
Malignant hypertension with or without TMA or acute renal failure	Several hours, MAP −20% to −25%	Labetalol Nicardipine	Nitroprusside Urapidil
Hypertensive encephalopathy	Immediate, MAP −20% to −25%	Labetalol Nicardipine	Nitroprusside
Acute ischaemic stroke and BP >220 mmHg systolic or >120 mmHg diastolic	1 h, MAP −15%	Labetalol Nicardipine	Nitroprusside
Acute ischaemic stroke with indication for thrombolytic therapy and BP >185 mmHg systolic or >110 mmHg diastolic	1 h, MAP −15%	Labetalol Nicardipine	Nitroprusside
Acute hemorrhagic stroke and systolic BP >180 mmHg	Immediate, systolic 130 < BP < 180 mmHg	Labetalol Nicardipine	Urapidil
Acute coronary event	Immediate, SBP <140 mmHg	Nitroglycerine Labetalol	Urapidil
Acute cardiogenic pulmonary edema	Immediate, SBP <140 mmHg	Nitroprusside or Nitroglycerine (with loop diuretic)	Urapidil (with loop diuretic)
Acute aortic disease	Immediate, SBP <120 mmHg and heart rate <60 bpm	Esmolol and Nitroprusside or Nitroglycerine or nicardipine	Labetalol or Metoprolol
Eclampsia and severe pre-eclampsia/HELLP	Immediate, SBP <160 mmHg and DBP <105 mmHg	Labetalol or nicardipine and magnesium sulphate	

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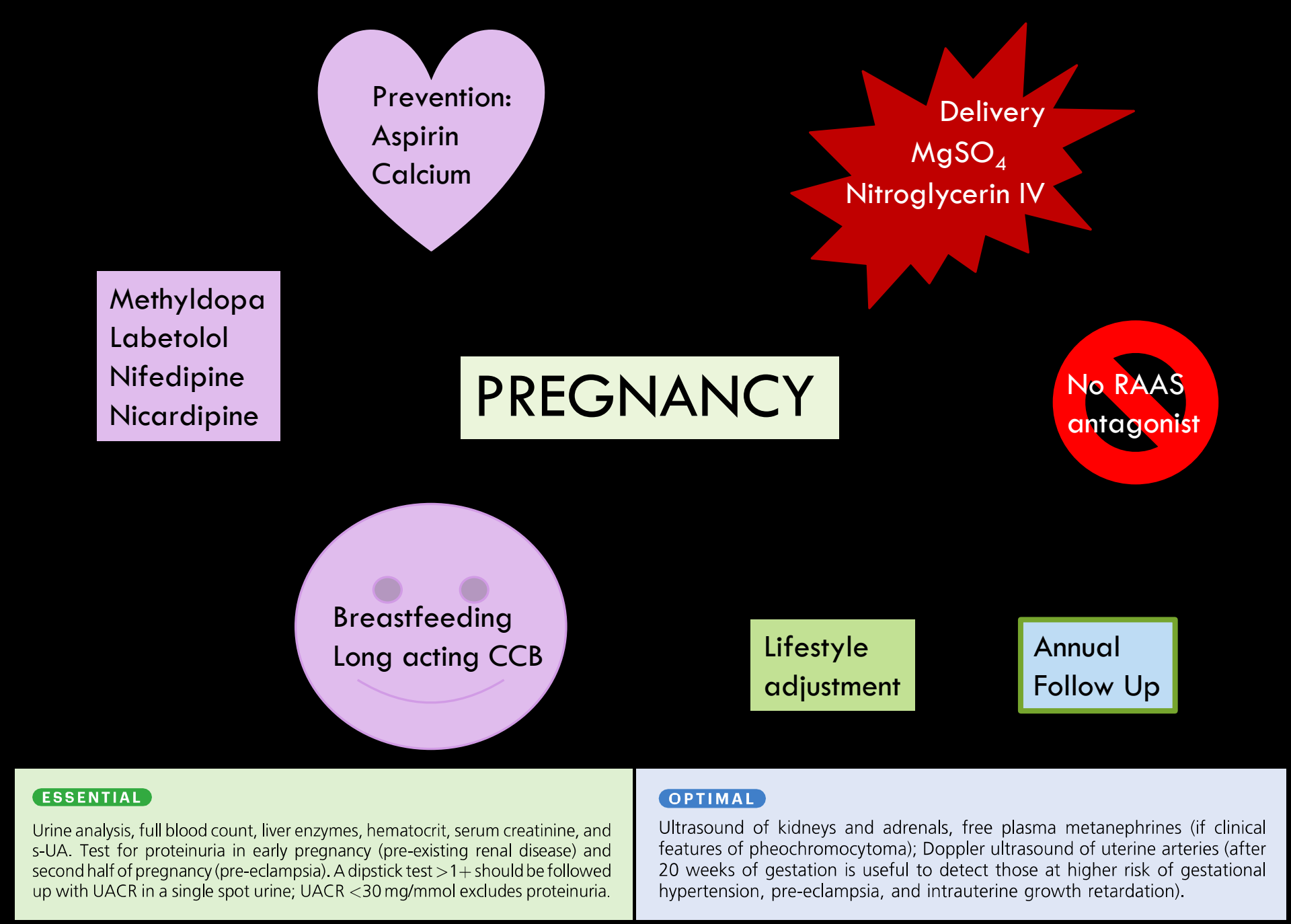
ESSENTIAL **Thorough physical examination:** cardiovascular and neurologic assessment. Laboratory analysis: haemoglobin, platelets, creatinine, sodium, potassium, lactate dehydrogenase (LDH), haptoglobin, urinalysis for protein, urine sediment. **Examinations:** fundoscopy, ECG.

