National Guideline for Management of Hypertension for Primary Health Care Providers

Directorate of Non-Communicable Diseases
Ministry of Health
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National guideline for management of Hypertension
For Primary healthcare Providers

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To serve as a reference to the doctors managing this common condition at primary healthcare level.

This document was reviewed by the Directorate of NCD to be in line with the National policies, strategies and regulations.

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Abbreviations

ABI	Ankle Brachial Index
ABPM	Ambulatory Blood Pressure Monitoring
ACEI	Angiotensin-Converting-Enzyme Inhibitors
AIS	Acute Ischemic Stroke
ALT	Alanine Transaminase
ARB	Angiotensin Receptor Blockers
AST	Aspartate Transaminase
BB	Beta Blockers
BMI	Body Mass Index
CCB	Calcium Channel Blockers
CVD	Cardiovascular Disease
CKD	Chronic Kidney Disease
CCF	Congestive Cardiac Failure
DBP	Diastolic Blood Pressure
DHP-CCB	Dihydropyridine (DHP) Calcium Channel Blockers
DM	Diabetes Mellitus
ECG	Electrocardiogram
eGFR	estimated Glomerular Filtration Rate
HbA1C	Glycosylated Hemoglobin
HLC	Healthy Lifestyle Centers
HMOD	Hypertension-Mediated Organ Damage
ICH	Intracerebral Hemorrhage
ISH	International Society for Hypertension
LDL	Low Density Lipoprotein
LVF	Left Ventricular Failure
MRA	Mineralocorticoid Receptor Antagonist
NCDs	Non-Communicable Diseases
NSAID	Non-Steroidal Anti-Inflammatory Drugs
OCP	Oral Contraceptive Pills
OPD	Outpatient Department
SBP	Systolic Blood Pressure
SAH	Subarachnoid Hemorrhage
SPC	Single Pill Combinations
TIA	Transient Ischemic Attack
USS	Ultrasound Scan

Introduction

Hypertension is one of the commonest preventable causes of premature morbidity and mortality worldwide and one of the most common medical disorders, associated with increased risk of cardiovascular disease and all-cause mortality. It is the leading risk factor for the global burden of diseases.

Primary hypertension is known to affect one out of every four Sri Lankan adults and the prevalence is strongly influenced by advancing age and lifestyle factors. As the demographics of Sri Lanka is shifting towards an older population, the prevalence of hypertension and the requirement for its treatment will continue to rise. The National STEPS (2015) survey reported that 25.4% of Sri Lankan men and 26.7% of women were hypertensive and it was also found out that 31% of the population had never had their blood pressure checked.

Objectives of the Guidelines

To identify and manage patients with hypertension in primary health care institutions in a sustainable and cost-effective manner, thereby reducing the burden on the secondary/tertiary health care system in the country.

This guideline is intended for the use of Medical Officers at primary medical care institutions in Sri Lanka.

Chapter 1

1.1 Definition and Grading of Hypertension

Definition

Hypertension is defined as clinic systolic BP (SBP) ≥140 mmHg and/or diastolic BP (DBP) ≥ 90 mmHg following repeated examination

1.2 Grading of hypertension

There is a continuous association between higher BP and increased cardiovascular disease (CVD) risk. The classification is based on the BP-related CVD risk and the benefit of BP reduction as shown in clinical trials.

Table 1.1: Grading of Hypertension

Category	**Systolic (mmHg)**		**Diastolic (mmHg)**
Normal BP	<130	and	<85
High-normal BP	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	≥160	and/or	≥100
Isolated systolic hypertension	≥140	and	<90

Source: 2020 ISH Guideline

- ❖ Note: When an individual's systolic and diastolic BP falls into different categories, the patient is categorized according to the higher BP reading.

High-normal blood pressure

A systolic blood pressure 130-139mmHg and/or a diastolic blood pressure 85-89mmHg identifies people with high-normal blood pressure who would benefit from lifestyle intervention to prevent progression to established hypertension.

Assessment of cardiovascular disease risk is important in this group during evaluation to decide on optimum management and patients with high-normal blood pressure require follow-up to detect development of hypertension.

Isolated systolic hypertension

Isolated systolic hypertension is defined as elevated SBP (≥ 140mmHg) in the presence of normal/low DBP (<90mmHg). This entity is common among elderly and young individuals including children and adolescents

Primary hypertension

- Primary hypertension develops over time and a combination of risk factors may play a role.

Risk factors associated with primary hypertension are

- Male sex
- Aging
- Overweight or obesity
- Dyslipidemia
- Diabetes/ insulin resistance
- Family history of early-onset hypertension
- Sedentary lifestyle
- Stress
- High sodium intake
- High alcohol intake
- Low potassium intake
- Low calcium intake

Secondary hypertension

- Secondary hypertension is defined as hypertension due to a specific cause of increased blood pressure, which may be treatable with an intervention specific to the cause.

1.3 Measurements of blood pressure

1.3.1 Steps to be taken prior to the measurement of BP:

- The patient should avoid caffeine, exercise and smoking for at least 30 min before BP measurement.
- Ensure the patient has emptied the bladder.
- Patient should be seated comfortably on a chair, feet touching the floor in a quiet environment for 5 min before beginning BP measurements.
- Remove all the clothing covering the location of cuff placement.
- Neither patient nor observer should talk during the period of rest and measurement
- Use a standard bladder cuff (12-13cm wide and 35cm long) for most patients but have wider and smaller cuffs available as the inappropriate cuff size can lead to inaccurate BP reading.
- The cuff should be positioned at the level of the heart, with the back and arm supported to avoid muscle contraction and legs should be uncrossed.
- For manual auscultatory devices, the cuff should cover 75-100% of the individual's upper arm circumference. For electronic devices, the device instructions should be followed.

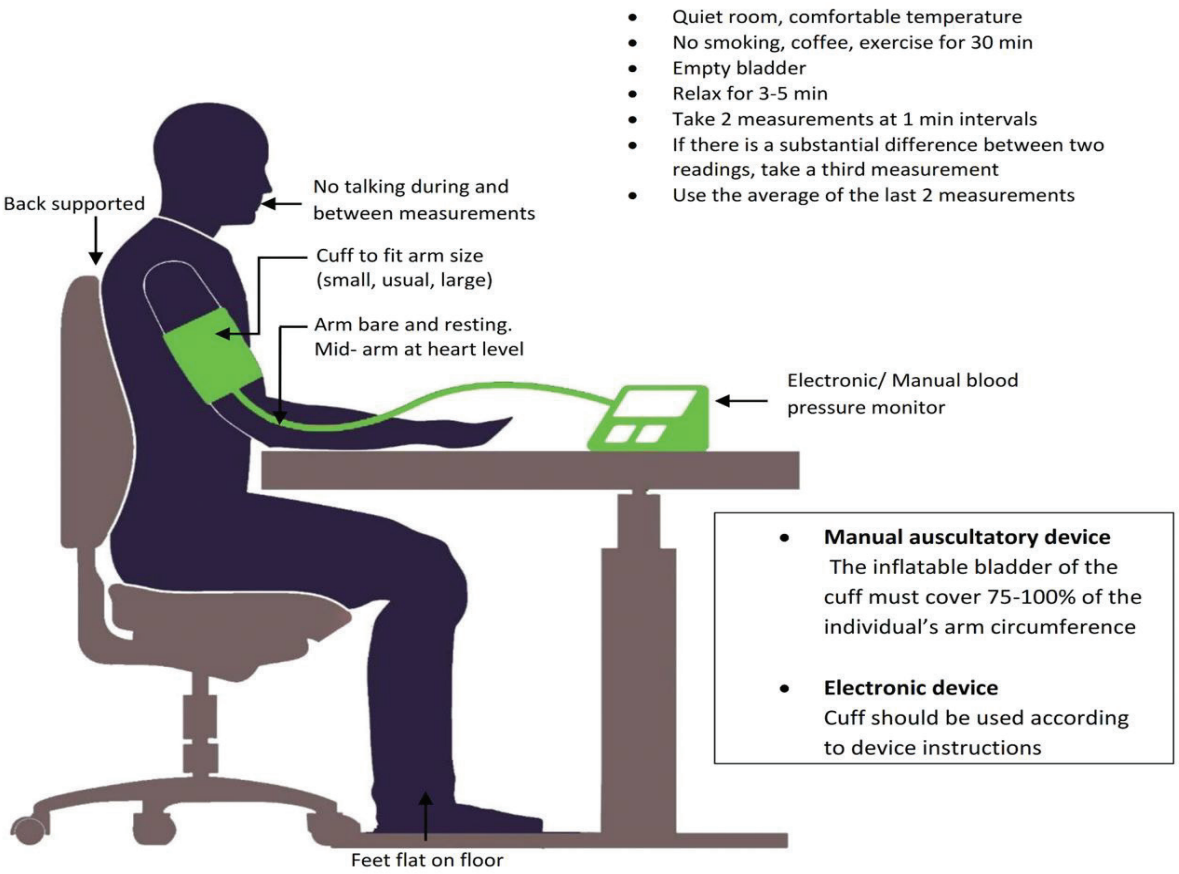


Figure 1.1 : Steps to be taken before and during the measurement of blood pressure

