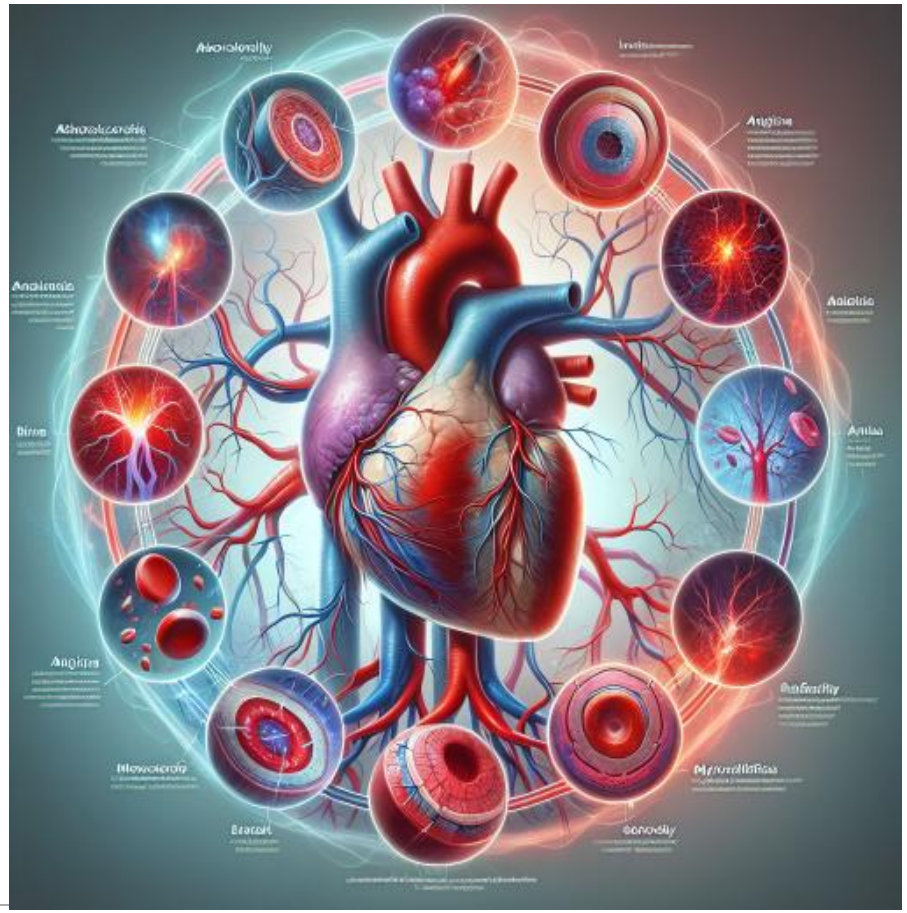
Epidemiology of cardiovascular diseases-2026



Assistant Prof.
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OBJECTIVES

- **Define** cardiovascular diseases and identify their major types.
- **Describe** the global and regional burden of CVD and current trends.
- **Recognize** key modifiable and non-modifiable risk factors.
- **Interpret** basic epidemiological measures used in cardiovascular research.
- **Explain** main prevention strategies to reduce cardiovascular morbidity and mortality.

DEFINITION:

Cardiovascular diseases (CVD) are a group of disorders affecting the heart and blood vessels, often resulting from atherosclerosis, hypertension, or structural abnormalities, and remain a leading cause of morbidity and mortality worldwide.

Coronary heart disease (Ischaemic heart disease)

Defined as ".impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart" .

The WHO has drawn attention to the fact that CHD is our modern "epidemic", i.e., a disease that affects populations, not an unavoidable aging attribute.

Cardiovascular diseases (CVDs) include:

- Coronary heart disease
- Cerebrovascular disease
- Peripheral arterial disease
- Rheumatic heart disease
- congenital heart disease
- Deep vein thrombosis
- Pulmonary embolism

Cardiovascular diseases (CVDs) are the leading cause of death globally.

An estimated 19.8 million people died from CVDs in 2022, representing approximately 32% of all global deaths. Of these deaths, 85% were due to heart attack and stroke.

Over three quarters of CVD deaths take place in low- and middle-income countries.

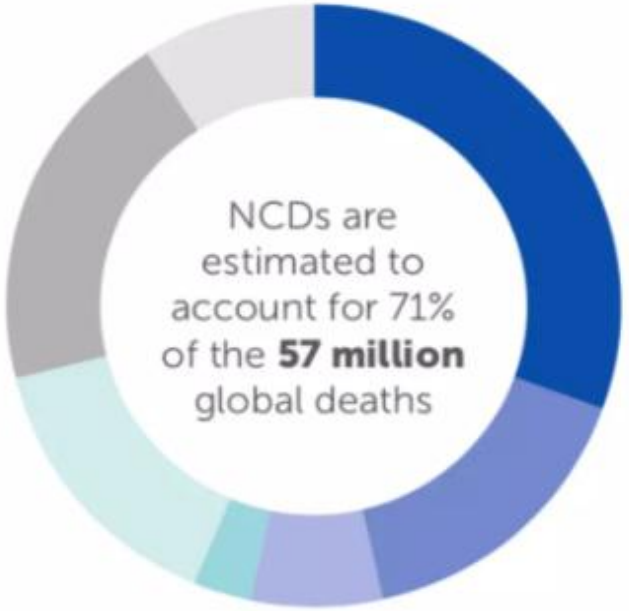
Out of the 18 million premature deaths (under the age of 70) due to noncommunicable diseases in 2021, at least 38% were caused by CVDs.