OPTIMAL Additional investigations may be required and indicated depending on presentation and clinical findings and may be essential in the context: Troponins (chest pain), chest X-ray (congestion/fluid overload), transthoracic echocardiogram (cardiac structure and function), CT/MRI brain (cerebral hemorrhage/stroke), CT-angiography thorax/abdomen (acute aortic disease). Secondary causes can be found in 20–40% of patients presenting with malignant hypertension [118] and appropriate diagnostic workup to confirm or exclude secondary forms is indicated.

Unger et al., 2020, Journal of Hypertension, 38(6)



ESSENTIAL

Urine analysis, full blood count, liver enzymes, hematocrit, serum creatinine, and s-UA. Test for proteinuria in early pregnancy (pre-existing renal disease) and second half of pregnancy (pre-eclampsia). A dipstick test >1+ should be followed up with UACR in a single spot urine; UACR <30 mg/mmol excludes proteinuria.

OPTIMAL

Ultrasound of kidneys and adrenals, free plasma metanephrines (if clinical features of pheochromocytoma); Doppler ultrasound of uterine arteries (after 20 weeks of gestation is useful to detect those at higher risk of gestational hypertension, pre-eclampsia, and intrauterine growth retardation).

Unger et al., 2020, Journal of Hypertension, 38(6)

AFRICA

HPT & HMOD
Younger age

Stroke

Night HPT

RHT

Kidney disease

Heart failure

Mortality

↓ RAAS
Δ Renal handling of Na^+
↑ CV reactivity
↑ Vascular aging

Screen over 18 y annually

Lifestyle: DASH and ↓ salt

CCB & Thiazide-like diuretic (angioedema with ACEi)

*HMOD, hypertensive major organ damage

Unger et al., 2020, Journal of Hypertension, 38(6)