1.3.2 Steps to be followed during BP Measurement:

- When using auscultatory methods, use phase I and V Korotkoff sound to identify SBP and DBP respectively.[1]
- Two BP measurements should be recorded 1-2 minutes apart and if there is a substantial difference between the two readings, a third BP measurement should be taken. Record the average of the last two blood pressure measurements as the clinic blood pressure.
- BP should be measured in both upper arms. If there is a consistent and significant difference in BP between arms (i.e. >10 mmHg) the arm with higher BP reading should be used for subsequent measurements. If the difference of blood pressure is >20 mmHg in both arms consider further investigations.
- If the pulse is irregular, BP should be measured using direct auscultation over the brachial artery.

[1] Consider including getting the SBP with pulse or inflating initially to 180mmHg to avoid wrong SBP readings in patients with auscultatory/ silent gap

- In older people, those with DM or with symptoms of orthostatic hypotension:
    - BP should be measured in a supine or seated position
    - 1 min and 3 min after standing
    - A drop in SBP of ≥ 20 mmHg or in DBP of ≥ 10 mmHg within 3 minutes of standing is defined as orthostatic hypotension and is associated with an increased risk of CV events.
    - In people with a significant postural drop or symptoms of postural hypotension blood pressure target should be based on standing blood pressure.

Chapter 2

2.1 Diagnosis of hypertension

Diagnosis of hypertension and follow up is commonly based on clinic blood pressure* (BP) measurements.

The diagnosis of hypertension should not be made on a single clinic visit unless the BP is substantially elevated (≥180/110 mmHg) and/or there is evidence of hypertension mediated organ damage (HMOD).

Repeat BP measurements at repeat clinic visits are required to confirm the diagnosis of hypertension. The number of clinic visits and the time interval between visits are determined by the degree of BP elevation.

Patients with a substantial elevation of BP (e.g. Grade 2) require fewer clinic visits and shorter time intervals between visits (i.e. a few days or weeks) for the confirmation of the diagnosis. Conversely, repeat BP measurements extended over a few months may be required for the confirmation of diagnosis in patients with BP readings in the Grade 1 range without evidence of HMOD

*Clinic blood pressure measurement includes readings taken in OPD, medical clinics and Healthy Lifestyle Center (HLC).

2.2 Blood Pressure measurements and Recommendations

Table 2.1: Blood pressure measurements and recommendations

Clinic BP levels	**Recommendation/action**
<120/80mmHg	Repeat BP at least annually
120-129/80-84 mmHg	Repeat at least annually
130-139/85-89 mmHg	Repeat BP at least annually. Consider out of clinic BP measurements to exclude masked *hypertension
140-159/90-99mmHg	Repeat clinic BP measurements within 2 to 4 weeks to confirm the diagnosis of hypertension
160-179/100-109 mmHg	Repeat blood pressure within two weeks to confirm the diagnosis
≥180/110 mmHg	Confirm diagnosis if there is evidence of HMOD **(Hypertension-mediated organ damage) Repeat measurements within 1 week if there is no evidence of HMOD to confirm the diagnosis

* **Masked hypertension**: Masked HT is the term used for patients with elevated BP recordings only in the out-of-clinic blood pressure (BP) recordings, while the clinic recordings are within normal range.

HMOD: HMOD is the damage that occurs in the brain, the heart, the kidneys, central and peripheral arteries and retina due to hypertension. HMOD is more common with longstanding hypertension and severe hypertension. However, HMOD can occur in patients with less severe hypertension.

HMOD can be reversed with the initiation of antihypertensive treatment, especially if the treatment is initiated early. However, with long-standing hypertension HMOD may become irreversible despite improved blood pressure control.

2.3 HMOD – Hypertension Mediated Organ Damage

Taking a focused history, relevant physical examinations and review available investigations would help in identifying HMOD (Refer table 2.2)

Table 2.2: Identifying features of HMOD in history, physical examination and laboratory findings

Target organ	History – current or previous	Suggestive physical examination findings	Prior investigation findings of HMOD
Brain	TIA Stroke (ICH, AIS, SAH) Dementia / memory impairment	Face, arm, leg weakness Dysphasia/dysarthria Hemiplegic gait Visual field defect	Brain imaging - old stroke
Heart and blood vessels	ACS, IHD (angina/CABG/stenting), CCF/LVF AF Aortic dissection Intermittent claudication	Pulses – irregularly irregular Low volume/absent distal pulses Apex - displaced Lung bases- fine crepitation Legs- chronic limb ischemia	ECG-AF, old MI, LVH CXR – cardiomegaly Echo- LVH ABI-<0.9
Kidneys	CKD (oedema, tiredness, Dialysis etc.)	Oedema	Proteinuria, Raised serum creatinine USS- small kidneys
Eyes	Blurred vision, visual field defects, blindness (usually late)	Advanced retinopathy (retinal hemorrhages, micro aneurysms, hard exudates, cotton wool spots and papilledema)	Fluorescein angiography

ABI-ankle brachial index, AIS- acute ischemic stroke, CCF- congestive cardiac failure, CKD-chronic kidney disease, ICH- intracerebral hemorrhage, LVF- left ventricular failure, LVH- left ventricular hypertrophy, SAH-subarachnoid hemorrhage, TIA - transient Ischemic attack, USS - ultrasound scan.

2.4 Clinical assessment

2.4.1 To look for features of HMOD: refer to table 2.2

2.4.2 To look for Secondary hypertension

2.4.2.1 Evaluation of a patient for evidence of secondary hypertension

- Secondary hypertension is defined as hypertension due to a specific cause of increased blood pressure, which may be treatable with an intervention specific to the cause.
- Screening all hypertensive patients for secondary hypertension is not feasible or cost-effective.
- If there are clinical features suggestive of an underlying cause for hypertension (see Table 2.3), they should be referred to a specialist for further investigations and management.

Table 2.3: Features suggestive of secondary hypertension

History	• Young age (<40 years) • Acute worsening of hypertension in a previously well-controlled blood pressure • History suggestive of obstructive sleep apnea (increased BMI, snoring, daytime sleepiness, gasping or choking at night, witnessed apneas during sleep) • History suggestive of renal disease (hematuria, proteinuria) • Features suggestive of pheochromocytoma (episodes of paroxysmal hypertension, headache, sweating and palpitations) • Long term medications (NSAIDs, combined OCP, antidepressants, steroids) • Recreational substances abuse
Clinical Examination	• Features of CKD (anemia, oedema) • Presence of renal bruit • Renal mass • Delayed radial- femoral pulsation suggestive of coarctation of aorta • Features of acromegaly (enlarged face, hands and feet, protrusion of jaw, large tongue) • Features of Cushing syndrome (moon face, central obesity, skin atrophy, striae, and bruising; chronic steroid use)
Investigations	• Urine full report: hematuria, proteinuria • Persistent hypokalemia • Elevated serum creatinine

2.4.3 Cardiovascular risk stratification

Assess cardiovascular risk

- Screening for and management of modifiable CVD risk factors are recommended in adults with hypertension.
- Those with established CVD (coronary artery disease. stroke, TIA, peripheral vascular disease), CKD and DM are considered as having high CVD risk
- In the absence of above three disease conditions, the global cardiovascular risk of the individual i.e. the likelihood of a person developing a CV event (coronary heart disease, stroke or other atherosclerotic disease) over a 10-year period should be assessed using WHO/ISH chart (**Annexure 1**)

2.5 Diagnostics

Investigations should include basic laboratory tests and additional diagnostic tests when indicated.

