



WHO
CVD-Risk
Management
Package
for low- and
medium-resource
settings



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WHO CVD–Risk Management Package for low- and medium-resource settings

Appropriate assessment and management of cardiovascular risk is vital to prevent fatal and non fatal heart attacks and strokes and to improve health outcomes in individuals at high risk of cardiovascular events. Those at high cardiovascular risk include patients with established coronary heart disease and cerebrovascular disease as well as those with risk factors. These risk factors such as hypertension, diabetes, smoking, high blood lipids, physical inactivity, obesity and a positive family history often occur together and need to be treated in a comprehensive manner.

The ‘WHO CVD–Risk Management Package’ has been designed to make the assessment and management of cardiovascular risk feasible and affordable in low and medium resource settings. It consists of clinical protocols that can be applied in three scenarios with hierarchical resource levels and is sufficiently flexible to be adapted to diverse health care facilities.

Introduction

Cardiovascular disease (CVD) is a leading cause of global morbidity and mortality and is responsible for one-in-three deaths. The majority of the 32 million individuals who develop heart attacks and strokes every year have one or more cardiovascular risk factors: hypertension, diabetes, smoking, high blood lipids or physical inactivity. Most of these CVD events are preventable if meaningful action is taken against these risk factors. Too frequently, however, the focus is on single risk factors, rather than on comprehensive cardiovascular risk. For CVD prevention and control activities to achieve the greatest impact, a paradigm shift is required from the “treatment of risk factors in isolation” to “comprehensive cardiovascular risk management”. To facilitate this shift, the World Health Organization (WHO) developed this CVD-Risk management package through an iterative process with collaborating experts (1).

In addition to the above, the package:

- Enables cardiovascular risk management (in low-resource settings), through affordable approaches and rational resource allocation;
- Promotes evidence-based non-pharmacological treatment and the use of cost-effective generic drugs for managing cardiovascular risk;
- Empowers patients and their families to cope with a long-term illness through self-management protocols;
- Informs policy makers of the need and feasibility of managing cardiovascular risk in less well-resourced settings.

Overview of the WHO CVD-Risk Management Package

The package has been designed primarily for the management of cardiovascular risk in individuals detected to have hypertension through opportunistic screening. However, it could be adapted for use with diabetes or smoking as entry points. The package is meant to be implemented in a range of health-care facilities in low- and medium-resource settings, in both developed and developing countries, and for this reason it has been designed for three scenarios that reflect the commonly encountered resource availability strata in such settings. The minimum conditions that characterize the three scenarios, in terms of the skill-level of the health worker and the diagnostic and therapeutic facilities and health services available, are described in Table 1. Before implementing the package, the health-care centres in primary, secondary and tertiary health-care levels should be categorized into one of the three scenarios, depending on the level of available facilities (see Table 1). Thereafter, the respective protocols and referral pathways should be used for CVD risk assessment and management. While the basic elements of the package remain the same across the three scenarios, the specific thresholds for clinical intervention differ across the three resource settings according to the level of personnel and facilities available. Furthermore, given the variability of conditions across countries and/or geographical areas, the tools of the package may need to be adapted to local needs.

Table 1. Characteristics of the three scenarios in the WHO CVD–Risk Management Package

RESOURCE AVAILABILITY	SCENARIO ONE	SCENARIO TWO	SCENARIO THREE
Human resources	Non physician health worker	Medical doctor or specially trained nurse	Medical doctor with access to full specialist care
Equipment	Stethoscope Blood pressure measurement device Measuring tape or weighing scale Optional: test tubes, holder, burner, solution or test strips for checking urine glucose	Stethoscope Blood pressure measurement device Measuring tape or weighing scale Test tubes, holder, burner, solutions or test strips for checking urine glucose and albumin	Stethoscope Blood pressure measurement device Measuring tape or weighing scale Electrocardiograph Ophthalmoscope Urine analysis Blood analysis: fasting blood sugar, electrolytes, creatinine, cholesterol and lipoproteins
Generic drugs	Essential: thiazide diuretics Optional: metformin (for refill)	Thiazide diuretics Beta blockers Angiotensin converting enzyme inhibitors Calcium channel blockers (sustained release formulations) (Reserpine and methyl dopa if the above antihypertensives are unavailable) Aspirin Metformin (for refill)	Thiazide diuretics Beta blockers Angiotensin converting enzyme inhibitors Calcium channel blockers (sustained release formulations) (Reserpine and methyl dopa if the above antihypertensives are unavailable) Aspirin Insulin Metformin Glibenclamide. Statins (if affordable) Angiotensin receptor blocker (if affordable)
Other facilities	Referral facilities Maintenance and calibration of blood pressure measurement devices	Referral facilities Maintenance and calibration of equipment	Access to full specialist care Maintenance and calibration of equipment

Contents of the WHO CVD–Risk Management Package

Some of the key components of the package are:

- The **core module**. This contains easy-to-follow protocols for assessing and managing cardiovascular risk, and for counselling on diet, physical activity and smoking cessation in the three scenarios.
- A **training manual** contains protocols for training health-care providers to implement the package (separate publication).
- The **self-management module** is a collection of educational materials and patient self-monitoring protocols, to help patients and families manage cardiovascular risk (separate publication).

Core module content

- **Scenario One: (Non Physician health worker)**
 - Protocol for assessment and management of cardiovascular risk.
 - Protocols for counselling on diet, physical activity and cessation of tobacco use
 - Patient record card
- **Scenario Two: (Medical doctor or specially-trained nurse)**
 - Protocol for assessment of cardiovascular risk.
 - Protocol for management of cardiovascular risk.
 - Protocols for counselling on diet, physical activity and cessation of tobacco use
 - Patient record card
- **Scenario Three: (Medical doctor with access to full specialist care)**
 - Protocol for assessment of cardiovascular risk.
 - Protocol for management of cardiovascular risk.
 - Protocol for management of cardiovascular risk in diabetics.
 - Protocols for counselling on diet, physical activity and cessation of tobacco use
 - Patient record card

Scenario One

Protocols applicable for implementation of the package

1. Protocol for CVD-Risk Assessment and Management
2. Protocol for counselling on diet and physical activity
3. Protocol for counselling on cessation of tobacco use
4. Patient record card

The health care facility should be tobacco-free and support a tobacco-free environment



- * Thiazide diuretic: Hydrochlorothiazide starting dose 12.5 mg (low-dose) to be increased up to 25 mg (maximum dose)
- Care of patients with cardiovascular disease or diabetes or very high levels of blood pressure or other complications related to hypertension should be accomplished at a better equipped facility. Refill metformin in well-controlled diabetics and refer for periodic blood sugar and specialist advice.
- ** Alternatively, waist circumference or body weight