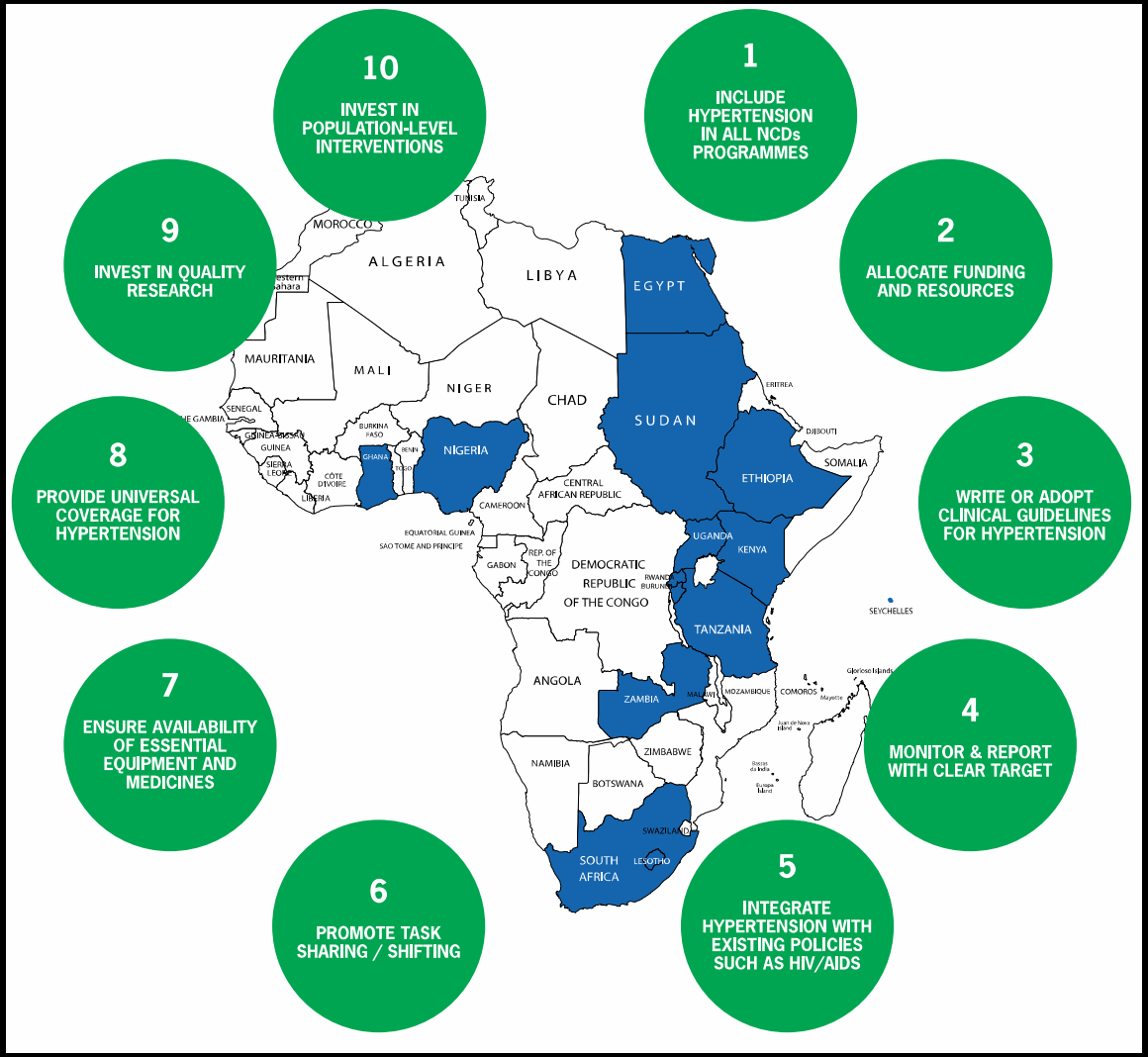
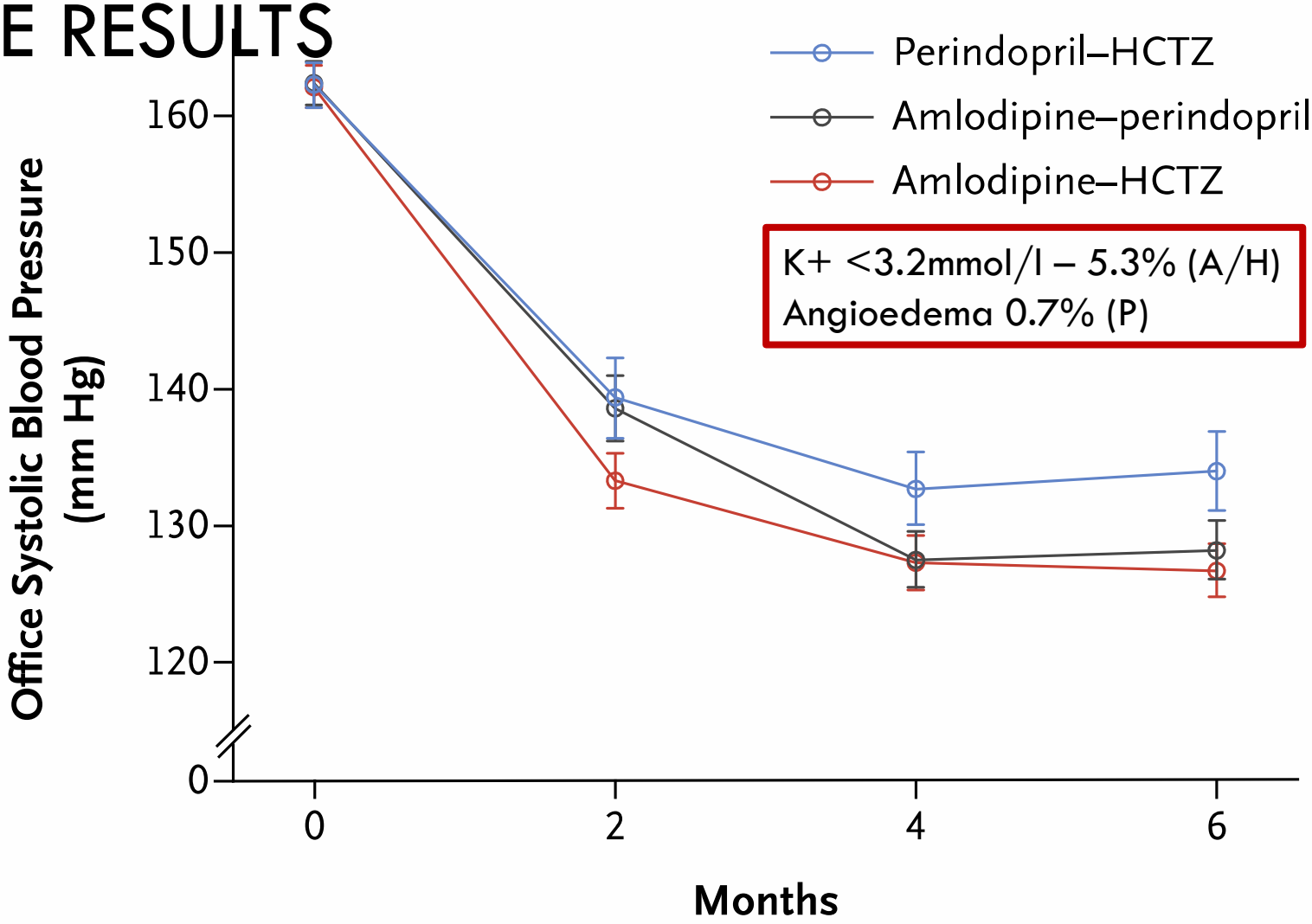