Basic laboratory tests

Basic laboratory tests should be performed in all patients with hypertension.

- Fasting blood glucose
- Total cholesterol
- 12-lead ECG
- Urine protein

If facilities are available

- Urine full report or urine dipstick
- Lipid profile is preferred
- Serum creatinine and calculate eGFR
- HbA1c
- Haemoglobin and/or haematocrit
- Serum electrolytes
- ALT/AST

2.6 Criteria for referral to a specialist

- Suspected secondary hypertension based on history and examination
- HMOD: proteinuria, advanced hypertensive retinopathy, new-onset CVD, CKD etc.
- Hypertension in young (age <40 years)
- Suspected white-coat hypertension* / masked hypertension **(when ABPM is required)
- Resistant hypertension***

***White coat hypertension:** White coat hypertension is the clinical condition when individuals who have BP readings that are consistently higher than normal only in the clinical setting, while the readings recorded outside, either by ambulatory monitoring or self-measurement at home, are normal.

****Masked hypertension**: Masked HT is the term used for patients with elevated BP recordings only in the out-of-clinic blood pressure (BP) recordings, while the clinic recordings are within normal range.

*****Resistant hypertension:** Hypertension not controlled (SBP >140 mmHg and/or DBP >90) by appropriate lifestyle measures and treatment with optimal or best-tolerated doses of three or more drugs, which should include a diuretic in patients whose adherence to therapy has been confirmed.

2.7 Criteria for immediate admission for specialist care

- Hypertensive emergency: An elevated SBP ≥180 mmHg and/or DBP ≥120 mmHg, with evidence of acute HMOD. Parenteral treatment is recommended for management of hypertensive emergencies.

Chapter 3

3.1 Interventions for hypertension at primary care settings

Treatment of hypertension includes lifestyle and pharmacological interventions. The appropriate time of initiation of treatment and type of intervention, either lifestyle modifications alone or with drug therapy, depends on the grade of HT, CVD risk level and presence of HMOD.

All those who are confirmed to have hypertension should receive appropriate lifestyle interventions.

3.2 Lifestyle interventions

- Encourage the intake of vegetables, fruits, whole grains and protein from plant sources or fish.
- Reduce intake of foods high in sugar, saturated and trans-fats.
- Individualize the eating pattern in a locally and culturally acceptable manner.
- Limit the daily salt intake to 5g (1 teaspoon). This can be achieved by avoiding addition of salt to rice and minimizing intake of high-salt food items such as soy sauce, yeast extract spreads, salt-added snacks, sausages and fast foods. When cooking dried fish it is advisable to cook it after washing several times to remove salt
- Educate patients that salt is found in many processed foods including bread. Look at the food label to identify the salt content in these foods.
- Individuals who are overweight or obese (body mass index more than or equal to 23 kgm^2) to lose 5-10% of their current body weight in 3 to 6 months and maintain it thereafter.
- Minimize abdominal obesity by keeping waist circumference less than 80cm and 90cm in females and males, respectively.
- Recommend avoiding tobacco use or cessation of all forms of tobacco use.
- Recommend avoiding alcohol consumption or cessation of all forms of alcohol use
- Engage in moderate intensity aerobic exercise (e.g.: brisk walking, cycling, swimming and gardening) for 30 minutes at least on 5 days every week.
- Engage in resistance exercises on 2 to 3 days per week.

3.3 Pharmacological interventions

- Immediate initiation of pharmacological interventions is indicated for:
    - **Grade 2 hypertension**
    - **Grade 1 hypertension with high cardiovascular risk (≥20%)**

- First line medications include **ACEI/ARB, DHP-CCB** and **thiazides/thiazide-like diuretic**

- Appropriate antihypertensive drugs should be selected considering compelling indications, contraindications, conditions that require the careful use of drugs, and the presence or absence of complications

- A stepwise approach is recommended for pharmacological interventions

3.4 Recommendations

When to start pharmacological interventions

3.4.1 Grade 1 hypertension in adults with low to moderate cardiovascular risk (<20%) and has no CVD, DM, CKD or HMOD even after 3-6 months of lifestyle interventions, and if BP not controlled, start antihypertensive drug treatment

3.4.2 Grade 1 hypertension in adults with high cardiovascular risk (≥20%)

Upon confirmation of hypertension, initiate immediate antihypertensive drug treatment in addition to lifestyle advice if any of the following are present.

- Cardiovascular disease (CVD)
- Diabetes mellitus (DM)
- Chronic kidney disease (CKD)
- Hypertension-Mediated Organ Damage (HMOD)
- High cardiovascular risk (estimated 10-year risk ≥20% with WHO/ISH risk assessment tool)

3.4.3 Grade 2 Hypertension (BP ≥160/100mmHg)

Upon confirmation of Grade 2 hypertension initiate immediate antihypertensive drug treatment in addition to lifestyle advice.

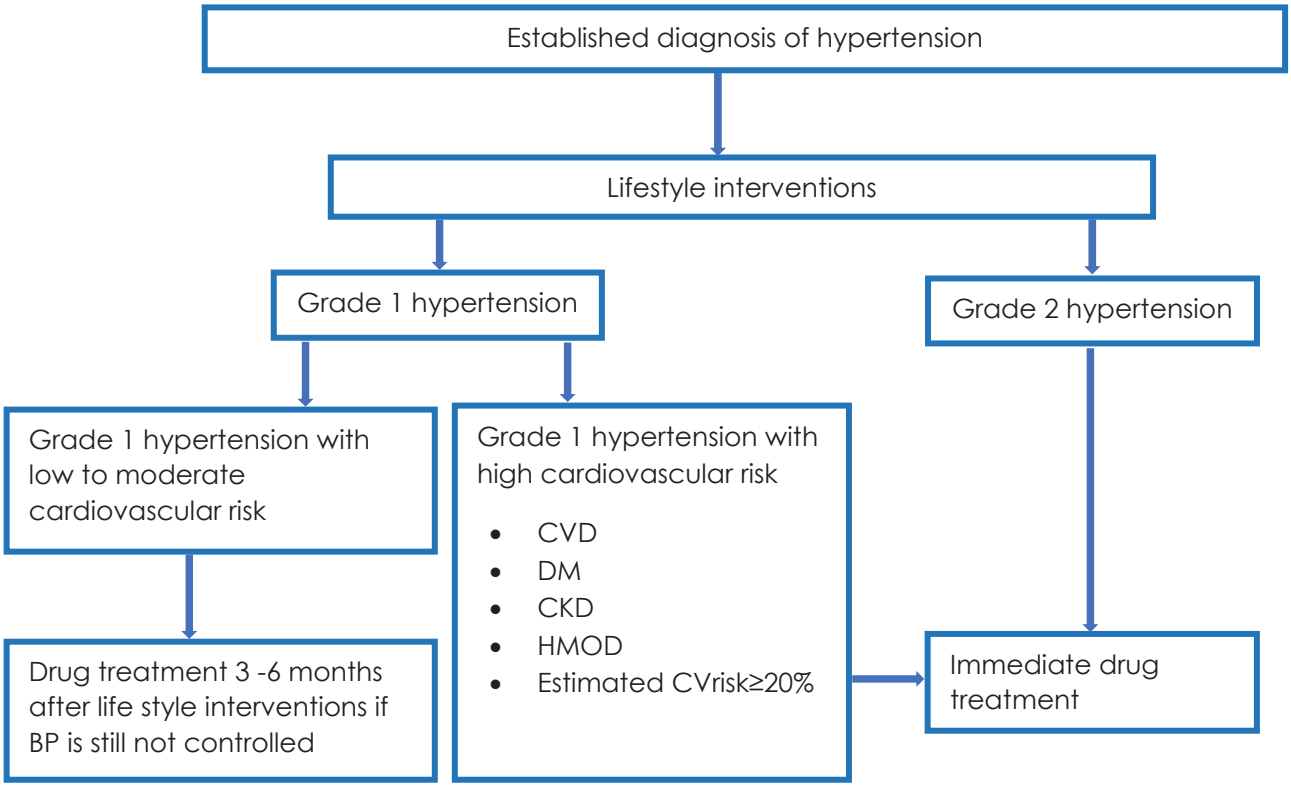


Figure 3.1: Therapeutic Option of Management of Hypertension

3.5 How to approach pharmacological interventions

Stepwise approach to pharmacological interventions is recommended.
Before moving to the next step, check adherence to lifestyle and drug treatment.