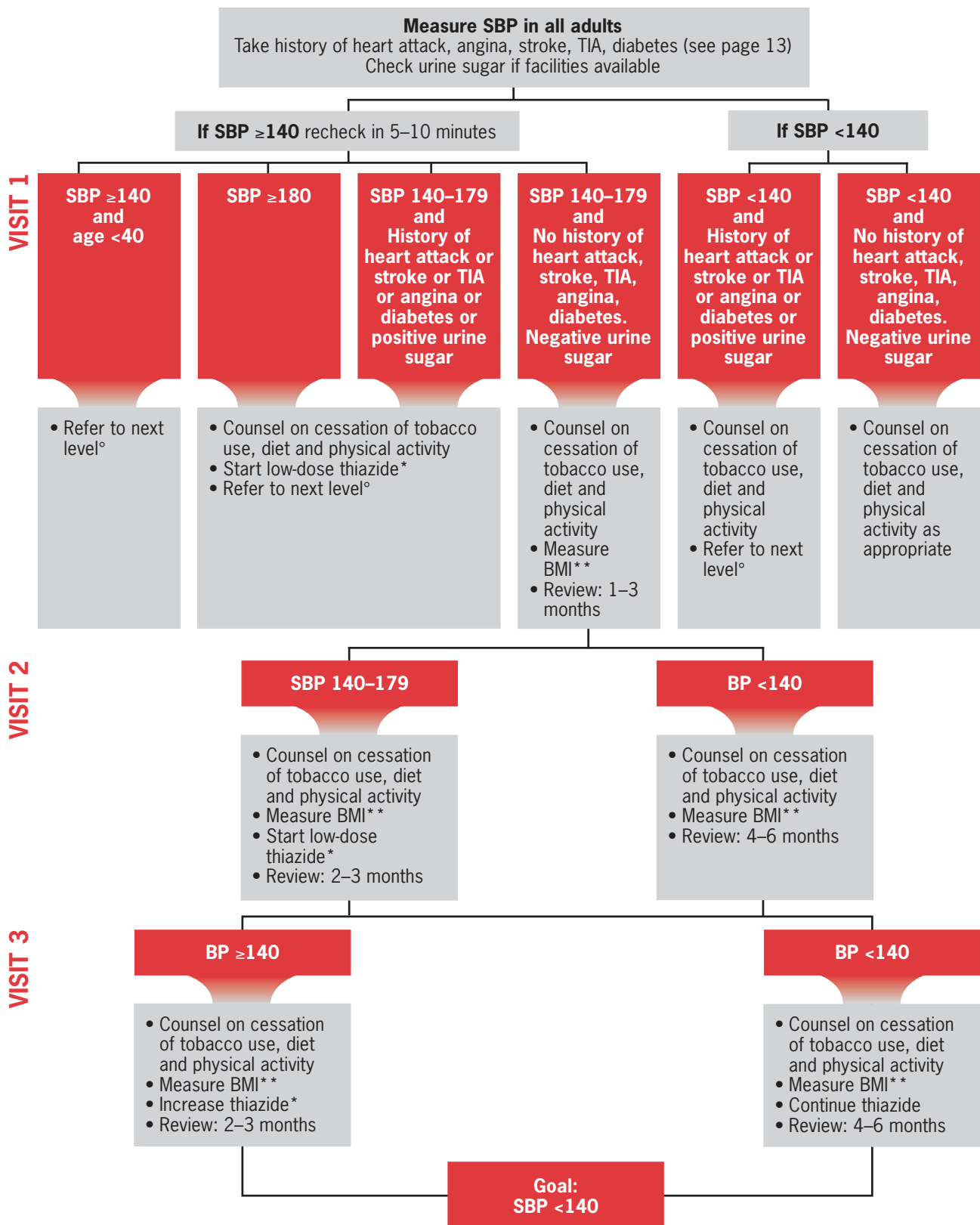
Abbreviations:

SBP = Systolic blood pressure (mmHg)

TIA = Transient ischemic attack

BMI = Body Mass Index

Scenario One: Protocol for CVD-Risk Assessment and Management (Non physician health worker)



Scenario One: Protocol for counselling on diet , physical activity (Non physician health care worker)

Counsel your patient to

Eat a “heart healthy” diet

Stop tobacco use
(see protocol
page 11)

Take regular
physical activity

■ SALT (sodium chloride)

Restrict to less than **5 grams** (1 teaspoon) per day

Reduce salt when cooking, limit processed and fast foods

■ FRUITS AND VEGETABLES

5 servings (400–500 grams) of fruits and vegetable per day

1 serving is equivalent to 1 orange or apple or mango or banana or 3 tablespoons of cooked vegetables.

■ FATTY FOOD

Limit fatty meat, dairy fat and cooking oil (less than two tablespoons per day)

Replace palm or coconut oil with olive/soya/corn/rapeseed/safflower oil.

Replace other meat with chicken (without skin)

■ FISH

Eat fish at least **three** times per week, preferably oily fish such as tuna, mackerel, salmon

■ ALCOHOL

Avoid heavy alcohol intake.

Men: no more than **2** drinks per day

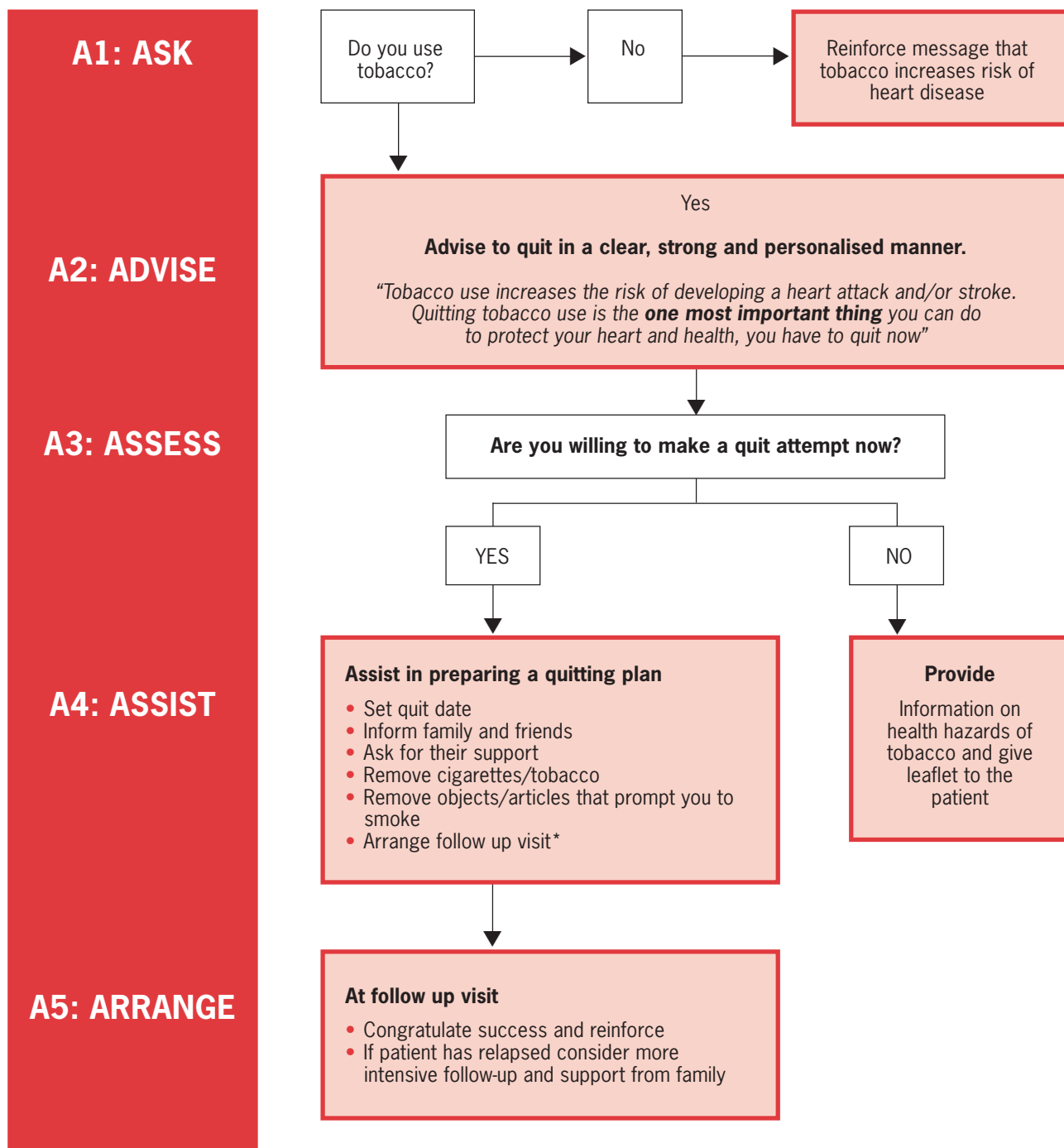
Women: No more than **1** drink per day

■ PHYSICAL ACTIVITY

Progressively increase moderate physical activity such as brisk walking, cycling to at least **30** minutes per day

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

**Scenario One: Protocol for counselling on cessation of tobacco use The 5 steps – 5As
(Non physician health care worker)**



* Ideally second follow-up visit is recommended within the same month and every month thereafter for 4 months and evaluation after 1 year. If not feasible, reinforce counselling whenever the patient is seen for blood pressure monitoring.