Fig 4. 2015 map of African countries with evidence of existing clinical practice guidelines for hypertension management and 10 actions to reduce the hypertension burden in Africa

Dzudie et al., CVJA 2017 28(4); 262

CREOLE RESULTS

Ojji *et al.*,
NEJM 2019



No. at Risk				
Perindopril–HCTZ	224	224	214	204
Amlodipine–perindopril	225	225	214	207
Amlodipine–HCTZ	231	231	224	223

	Duration of Action (h)	t ½ (h)	Starting Dose (mg)	Cost* (Rands)
HCTZ	6-12	5.6-14.7	12.5	14
Indapamide	8-12	14-25	2.5 (1.5)	18 (44)
Furosemide	6-8	0.5-1	40 bd	10
Enalapril	12-24	2 (35-38)	5	24
Perindopril	24	1.5-3 (3-10)	4	50
Lisinopril	24	12	5	25
Telmisartan	<24	24	40	130
Candasartan	>24	5-9	8	143
Irbesartan	24	11-15	150	73
Losartan	24	1.5-2 (6-9)	50	63
Valsartan	24	6-9	80	99
Amlodipine	>24	30-50	5	63
Nifedipine	24	2-5	30	154
Felodipine	24	10-16	5	113
Lercanidipine	>24	8-10	10	200