- **Monotherapy** is recommended as Step 1 treatment in low-risk Grade 1 hypertension, very old (>80 years), and in frail individuals
- **Initial dual low-dose combination therapy** is the optimal recommended treatment in other patient categories at Step 1 treatment
- **Dual full-dose combination** is recommended for Step 2 in those with inadequately controlled hypertension with Step 1 treatment
- **Three-drug combination** is required for patients with poorly controlled hypertension with step 2 treatment.
- When BP is poorly controlled with three-drug combination (i.e. resistant hypertension) refer to the specialist clinic for further management

3.5.1. Stepwise approach

Step 1

- **Monotherapy**
    1. Monotherapy is particularly indicated for low risk Grade 1 hypertension, patient's ≥ 80 years, patients with frailty
    2. Monotherapy with an ACEI/ARB or a DHP-CCB* or a thiazides**/thiazide-like diuretics
    3. ACEI/ARB and thiazides**/thiazide-like diuretics are preferred in post-stroke, heart failure and CCB intolerance

➢ If BP target is not achieved within 4 to 8 weeks with low dose monotherapy

I. Increase dose of monotherapy

OR

II. Start on dual low dose combination

- **Dual low-dose combination:**

Optimal step 1 treatment is dual low-dose combination *(low dose generally refers to half of the maximmum recommended dose)* except in those with low-risk Grade 1 hypertension, those aged ≥ 80 years and those who are frail.

Desirable combinations of antihypertensive drugs include:

- Angiotensin-converting enzyme inhibitors (ACEI)/ Angiotensin receptor blockers (ARB)and Dihydropyridines Calcium Channel Blockers (DHP-CCB*)
- ARB/ACEI and thiazides**/thiazide-like diuretics
- Thiazides**/thiazide-like diuretics and DHP-CCB*

**use non-DHP-CCB (e.g. diltiazem, verapamil) if DHP-CCB are not available or not tolerated*

***use thiazides if thiazide-like diuretics are not available*

Step 2

- **Dual full-dose** (i.e. maximum tolerated therapeutic dose) **combination** with:
    - ACEI/ARB and DHP-CCB* *or*
    - ACEI/ARB and thiazides**/thiazide-like diuretics *or*
    - Thiazides**/thiazide-like diuretics and DHP-CCB*

  **use non-DHP-CCB (e.g. diltiazem, verapamil) if DHP-CCB are not available or not tolerated*

  ***use thiazides if thiazide-like diuretics are not available*
- Dual full-dose combination with ACEI / ARB + thiazides /thiazide-like diuretics is preferred in post-stroke, heart failure and CCB intolerance

Step 3

- **Three-drug combination** with:
  ACEI/ARB + DHP-CCB* + thiazides** / thiazide-like diuretics
  **Use non-DHP-CCB (e.g. diltiazem, verapamil) if DHP-CCB are not available or not tolerated*
  ***use thiazides if thiazide-like diuretics are not available*

In all the steps, **beta blockers** should be considered in the regimen in those with:

- Heart failure*
- Coronary artery disease
- Atrial fibrillation
- Pregnancy or planning to become pregnant**

**the beta blockers recommended in heart failure include carvedilol, metoprolol and bisoprolol only*
***the beta blocker recommended in pregnancy is labetalol*

3.6 Important points related to drug treatment

- Those with isolated systolic hypertension should receive the same treatment as individuals with both raised systolic and diastolic blood pressure.
- Women considering pregnancy or who are pregnant should receive treatment in line with the recommendations from a specialist clinic
- When choosing a drug, attention should be paid to the contraindications. (see Table 3.1)
- Combination of an ACEI with an ARB is not recommended.
- Using once-daily regimen which provides 24-hour blood pressure control is ideal
- Use of single pill combinations (SPCs) is preferred; use free combinations if SPCs are not available or unaffordable
- Treatment should be affordable and/or cost-effective
- Treatment should be well-tolerated

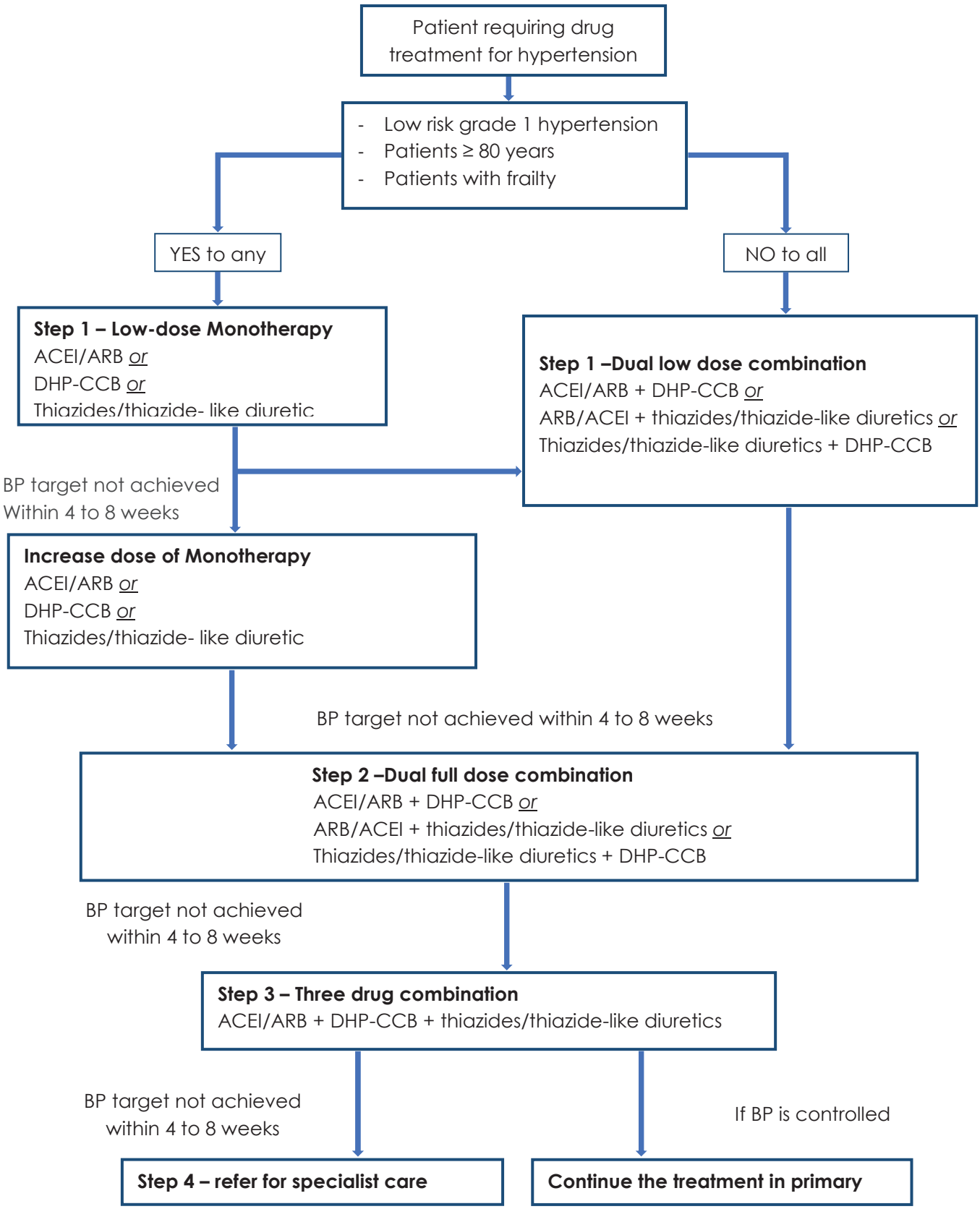


Figure 2.2 : Stepwise approach to management of Hypertension

In all the steps, **beta blockers** should be considered in the regimen in those with:

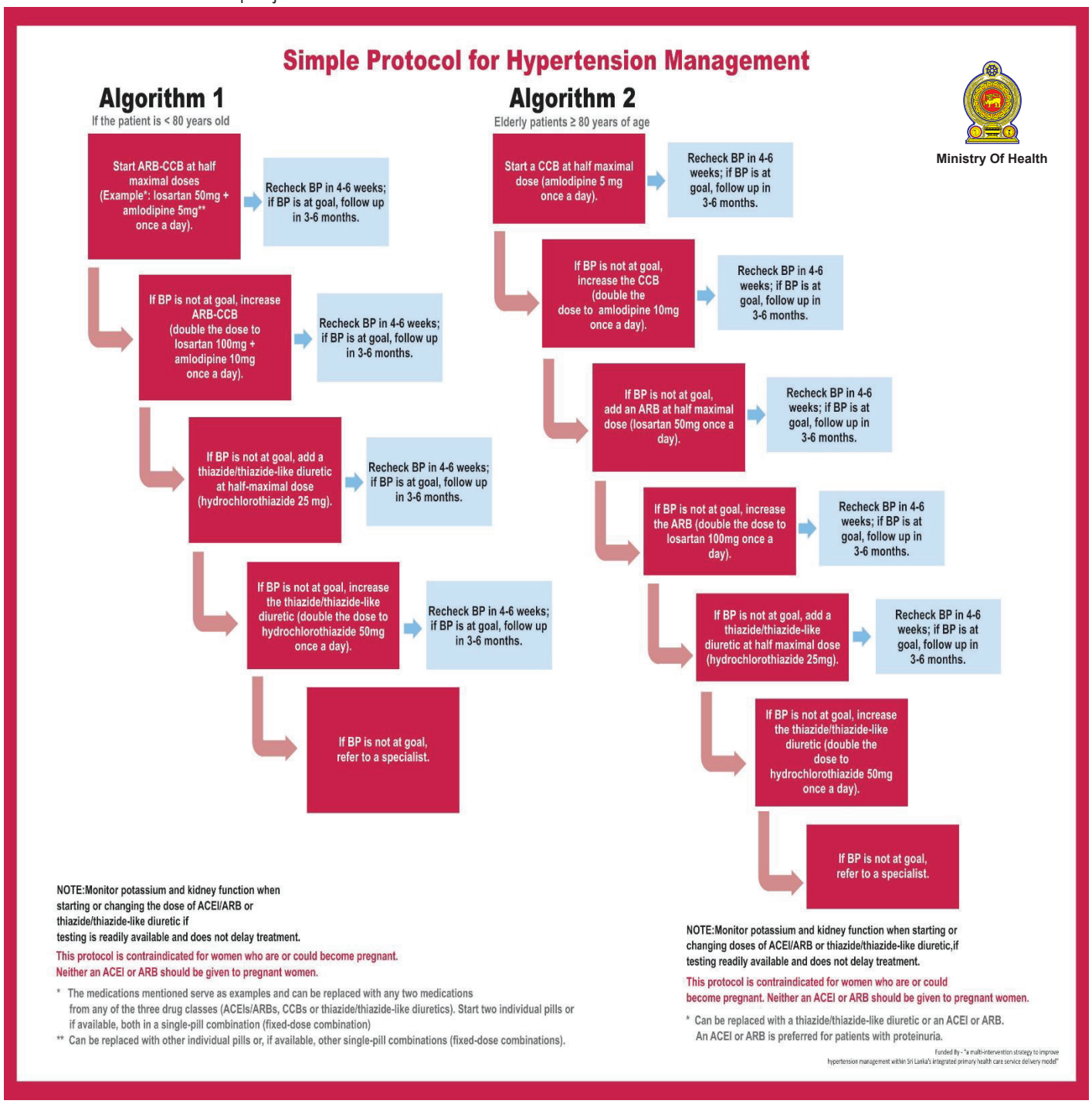
- Heart failure*
- Coronary artery disease
- Atrial fibrillation
- Pregnancy or planning to become pregnant**

**the beta blockers recommended in heart failure include carvedilol, metoprolol and bisoprolol only*
***the beta blocker recommended in pregnancy is labetalol*

Adapted version of WHO protocol

World Health organization has recently published a protocol for primary care institution in 2021

The flow chart adapted from WHO protocol currently piloted in Kaluthara district under the "Resolve to Save Lives" project.



Depending on the success of this pilot it can be adapted after obtaining consensus from all relevant stakeholders. https://apps.who.int/iris/bitstream/handle/10665/344424/9789240033986-eng.pdf

- **Drug doses are in Annexure 2**
  ***Prescribe the drug according to the availability at your institution**

Table 3.1: Contraindications for antihypertensive drugs

Drug class	Contraindications	Careful administration
ACE inhibitors	• Pregnancy • Angioneurotic oedema • Bilateral renal artery stenosis • Hyperkalaemia	
ARBs	• Pregnancy • Bilateral renal artery stenosis • Hyperkalaemia	
β-blockers	• Asthma • Pulse rate less than 50 bpm • Second and third-degree heart block • Untreated pheochromocytoma	• Impaired glucose tolerance • Obstructive pulmonary disease • Peripheral arterial disease
Dihydropyridine CCBs e.g. amlodipine, nifedipine	• Tachyarrhythmia • Myocardial infarction within 1 month • Significant aortic stenosis	
Non-dihydropyridine CCBs e.g. verapamil, diltiazem	• Pulse rate less than 50 bpm • Second- and third-degree heart block • Heart failure	
Thiazide diuretics	• Conditions where sodium and potassium are markedly decreased	• Gout • Pregnancy • Impaired glucose tolerance
Mineralocorticoid receptor antagonist e.g. spironolactone	• Hyperkalemia • eGFR <30ml/minute/1.73m^2	• Concomitant use of ACEI/ARB
Alpha blockers	• History of postural hypotension • History of micturition syncope	

3.7 Achieving BP Targets

Recommendations

1 It is recommended that the first objective of treatment should be to lower BP to <140/ 90 mmHg in all patients

2. The systolic blood pressure target should be 120–129 mmHg in patients < 65 years.

3 The systolic blood pressure target should be 130–139 mmHg in patient's ≥ 65 years.

4 In those >80 years, the systolic blood pressure target should be 130-139 mmHg provided the treatment is well tolerated

5 Diastolic blood pressure target should be < 80mmHg (but not less than 70 mmHg) for all hypertensive patients independent of the age, CV risk and comorbidities

6 Measure standing as well as sitting blood pressure in people with hypertension and
- Diabetes mellitus **or**
- Symptoms of postural hypotension **or**
- Age ≥ 80 years.

In people with a significant postural drop or symptoms of postural hypotension, treat to a target blood pressure based on standing blood pressure.

3.8 Follow up assessments

- The response to drug treatment and lifestyle changes should be monitored in all patients with hypertension using clinic blood pressure values every 1 to 2 months, depending on the level of BP.
- Shorter intervals between visits will be needed for symptomatic patients and those with severe hypertension (≥180/110mmHg), intolerance to antihypertensive drugs or HMOD.
- Once the BP target is reached and stable, frequency of reviewing blood pressure and follow up assessments depends on the cardiovascular risk and presence of HMOD.
- A routine follow up assessment should be done annually including assessing CV risk and HMOD.
- Investigations indicated in the follow up assessments include urinalysis, serum creatinine, serum electrolytes, blood glucose and lipid profile/total cholesterol .These could be done at the next higher level of care or through the lab networking system. ECG is required only if clinically indicated.
- When ACEI, ARB, diuretics and aldosterone antagonist are used, serum creatinine and serum electrolytes should be done 4 weeks after initiation of treatment or dose increment* if possible. Thereafter it should be repeated as clinically indicated.