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

Scenario One: Patient Record Card

Mr Mrs Miss Age Clinic No

Date	SBP (mmHg)	Counselling on diet and physical activity Yes/No	Tobacco use Yes/No	Counselling on cessation of tobacco use	° BMI/ body weight/ waist circumference	Thiazide diuretic (dose, mg)

° Indicate kg/pounds and cm/inches° Indicate kg/pounds and cm/inches

Please complete this part only if patient needs referral

Date
Reason for referral
.....
Current medications

Questionnaire to determine probable angina, heart attack, stroke, TIA

Angina or heart attack

1. Have you ever had any pain or discomfort or any pressure or heaviness in your chest?

Yes No

If no go to Q8 , if yes proceed to the next question:

2. Do you get the pain in the center of the chest or left chest or left arm ?

Yes No



If no go to Q8, if yes proceed to next question:

3. Do you get it when you walk at an ordinary pace on level or when you walk uphill or hurry?

Yes No

4. Do you slowdown if you get the pain while walking?

Yes No

5. Does the pain go away if you stand still or if you take a tablet under the tongue?

Yes No

6. Does the pain go away in less than 10 minutes?

Yes No

7. Have you ever had a severe chest pain across the front of your chest lasting for half an hour or more?

Yes No

If the answer to questions 3 or 4 or 5 or 6 or 7 is yes patient may have angina or heart attack and needs referral.

Stroke and TIA

8. Have you ever had any of the following: difficulty in talking, weakness of arm and/or leg on one side of the body or numbness on one side of the body?

Yes No

If the answer to question 8 is yes the patient may have had a TIA or stroke and needs referral.

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

Scenario Two

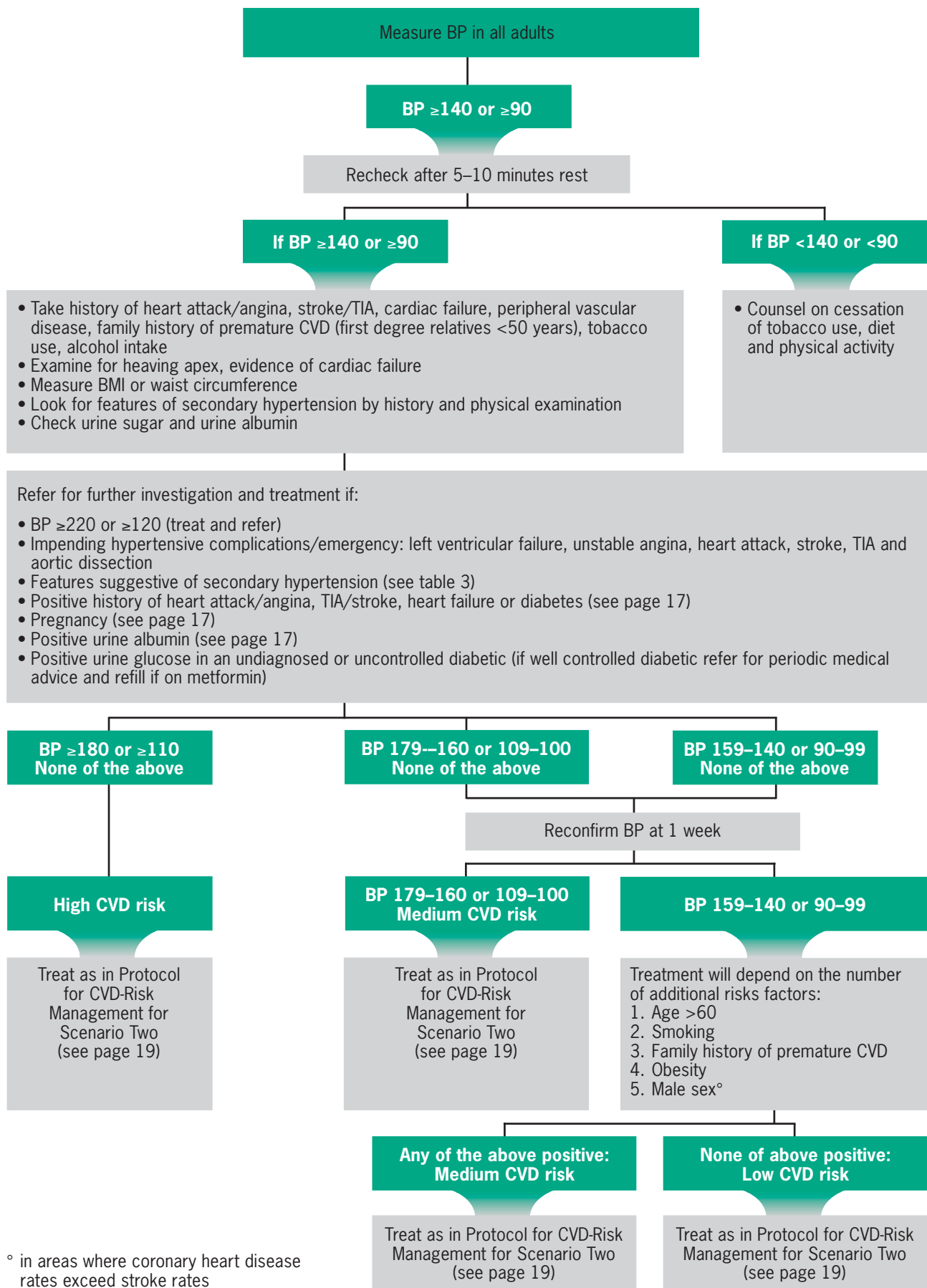
Protocols applicable for implementation of the package

1. Protocol for CVD-Risk Assessment
2. Protocol for CVD-Risk Management
3. Protocol for counselling on diet and physical activity
4. Protocol for counselling on cessation of tobacco use
5. Patient record card

The health care facility should be tobacco-free and support a tobacco-free environment

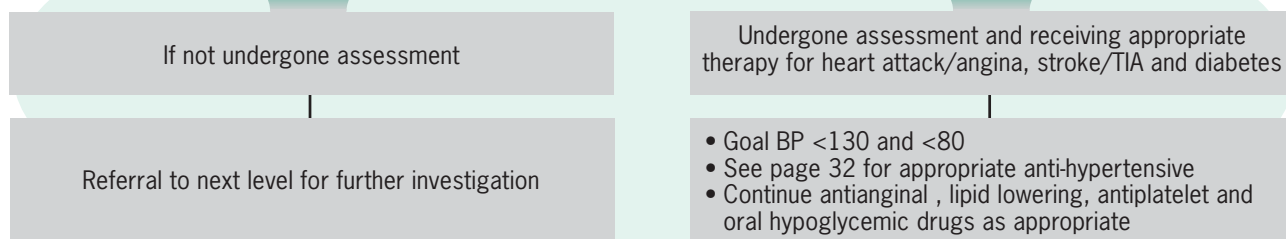


Scenario Two: Protocol for CVD-Risk Assessment (Medical doctor or specially trained nurse)