*Not all drugs are equal

Excl. VAT and Dispensing fee

SAMF & MIMS

	Dose	Cost* (Rands)	Addition of drugs (Rands)
Lisinopril/HCTZ	10/12.5	53.40	39
Perindopril/ Indapamide	4/1.25	91.50	68
Enalapril/ HCTZ	20/12.5	92.40	38
Perindopril/Amlodipine	5/5	132.90	113
Perindopril/ Indapamide	4/1.25	91.50	78
Amlodipine/ Losartan	5±50/100	210.37	126
Valsartan/HCTZ	80/12.5	306.78	113
Irbesatan/HCTZ	150/12.5	224.28	87
Telmisartan/ HCTZ	40/12.5	107.90	144
Valsartan/ HCTZ		152.96	113
Losartan/ HCTZ	50/12.5	82.50	77
Amlodipine/ Valsartan	5/160	190	162
Telmisartan/ Amlodipine	40/5	265.61	193
Amlodipine/Valsartan/HCTZ	5/160/12.5	277.68	176

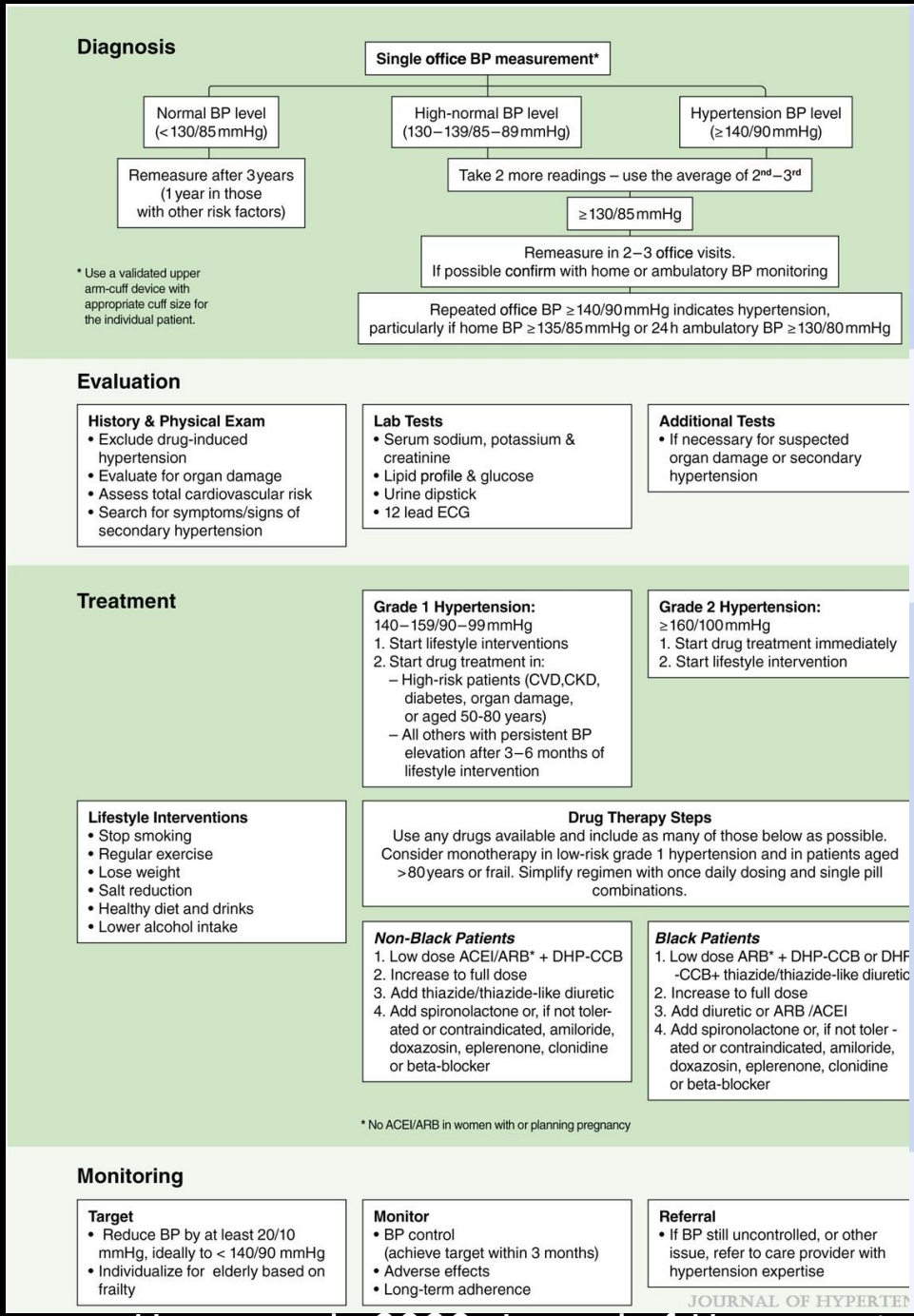
*Not all drugs are equal

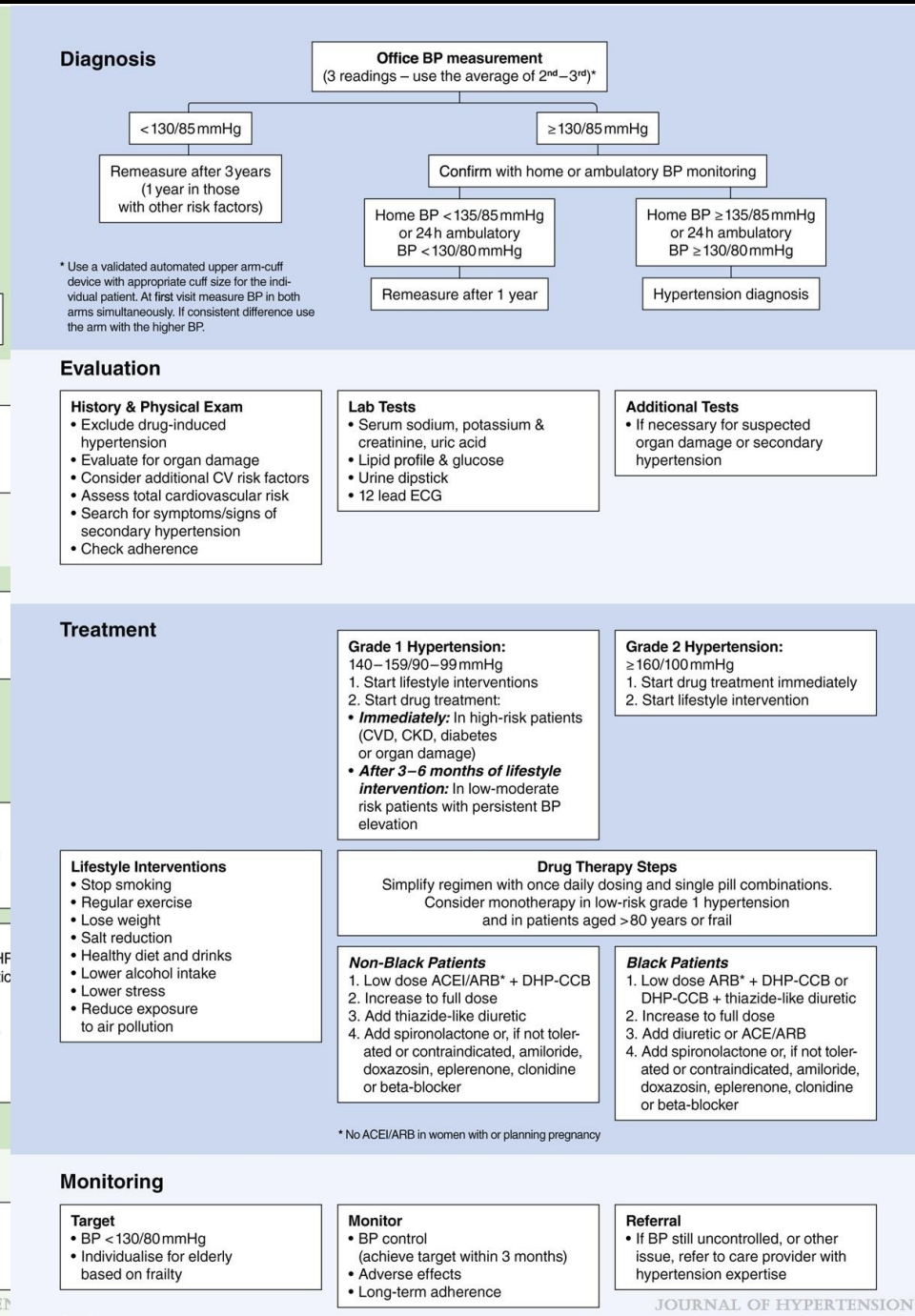
Excl. VAT and Dispensing fee

SAMF & MIMS

WHAT I THINK SAHS SHOULD DO

- Promote multiple readings
- Adopt QRISK2 but chart is essential
- Mandatory tests
- Lifestyle promotion
- CCB & thiazide or CCB/ACEi, SPC if feasible
- Promote adherence
- Screening programmes – crucial to measure BP