Significant rise in serum creatinine after starting / dose increment of an ACEI /ARB is suggestive of renovascular hypertension; appropriate evaluation and adjustment of treatment is advised. If the serum creatinine is found to be more than **25 % higher than the baseline, **ACEI/ARB** should be substituted.*

3.9 Emphasis on lifestyle intervention

- At each follow up visit the patients should be educated regarding the importance of lifestyle interventions.
- It is advisable to record progress of lifestyle interventions and achievement of targets.
- For further advice on lifestyle intervention please refer to National dietary and physical activity guideline for selected Non-communicable diseases: Chapter 3 for Hypertension specific diet and exercise

3.10 Managing concomitant cardiovascular disease risk

Hypertension without additional risk is not an indication for the use of statins or antiplatelet drugs.

3.10.1 Statin therapy

CV risk assessment should be carried out with the WHO/ISH risk prediction charts in hypertensive patients who are not already at high risk due to established CVD.

Recommendations

1 **Secondary prevention** in patients with established CVD*, high intensity statin therapy is recommended; refer to table 3.2

2 Statin therapy is recommended for **primary prevention** in those with,

- LDL-C ≥190 mg/dL : high intensity statin therapy(refer to table 3.2)
- LDL 70-189 mg/dL and 10-year cardiovascular risk ≥20%: moderate to high intensity statin therapy(refer to table 3.2)

High, Moderate and Low intensity statin therapy

Table 3.2: High, Moderate and Low intensity statin therapy

Statin potency category	Percentage LDL-C reduction	Type & dose of statin
High intensity	>40%	Atorvastatin 20 – 80 mg/d Rosuvastatin 10 – 40 mg/d
Moderate intensity	31 to 40%	Atorvastatin 10 mg/d Rosuvastatin 5mg/d Simvastatin 20 – 40 mg/d
Low intensity	20 to 30 %	Simvastatin 10 mg/d

**CVD includes acute coronary syndromes, stable angina, coronary or other arterial revascularization, stroke, TIA, or peripheral arterial disease presumed to be of atherosclerotic origin*

Please refer to the primary care guideline on dyslipidemia for further clarification on management of dyslipidemia

3.10.2 Antiplatelet therapy

Recommendations

1 Antiplatelet therapy is indicated for the **secondary prevention** in patients with CVD*(Low dose Aspirin 75mg nocte)

2 In hypertension, antiplatelet therapy is not recommended for the primary prevention of CVD*.
**CVD includes acute coronary syndromes, stable angina, coronary or other arterial revascularization, stroke, TIA, or peripheral arterial disease presumed to be of atherosclerotic origin*

3.11 Target SBP and DBP and recommended therapeutic agents

Table 3.3: Target SBP and DBP and recommended therapeutic agents

Patient category	BP target - mmHg	Drugs recommended in order of preference
Adults 18-40 years	SBP <130 (120-129) DBP <80 (70-79)	ACEI/ARB, CCB, thiazide/thiazide-like diuretic BB, MRA, alpha blocker
Adults 41-64 years	SBP <130 (120-129) DBP <80 (70-79)	ACEI/ARB, CCB, thiazide/thiazide-like diuretic BB, MRA, alpha blocker
Adults 65 -80 years	*SBP <140 (130-139) DBP <80 (70-79)	CCB or a thiazide/thiazide-like diuretic preferred ACEI/ARB BB
Adults 80 years and over	*SBP <140 (130-139) DBP <80 (70-79)	CCB or a thiazide diuretic ACEI/ARB BB
Patients with diabetes <65 years	SBP<130 (120-129) DBP <80 (70-79)	ACEI/ARB or a CCB or thiazide/thiazide-like diuretic
Patients with diabetes >65 years	SBP <140 (130-139) DBP <80 (70-79)	ACEI/ARB or a CCB or thiazide/thiazide-like diuretic
Patients with diabetes with albuminuria	SBP<130 (120-129) DBP <80 (70-79)	ACEI/ARB, non-DH-CCB, thiazide/thiazide-like diuretic
Patients with coronary heart disease <65 years	SBP <130 (120-129) DBP <80 (70-79)	BB, ACEI/ARBs DHP-CCB thiazide/thiazide-like diuretic, MRA
Patients with coronary heart disease >65 years	SBP ≤140 (130-140) DBP <80 (70-79)	BB, ACEI /ARBs DHP-CCB
Patients with heart failure HFrEF & HFpEF	SBP <130 (120-129) DBP <80 (70-79)	ACEI/ARB, beta blocker and thiazide/thiazide-like diuretic/loop-diuretic and/or MRA ARNI/SGLT2i if indicated
Patients with CKD	SBP 130 DBP 80	ACEI/ARB, thiazide/thiazide-like diuretic (eGFR>30 ml/min/1.73m2) / Loop diuretic (eGFR<30

		ml/min/1.73m2) CCB **MRA
Patients with CKD with proteinuria (≥30 mg/g)	SBP 130 DBP 80	ACEI/ARB Non-DHP-CCB
Patients after renal transplant	SBP<130 (120-129) DBP <80 (70-79)	ACEI/ARB
Patients with cerebrovascular disease	SBP≤130 (120-130) DBP <80 (70-79)	ACEI/ARB, CCB, thiazide/thiazide-like diuretic

*If tolerated;
**caution with hyperkalemia not recommended when eGFR <30 ml/min/1.73m2
The information provided in the box can also be used when you are following up a patient referred from a higher care level