° in areas where coronary heart disease rates exceed stroke rates

Patients with heart attack/angina, stroke/TIA and diabetes



Hypertension in pregnant women

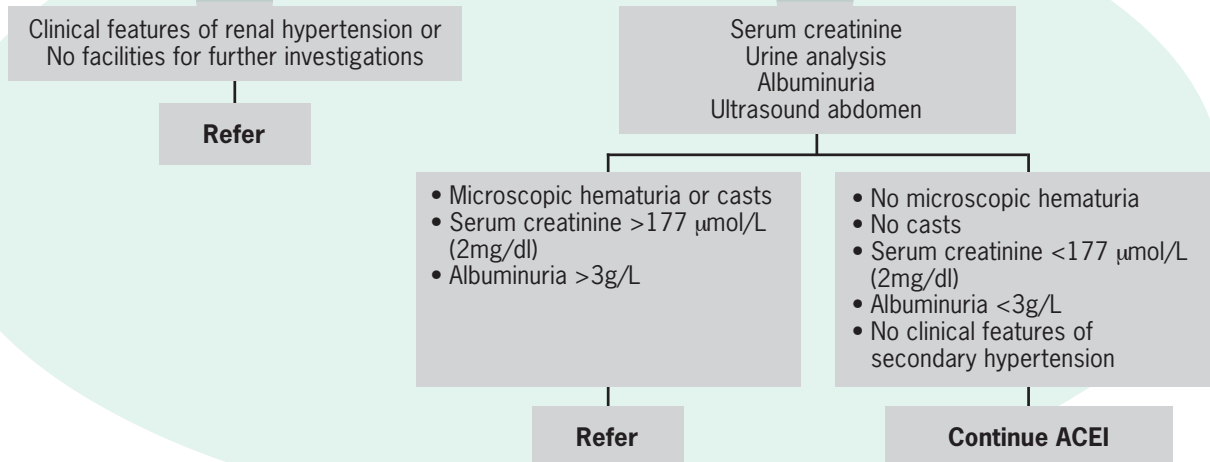
	Preeclampsia ^o	Chronic hypertension
Age (years)	Young (<20)	Older (>30)
Parity	Primigravida	Multipara
Onset	After 20 weeks of pregnancy	Before 20 weeks of pregnancy
Weight gain and edema	Sudden	Gradual
Proteinuria	Present	Absent

^o Preeclampsia may also occur in women who already have chronic hypertension

Urgent referral

- Drug of choice: Methyldopa
- Other drugs that can be used: Calcium Channel Blocker, Diuretics, Beta Blockers: (safe and effective in late pregnancy only)
- Contraindicated drugs: ACEI and ARB

Patients with albuminuria

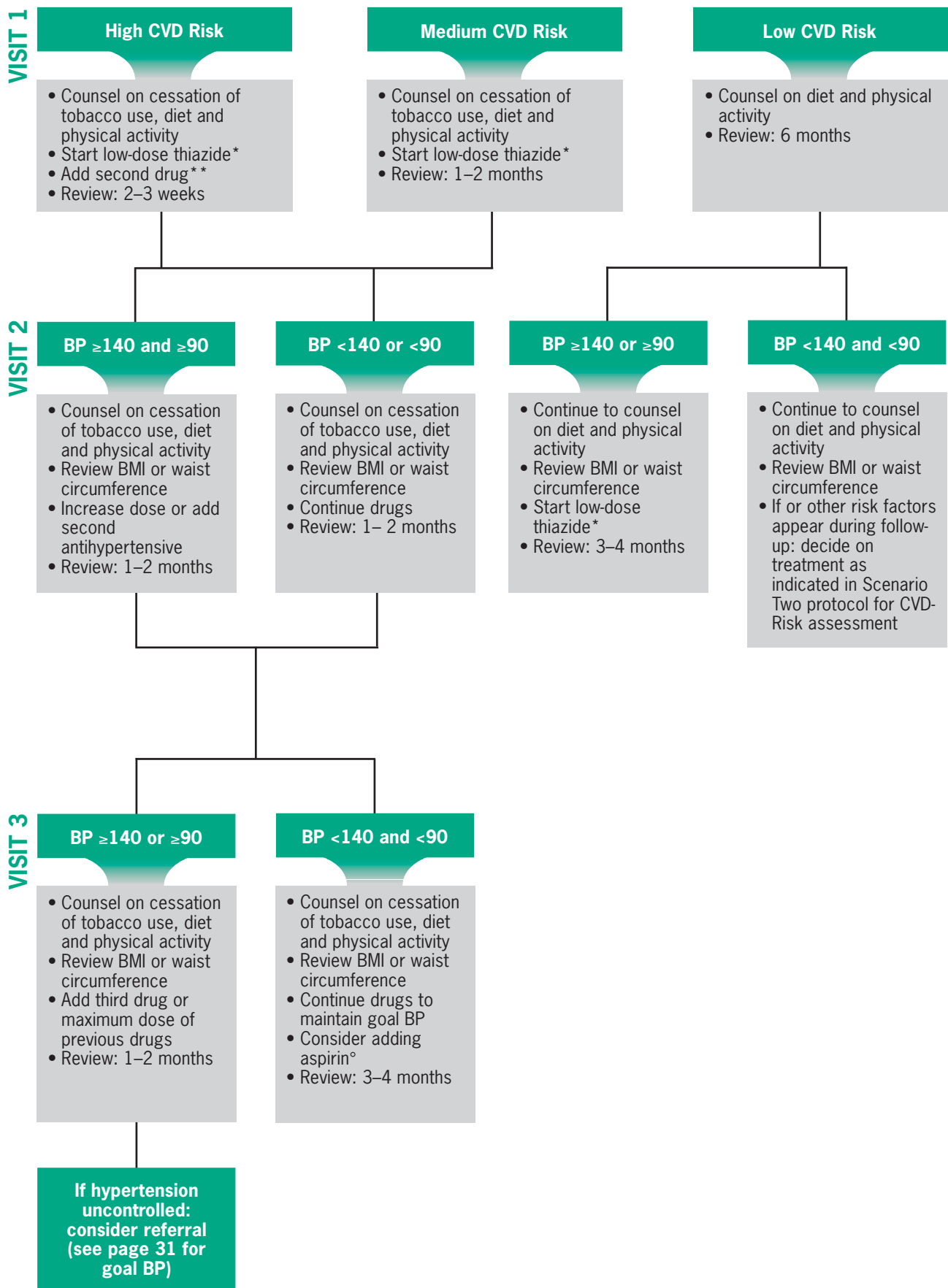


- * Thiazide diuretic: Hydrochlorothiazide starting dose 12.5 mg (low-dose) to be increased up to 25 mg (maximum dose)
- ** Second drug option: if no compelling indication, use the cheapest out of beta-blockers or calcium-channel blockers or ACE-Inhibitors

If drugs given above are not available: use methyldopa or reserpine or fixed dose combination

- In areas where coronary artery diseases rates exceed stroke rates

Scenario Two: Protocol for CVD-Risk Management (Medical doctor or specially trained nurse)



Scenario Two: Protocol for counselling on diet and physical activity (Medical doctor or specially trained nurse)

Counsel your patient to

Eat a “heart healthy” diet

Stop tobacco use
(see protocol page 21)

Take regular physical activity

■ SALT (sodium chloride)

Restrict to less than **5 grams** (1 teaspoon) per day

Reduce salt when cooking, limit processed and fast foods

■ FRUITS AND VEGETABLES

5 servings (400–500 grams) of fruits and vegetable per day

1 serving is equivalent to 1 orange or apple or mango or banana or 3 tablespoons of cooked vegetables.

■ FATTY FOOD

Limit fatty meat, dairy fat and cooking oil (less than two tablespoons per day)

Replace palm or coconut oil with olive/soya/corn/rapeseed/safflower oil.

Replace other meat with chicken (without skin)

■ FISH

Eat fish at least **three** times per week, preferably oily fish such as tuna, mackerel, salmon

■ ALCOHOL

Avoid heavy alcohol intake.