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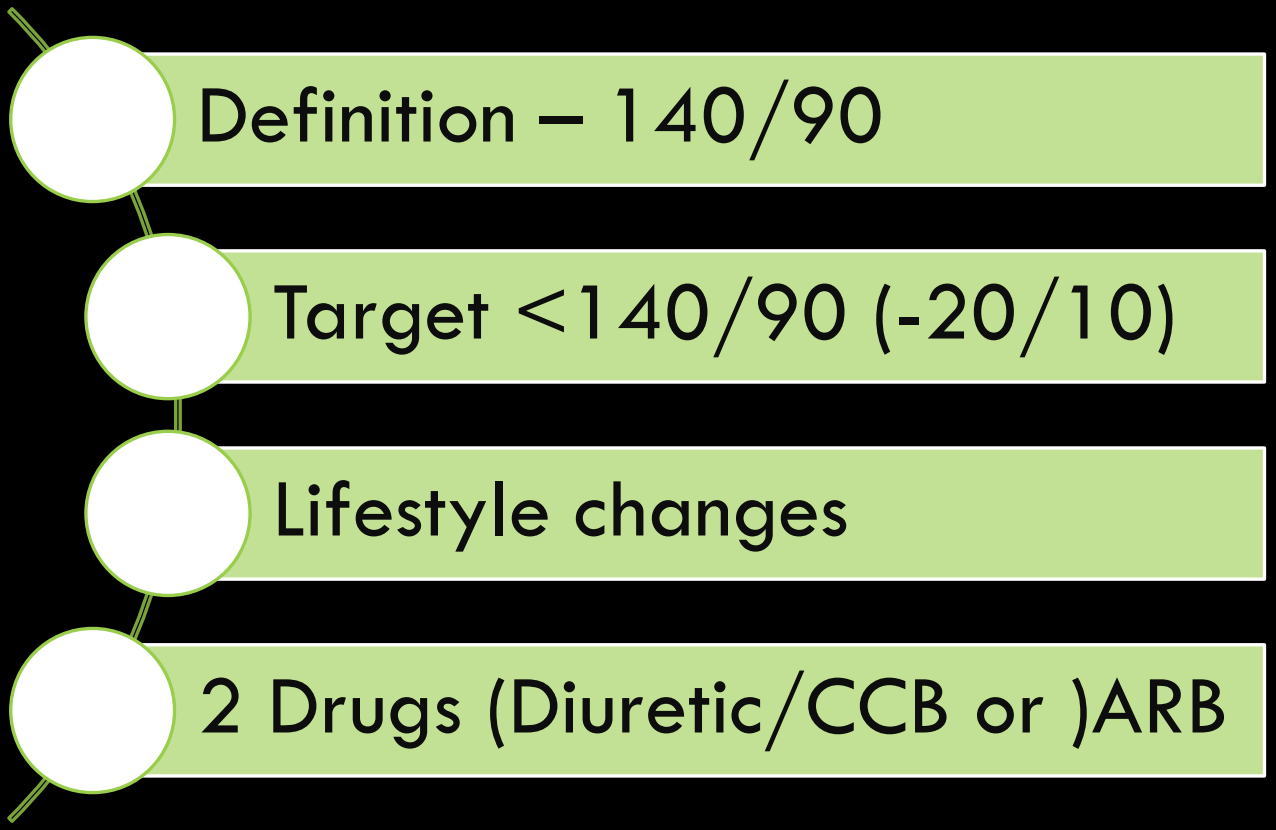
SUMMARY RECOMMENDATIONS



ameliorate poor rates of BP control by promoting simple and effective treatment strategies

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Albertino Damasceno
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Karen Nel
Joh-Ann Nice
Wihan Scholtz

COMMENTS AND QUESTIONS WELCOME

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