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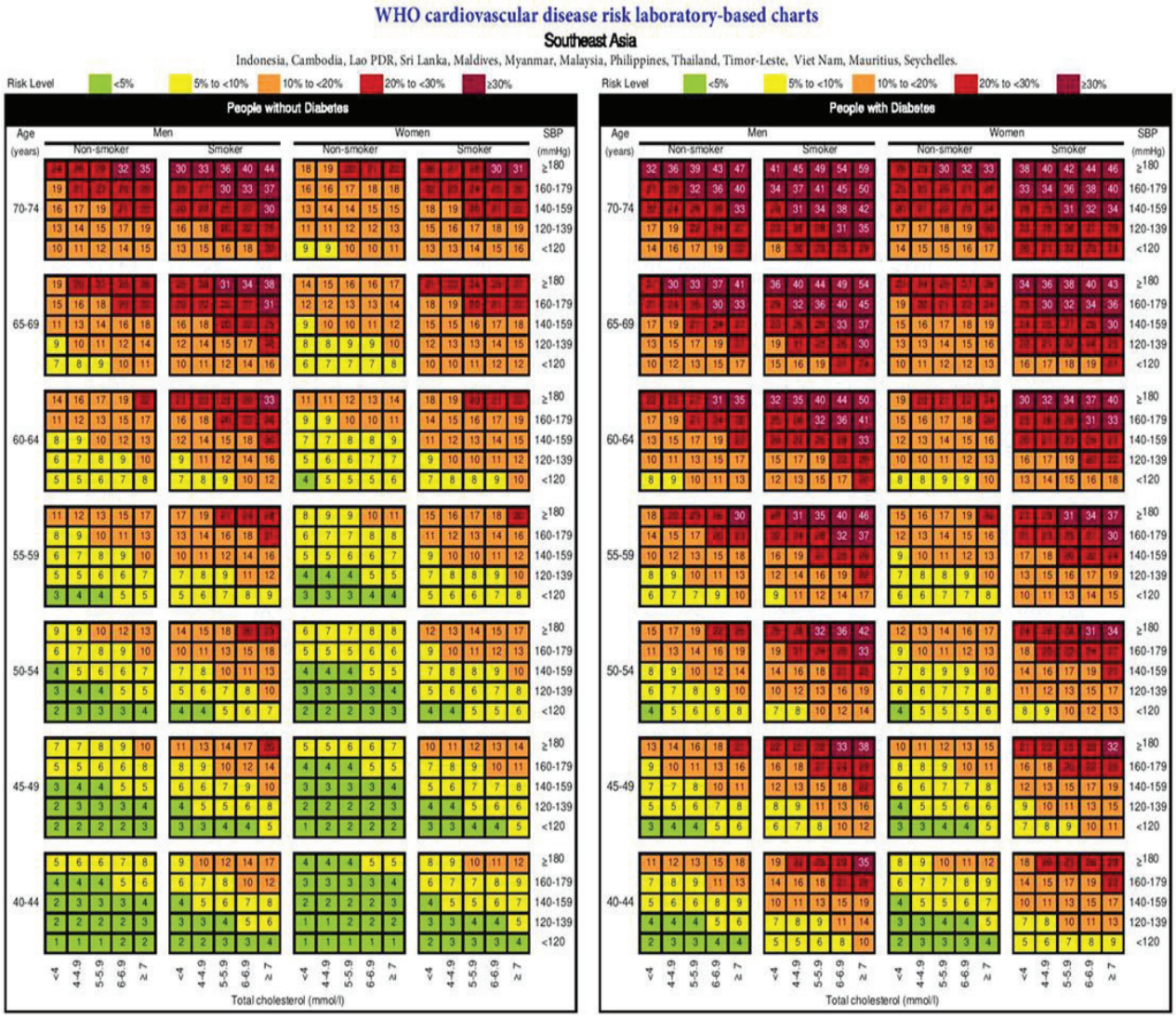
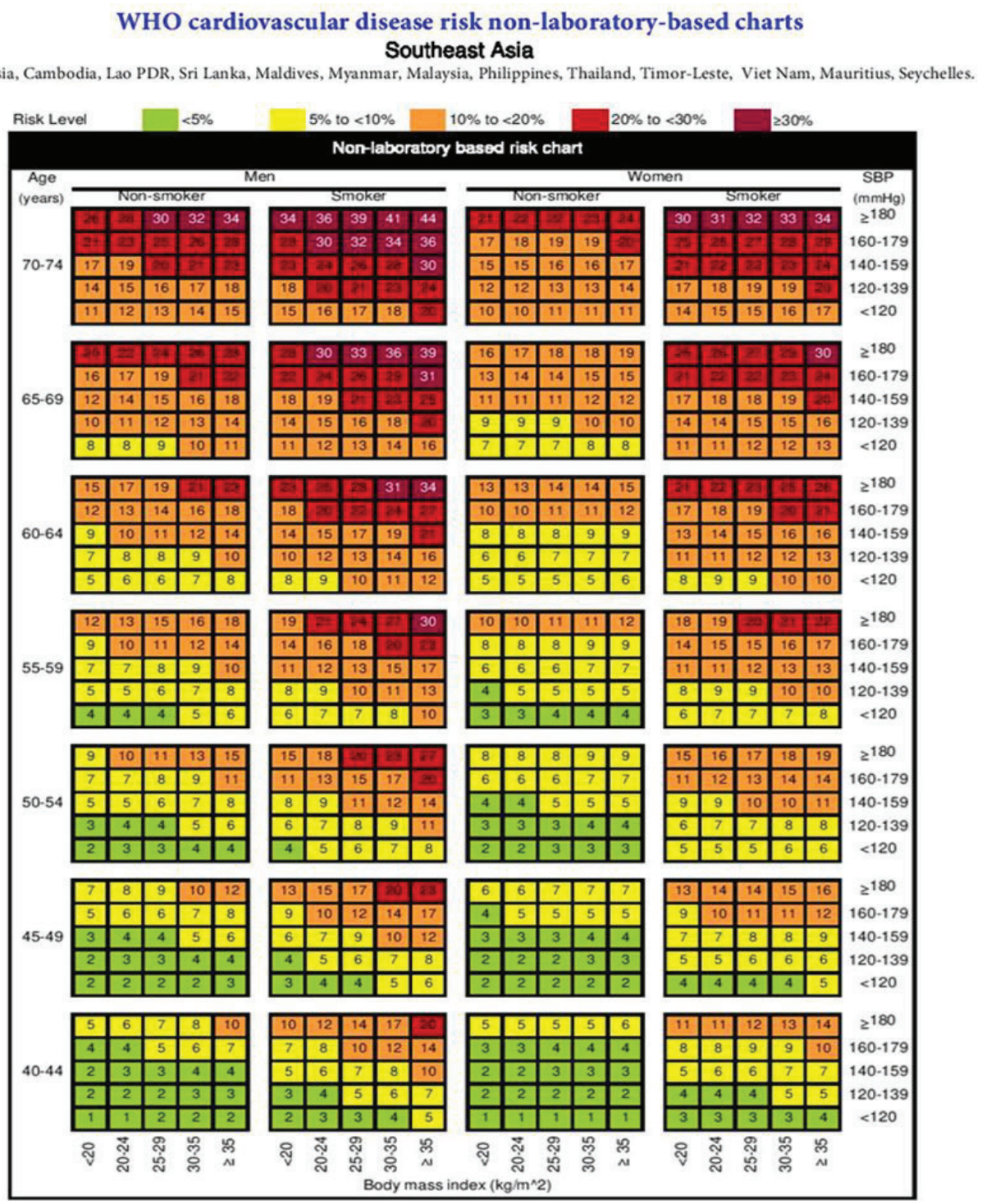
Annexure 1

WHO/ISH risk prediction chart

WHO cardiovascular disease risk laboratory-based charts for Southeast Asia Indonesia, Cambodia, Lao PDR, Sri Lanka, Maldives, Myanmar, Malaysia, Philippines, Thailand, Timor-Leste, Viet Nam, Mauritius, Seychelles.



WHO cardiovascular disease risk non-laboratory-based charts for Southeast Asia Indonesia, Cambodia, Lao PDR, Sri Lanka, Maldives, Myanmar, Malaysia, Philippines, Thailand, Timor-Leste, Viet Nam, Mauritius, Seychelles. Risk Level 0



- **Estimate the 10 year cardiovascular risk as follows using laboratory based charts;**

  Step 1 Select the appropriate chart depending on the presence or absence of diabetes

  Step 2 – Select male or female tables

  Step 3 – Select smoker or non-smoker boxes

  Step 4 – Select age group box (if age is 54; select 50-54, if age is 55; select 55-59)

  Step 5 – Within this box find the nearest cell where the individual's systolic blood pressure (mmHg) and the total blood cholesterol level (mmol/l) cross. The colour and the number of this cell determines the 10 year cardiovascular risk.

- **Estimate the 10 year cardiovascular risk as follows using non laboratory based charts;**

  Step 1 – Select male or female tables

  Step 2 – Select smoker or non-smoker boxes

  Step 3 – Select age group box

  Step 4 – Within this box find the nearest cell where the individual's systolic blood pressure (mmHg) and the Body Mass Index (kg/m^2) value cross. The colour and the number of this cell determines the 10 year cardiovascular risk.