Men: no more than **2** drinks per day

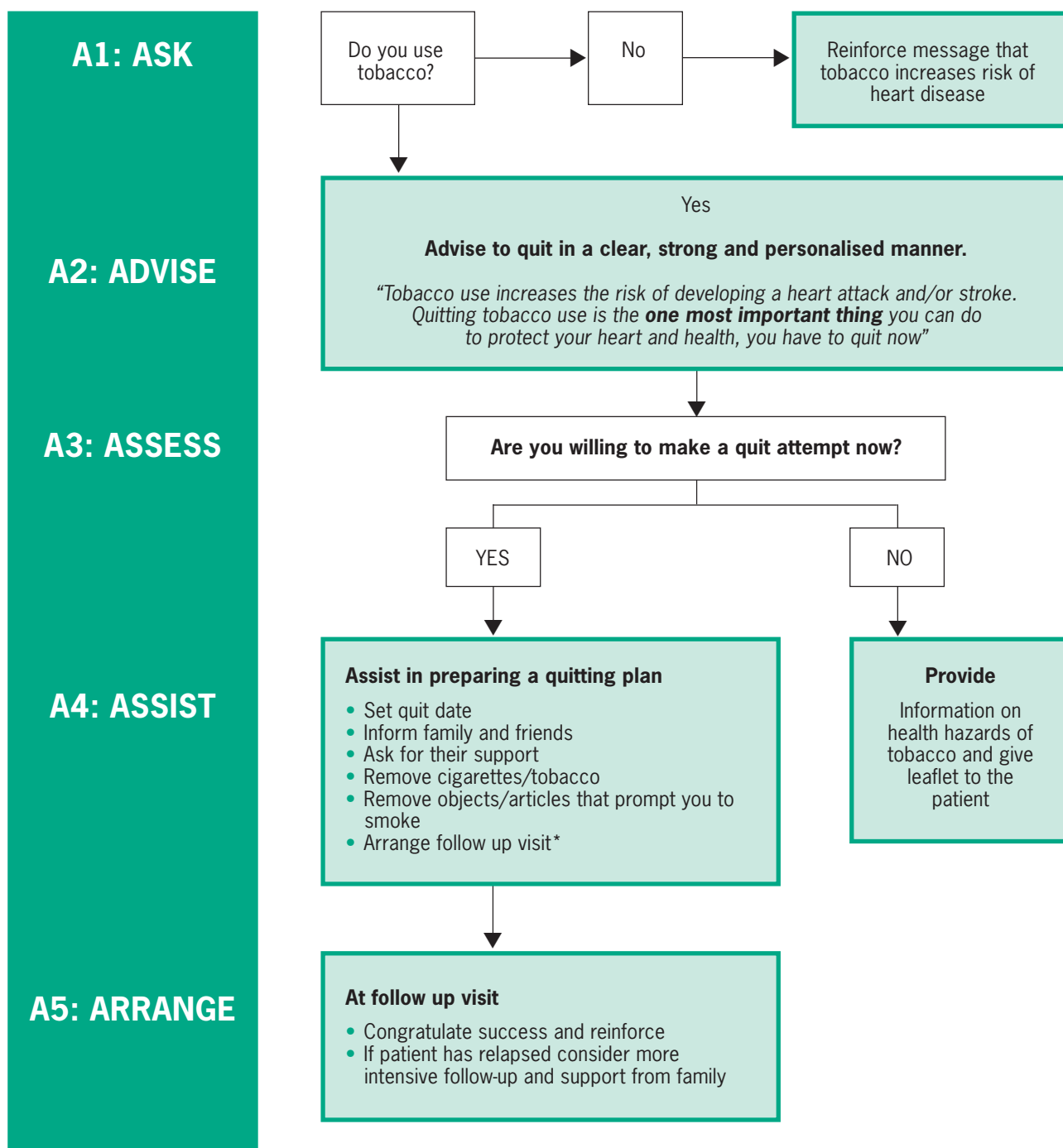
Women: No more than **1** drink per day

■ PHYSICAL ACTIVITY

Progressively increase moderate physical activity such as brisk walking, cycling to at least **30** minutes per day

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

Scenario Two: Protocol for counselling on cessation of tobacco use The 5 steps – 5As (Medical doctor or specially trained nurse)



* Ideally second follow-up visit is recommended within the same month and every month thereafter for 4 months and evaluation after 1 year. If not feasible, reinforce counselling whenever the patient is seen for blood pressure monitoring.

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

Scenario Two: Patient Record Card

Mr Mrs Miss Age Clinic No

- Essential hypertension Secondary hypertension

ASSOCIATED CLINICAL CONDITION	TARGET ORGAN DAMAGE
-------------------------------	---------------------

- | | |
|--|--|
| <input type="checkbox"/> Coronary heart diseases
<input type="checkbox"/> Congestive heart failure
<input type="checkbox"/> Cerebrovascular disease
<input type="checkbox"/> Renal disease (albuminuria >3g/L, creatinine >177µmol/L – [2mg/dl])
<input type="checkbox"/> Peripheral vascular disease
<input type="checkbox"/> Diabetes | <input type="checkbox"/> Left ventricular hypertrophy
<input type="checkbox"/> Microalbuminuria (0.2–3g/L)
<input type="checkbox"/> Hypertensive retinopathy |
|--|--|

Any other significant diagnosis

INVESTIGATIONS			
----------------	--	--	--

	Date	Date	Date
Fasting blood glucose			
Creatinine			
Electrolytes			
Lipids			
Urine albumin			

ECG

Date	Blood pressure (mmHg)	Counselling on diet and physical activity (Yes/No)	Tobacco use (Yes/No)	Counselling on cessation of tobacco use	°BMI/ body weight waist circumference	Type of drug	Drug dosage

° Indicate kg/pounds and cm/inches

Please complete this part only if patient needs referral

Date

Reason for referral

.....

Current medications

Scenario Three

Tools applicable for implementation of the package in Scenario Three

1. Protocol for CVD-Risk Assessment
2. Protocol for CVD-Risk Management
3. Protocol for CVD-Risk Management in Diabetics
4. Protocol for counselling on diet and physical activity
5. Protocol for counselling on cessation of tobacco use
6. Patient record card

The health care facility should be tobacco-free and support a tobacco-free environment



Abbreviations:

BP = Blood Pressure (all values given in mmHg)

TIA = Transient ischemic attack

FBS = Fasting blood sugar

HbA1 = Glycated Haemoglobin

ECG = Electrocardiogram

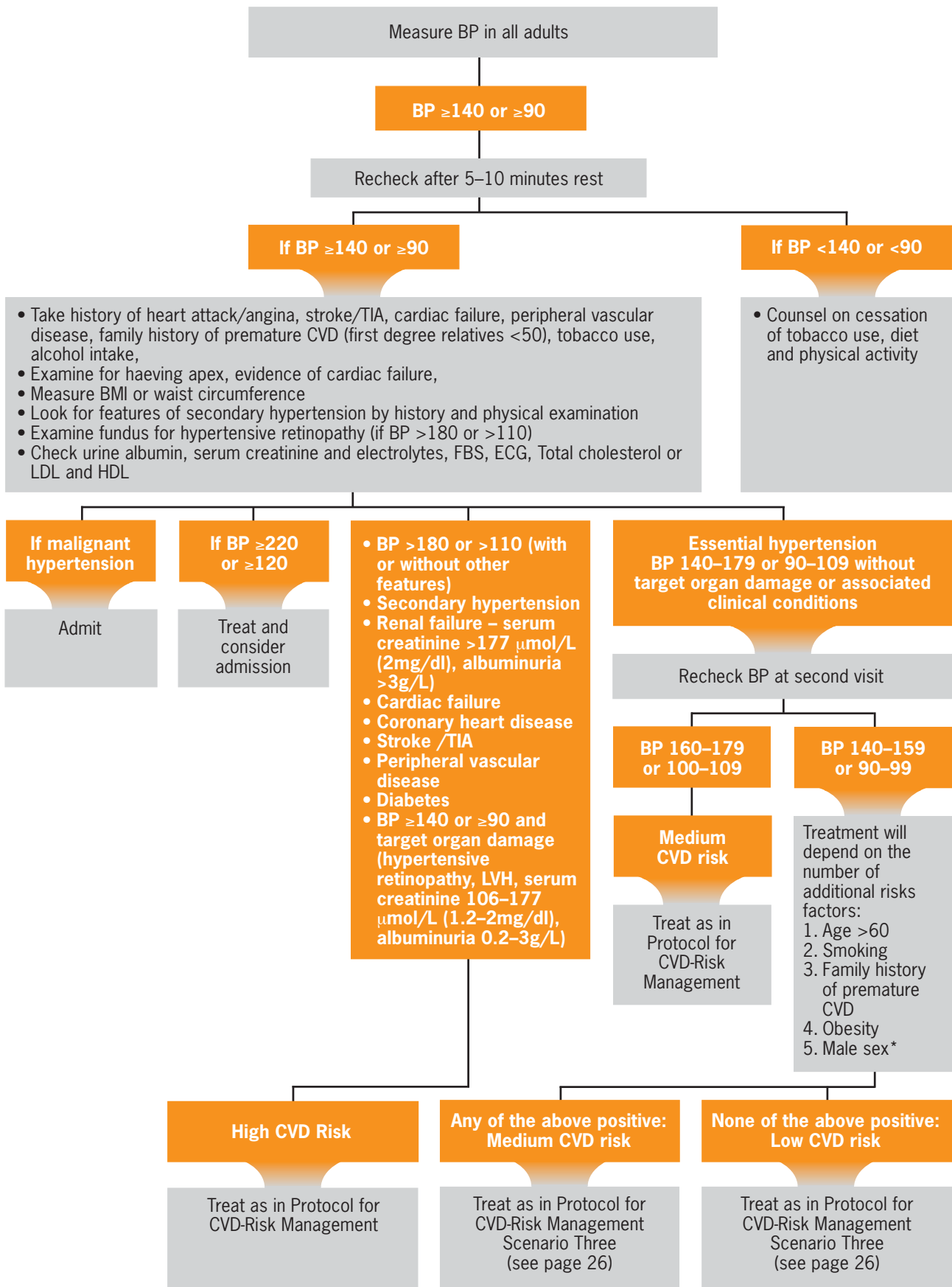
LDL = Low density lipoprotein

HDL = High density lipoprotein

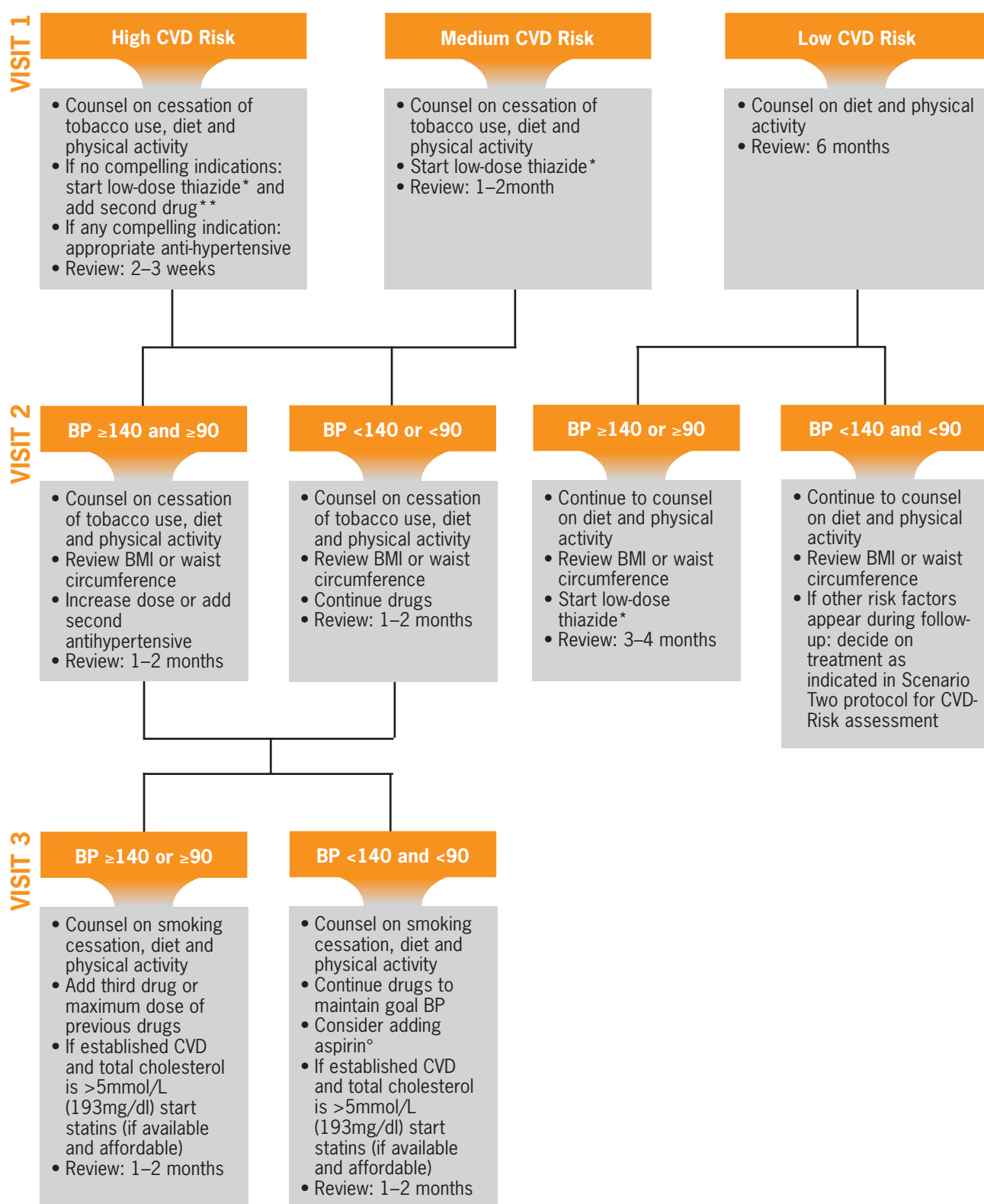
ACEI = Angiotensin converting enzyme inhibitors

ARB = Angiotensin receptor blocker

Scenario Three: Protocol for CVD-Risk Assessment (Medical doctors with access to full specialist care)



Scenario Three: Protocol for CVD-Risk Management (Medical doctor with access to full specialist care)



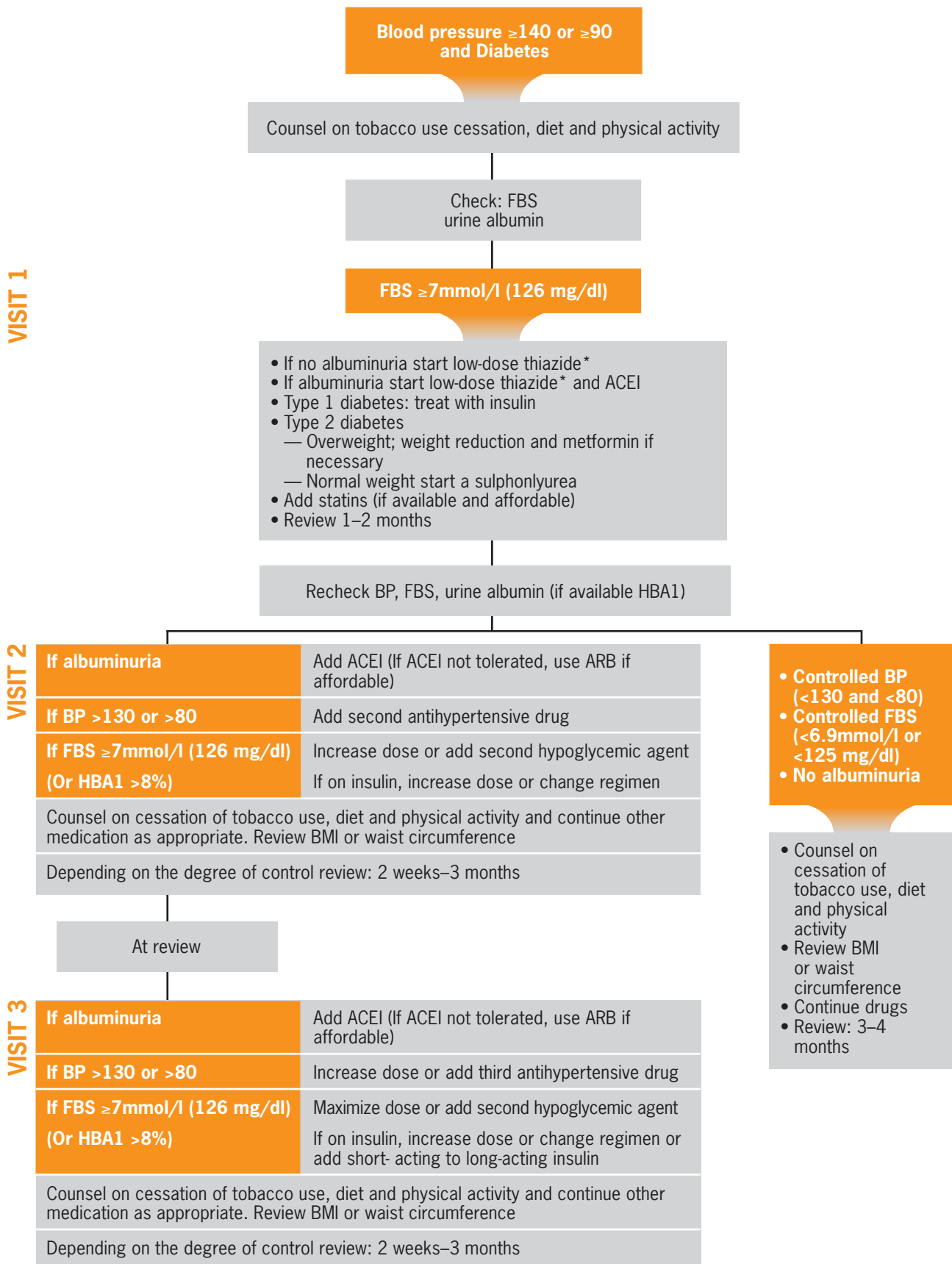
* Thiazide diuretic: Hydrochlorothiazide starting dose 12.5 mg (low-dose) to be increased up to 25 mg (maximum dose)