< 5% **5 % - < 10 %** **10 % - < 20 %** **20 % - < 30 %** **≥ 30 %**

Annexure 2

Antihypertension Drug doses and frequency

Drug class	Drugs	Starting dose	Maximum therapeutic dose
ACEI	Captopril	12.5mg BD	25mg to 50 mg to 75mg BD
	Enalapril	5mg OD	10mg to 20mg OD
	Imidapril	5mg OD	20mg OD
	Lisinopril	10mg OD	80mg OD
	Perindopril	5mg OD	10mg OD
	Ramipril	2.5mg OD	10mg OD
ARB	Losartan	50mg OD	100mg OD
	Candesartan	8mg OD	32mg OD
	Irbesartan	150mg OD	300mg OD
	Olmesartan	10mg OD	40mg OD
	Telmisartan	20mg OD	80mg OD
	Valsartan	80mg OD	320mg OD
DHP-CCB	Amlodipine	5mg OD	10mg OD
	Nifedipine extended-release	20mg OD	20mgBD to 40mgBD
Non-DHP-CCB	Diltiazem	30mg TDS	60mg TDS
	Diltiazem extended-release	90mg BD	180 mg BD
	Verapamil	40mg TDS	80 mg TDS
	Verapamil extended-release	240mg OD	240mg BD
Thiazides/thiazide like diuretics	Hydrochlorothiazide	12.5mg OD	25mg OD
	Chlorthalidone	25mg OD	50mg OD
	Indapamide	2.5mg OD	2.5mgOD
	Indapamide extended-release	1.5mg OD	1.5mg OD
Beta blockers	Atenolol	25mg OD	50mg OD
	Bisoprolol	5mg OD	20mg OD
	Carvedilol	12.5mg OD	50mg OD
	Labetalol	100mg BD	400mg BD
	Metoprolol	100mg OD	200mg BD
Aldosterone antagonists ***Recommended for treating resistant hypertension***	Spironolactone	12.5mg OD	50mg OD
Alpha blockers	Prazosin	0.5mg BD/TDS	6mg TDS
	Prazosin extended-release	2.5mg OD	20mg OD

Annexure 3

Desktop Summary – Management of Hypertension in Primary Care

Measure blood pressure on two occasions
Check for presence of hypertension-mediated organ damage and secondary hypertension in history, examination and previous investigations
Assessment of Cardiovascular risk

		<120/80	120-129 / 80-84	130-139 / 85-89	140-159 / 90-99	160-179 /100-109	>180/110 with no HMOD$	>180/110 with HMOD
First visit	Repeat measurement	1 year	1 year	1 year	2 to 4 weeks	within 2 weeks	within 1 week	No
	*Lifestyle advice (LSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	**Investigate	No	No	No	Yes	Yes	Yes	Yes
	Start drugs	No	No	No except in High CV risk#	Yes, if BP remains ⇑ 3-6 months of LSA	Yes, if BP remains ⇑	Yes, if BP remains ⇑	Yes, immediately

∞Specialist referral
- Suspected secondary hypertension based on history and examination
- HMOD: proteinuria, advanced hypertensive retinopathy, new-onset CVD, CKD etc.
- Hypertension in young (age <40 years)
- Suspected white-coat hypertension / masked hypertension (when ABPM is required)
- Resistant hypertension
- Pregnancy

****Extended Investigations (if facilities available)**
- Urine full report or urine dipstick
- Lipid profile
- Serum creatinine and eGFR
- Glycated HbA1c
- Haemoglobin and/or haematocrit
- Serum electrolytes
- ALT/AST

***Lifestyle advice**
- Healthy diet
- Physical activity
- Cessation of tobacco and alcohol
- Optimise weight

****Basic Investigations**
- Fasting blood glucose
- Total cholesterol
- 12- lead ECG
- Urine protein

#High CV risk
- CV risk >20%
- Existing CVD, DM, CKD
- HMOD

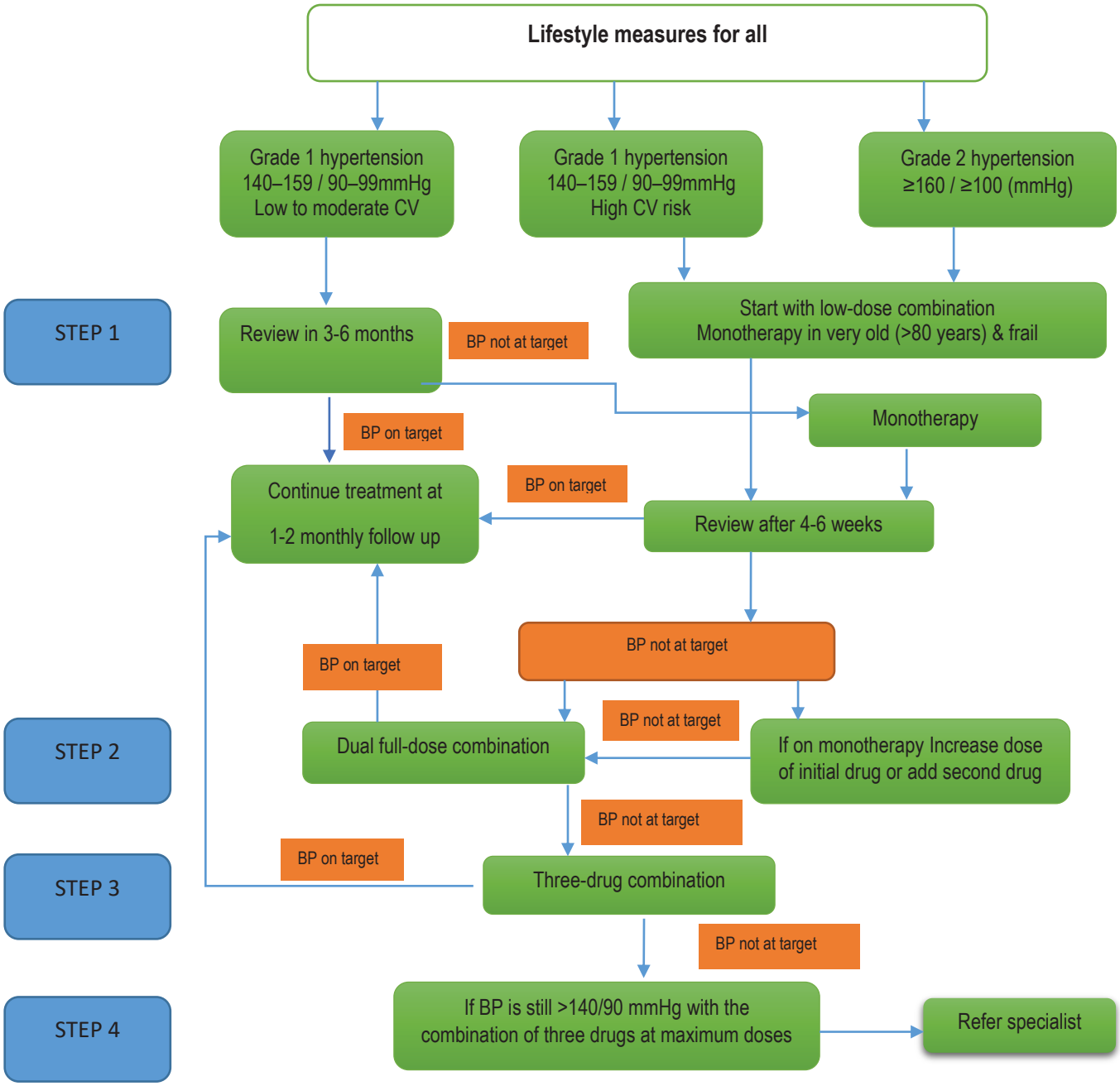
$HMOD (Hypertension mediated organ damage)
- Heart (ACS, LVH, HF)
- Brain (Stroke, TIA)
- Kidneys (Proteinuria, CKD)
- Eyes (Adv retinopathy)
- BV (PVD)

Antihypertensive medications

Class of drugs	Starting dose	Max dose
Diuretics (HCT)	12.5mg OD	25 mg OD
ACEI or ARBS (Enalapril or Losartan)	5mg OD 50mg OD	10-20 mg OD 100 mg OD
Calcium channel blockers (Amlodipine)	5mg OD	10mg OD
Nifedipine SR	20mg OD	20mg BD-40mg BD
Betablockers (Atenolol)	25mg OD	50mg OD

Dual combinations

Effective dual combinations		Indications
ACEI or ARB	CCB	DM
ACEI or ARB	Thiazides or Thiazide-like	HF, Stroke, DM
ACEI or ARB	Carvedilol, Bisoprolol	HF
CCB	Thiazides or Thiazide-like	Stroke
DHP-CCB or ACEi or ARB	Betablockers Carvedilol,Bisoprolol, Atenolol	IHD



BP targets

- Lower BP to <140/ 90 mmHg in all patients
- SBP target should be 120–129 mmHg < 65 years
- SBP target should be 130–139 mmHg in ≥ 65 years
- In those >80 years, the systolic blood pressure target should be 130-139 mmHg provided the treatment is well tolerated
- DBP target should be < 80mmHg (not less than 70 mmHg) for all hypertensive patients independent of the CV risk and comorbidities