** Second drug option: use the cheapest out of beta-blockers or calcium-channel blockers or ACE-Inhibitors

If drugs given above are not available: use methyldopa or reserpine or fixed dose combination

^o In areas where coronary artery diseases rates exceed stroke rates

Scenario Three: Protocol for CVD-Risk Management in Diabetics (Medical doctors with access to full specialist care)



Scenario Three: Protocol for counselling on diet and physical activity (Medical doctor with access to full specialist care)

Counsel your patient to

Eat a “heart healthy” diet

Stop tobacco use
(see protocol page 29)

Take regular physical activity

■ SALT (sodium chloride)

Restrict to less than **5 grams** (1 teaspoon) per day
Reduce salt when cooking, limit processed and fast foods

■ FRUITS AND VEGETABLES

5 servings (400–500 grams) of fruits and vegetable per day

1 serving is equivalent to 1 orange or apple or mango or banana or 3 tablespoons of cooked vegetables.

■ FATTY FOOD

Limit fatty meat, dairy fat and cooking oil (less than two tablespoons per day)

Replace palm or coconut oil with olive/soya/corn/rapeseed/safflower oil.

Replace other meat with chicken (without skin)

■ FISH

Eat fish at least **three** times per week, preferably oily fish such as tuna, mackerel, salmon

■ ALCOHOL

Avoid heavy alcohol intake.

Men: no more than **2** drinks per day

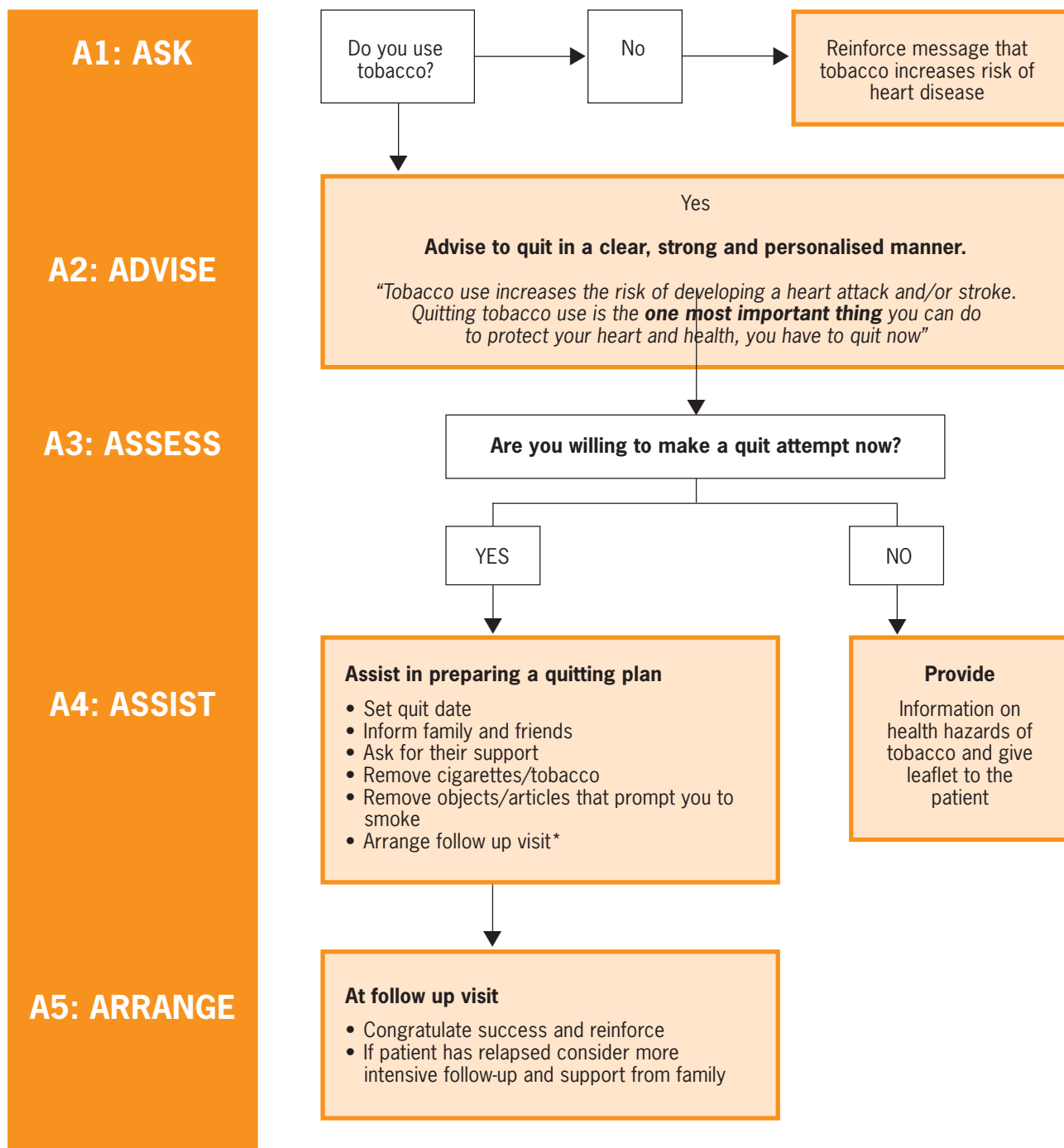
Women: No more than **1** drink per day

■ PHYSICAL ACTIVITY

Progressively increase moderate physical activity such as brisk walking, cycling to at least **30** minutes per day

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

**Scenario Three: Protocol for counselling on cessation of tobacco use The 5 steps–5As
(Medical doctor with access to full specialist care)**



* Second follow-up visit is recommended within the same month and every month thereafter for 4 months and evaluation after 1 year. If not feasible, reinforce counselling whenever the patient is seen for blood pressure monitoring.

PLEASE REFER TO THE TRAINING MANUAL FOR FURTHER INSTRUCTIONS

Scenario Three: Patient Record Card

Mr Mrs Miss Age Clinic No

- Essential hypertension Secondary hypertension

ASSOCIATED CLINICAL CONDITION	TARGET ORGAN DAMAGE
-------------------------------	---------------------

- Coronary heart diseases
- Congestive heart failure
- Cerebrovascular disease
- Renal disease (albuminuria >3g/L, creatinine >177µmol/L – [2mg/dl])
- Peripheral vascular disease
- Diabetes

- Left ventricular hypertrophy
- Microalbuminuria (0.2–3g/L)
- Hypertensive retinopathy

Any other significant diagnosis

INVESTIGATIONS			
	Date	Date	Date

Fasting blood glucose			
Creatinine			
Electrolytes			
Lipids			
Urine albumin			

ECG

Date	Blood pressure (mmHg)	Counselling on diet and physical activity (Yes/No)	Tobacco use (Yes/No)	Counselling on cessation of tobacco use	°BMI/ body weight waist circumference	Type of drug	Drug dosage

° Indicate kg/pounds and cm/inches

Evidence-based recommendations

Evidence-based recommendations on blood pressure goals

CATEGORY OF PATIENT	GOAL BP	EVIDENCE
Uncomplicated hypertension	<140 and <90 mmHg	Extensive clinical and observational data and limited data from randomized controlled trials
Uncomplicated hypertension with risk factors other than diabetes	<140 and <90 mmHg	Extensive clinical and observational data and limited data from randomized controlled trials
Hypertensive patients with diabetes, coronary heart disease, cerebrovascular disease, peripheral vascular disease or renal disease	<130 and <80 mmHg	Extrapolated from randomized controlled trials

Evidence-based recommendations on choice of cost-effective drug therapy

RECOMMENDATION	EVIDENCE
In the absence of compelling indications the least expensive of the following classes of drugs should be used to control hypertension as they are equivalent in efficacy and safety: <ul style="list-style-type: none">● Thiazide diuretics (low dose)● Beta-Blocker● Calcium channel blocker (sustained-released formulations)● Angiotensin converting enzyme inhibitor	Randomized controlled trials

Evidence-based recommendations on compelling indications for the use of specific antihypertensives

COMPELLING INDICATIONS	PREFERRED DRUG	EVIDENCE
Elderly with isolated systolic hypertension	Diuretic Calcium Channel Blocker	Randomized controlled trials
Renal disease: — diabetic nephropathy — non-diabetic	Angiotensin Converting Enzyme Inhibitor	Randomized controlled trials
Cardiac disease: — post heart attack — angina — left ventricular dysfunction — congestive heart failure (diuretics almost always included) — left ventricular hypertrophy	Angiotensin Converting Enzyme Inhibitor β -blocker β -blocker Angiotensin Converting Enzyme Inhibitor β -blocker Angiotensin Converting Enzyme Inhibitor Angiotensin Receptor Blocker Spironolactone Angiotensin Receptor Blocker	Randomized controlled trials
Cerebrovascular disease:	Diuretic Angiotensin Converting Enzyme Inhibitor	Randomized controlled trials

Recommendations on blood pressure measurement devices

- I. When it is not feasible to use validated automatic devices, good quality mercury devices are generally recommended. Provision should be made for servicing and calibration of the devices once a year. Appropriate cuff sizes and adequate training of users are critical to ensure accurate blood pressure measurement. Due precautions need to be taken when servicing and disposing of devices because of mercury toxicity, and the necessary precautions for dealing with mercury spills should be available.
- II. Automated devices should only be used if independently validated devices are available at affordable prices. When arriving at a decision to use automated devices, consideration must be given to the cost and availability of batteries, (usually need replacement after 1000 measurements), annual servicing charges and the durability in addition to the purchase price of the device.
- III. In certain settings aneroid devices may have to be used as they are the least expensive and easily portable. However, they may become inaccurate without the user being aware of it and require calibration every 6 months. Adequate training of users is critical to ensure accurate blood pressure measurement.

For further information, please refer to www.bmj.com

Useful additional information

Table 1. Drugs: dosage and contraindications for use

DRUG	DAILY DOSE	ADVICE FOR PATIENTS	CONTRAINDICATIONS
Thiazide diuretics			
Hydrochlorothiazide	Starting at 12.5mg once daily up to 25mg once daily	Eat fruits and vegetables every day.	Absolute: Gout
Beta blockers			
Propranolol	Starting at 40mg twice daily up to 140mg twice daily		Absolute: Asthma Chronic obstructive pulmonary disease High degree heart block Bradycardia <50/min Raynaud's
Atenolol	Starting at 50mg once daily up to 100mg once daily		Relative: Peripheral vascular disease
Ace-inhibitors			
Enalapril	Starting at 5mg once daily up to 40mg once daily	If persistent cough see the doctor	Absolute: Pregnancy Hyperkalemia Bilateral renal artery stenosis
Captopril	Starting at 6.25mg three times daily up to 50mg three times daily		Relative: Proteinuria, renal parenchymal disease (creatinine \geq2mg/dl use low dose)
Ca-channel blockers			
Nifedipine (sustained release formulations)	Starting at 30mg once daily up to 120mg once daily		Absolute: Congestive Heart Failure Aortic Stenosis
Verapamil	Starting at 30mg three times daily up to 60mg three times daily		Sino-Atrial Block Atrio-Ventricular Block Bradycardia

DRUG	DAILY DOSE	ADVICE FOR PATIENTS	CONTRAINDICATIONS
Nitrates			
Glyceryl trinitrate	Starting at 500 micrograms (one sublingual tablet) up to 1500 micrograms (three sublingual tablets)	May get headache	None
Aspirin			
	Starting at 75mg daily up to 150mg daily	Should be taken after meals	Absolute: Peptic ulcer Relative: Renal insufficiency Gout
Hypoglycemic Agents			
Glibenclamide	Starting at 2.5mg twice daily before meals up to 5 mg twice daily before meals	Meals should not be skipped	None
Metformin	Starting at 0.5g three times daily with meals up to 1.0 g three times daily with meals		Renal damage Hepatic disease Cardiac failure Chronic hypoxic lung disease

Table 2. Hypertensives crises: emergencies and urgencies

Hypertensive emergencies are those situation that require urgent blood pressure reduction to prevent or limit organ damage. These patients need urgent referral.

Hypertensive emergencies:	<ul style="list-style-type: none"> Unstable angina Acute myocardial infarction Acute left ventricular failure with pulmonary edema Aortic dissection Eclampsia Hypertensive encephalopathy
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Hypertensive urgencies include those situations in which it is desirable to reduce blood pressure within a few hours, e.g. hypertension with papilledema, progressive target organ complications. Hypertensive urgencies can be managed with oral antihypertensive drugs.

The initial goal of therapy is to reduce BP to between 160–180 /100–110 mmHg within 2 hours, and to <160 and <100 by 6 hours. Excessive fall of BP that may precipitate coronary, cerebral and renal ischemia should be avoided.

Diuretics, beta-blockers, ACEI, calcium channel blocker, methyldopa can be used alone or in combination. Sublingual administration of fast-acting nifedipine should be avoided as degree of fall of BP may be too rapid.

Table 3. Secondary hypertension: causes and clinical features

CAUSES	CLINICAL FEATURES
Renal diseases: Nephropathy Renal artery stenosis	History of : <ul style="list-style-type: none">● Episodes of blood or proteins in the urine, urinary infections, swelling of body● Kidney disease in the family (polycystic kidney disease)● Physical examination: abdomen or loin bruit, palpable kidneys
Phaeochromocytoma	<ul style="list-style-type: none">● Episodic symptoms: headache, flushing, sweating● High blood pressure occurs in a sudden way
Cushing syndrome	<ul style="list-style-type: none">● Typical general appearance: truncal obesity, stretch marks
Conn syndrome	<ul style="list-style-type: none">● Weakness, cramps, polyuria
Acromegaly	<ul style="list-style-type: none">● Tall stature, typical facies with prominent lower jaw, broad spade shaped hands
Coarctation of the aorta	<ul style="list-style-type: none">● High blood pressure in upper limbs but not in lower limbs. Delayed or weak femoral pulses
Drugs	<ul style="list-style-type: none">● Contraceptive pill, anti-inflammatory drugs, steroids, sympathomimetics, nasal decongestants, appetite suppressants, cyclosporine, erythropoietin, liquorice, antidepressants

References

1. *Reduction of cardiovascular burden through cost-effective integrated management of comprehensive cardiovascular risk.* World Health Organization Geneva 2002