Most cardiovascular diseases can be prevented by addressing behavioural and environmental risk factors such as tobacco use, unhealthy diet (including excess salt, sugar, and fats) and obesity, physical inactivity, harmful use of alcohol and air pollution.

PUBLIC HEALTH IMPORTANCE

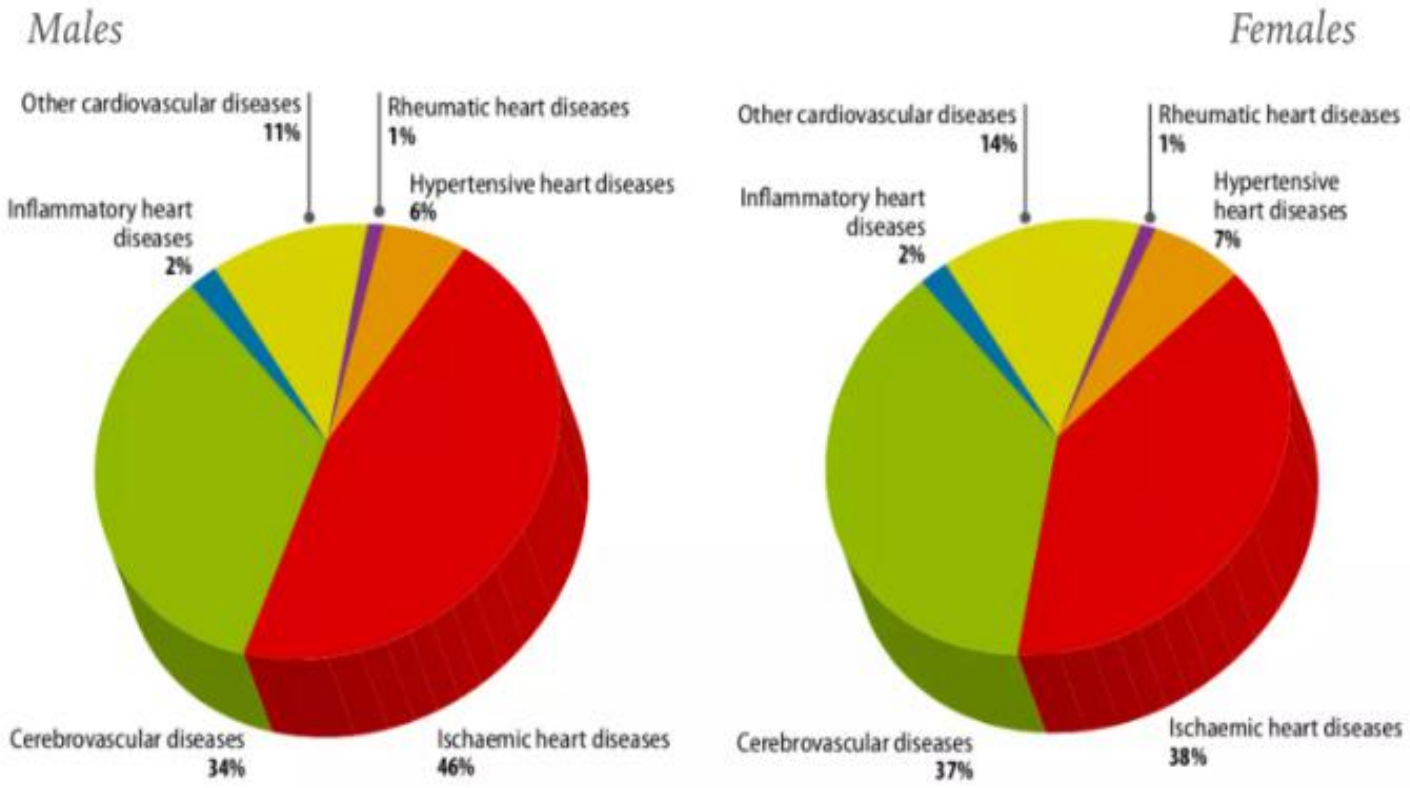
GLOBAL MORTALITY (% OF TOTAL DEATHS), ALL AGES, BOTH SEXES, 2016

- 31% Cardiovascular diseases
- 16% Cancers
- 7% Chronic respiratory diseases
- 3% Diabetes
- 15% Other NCDs
- 20% Communicable, maternal, perinatal and nutritional conditions
- 9% Injuries



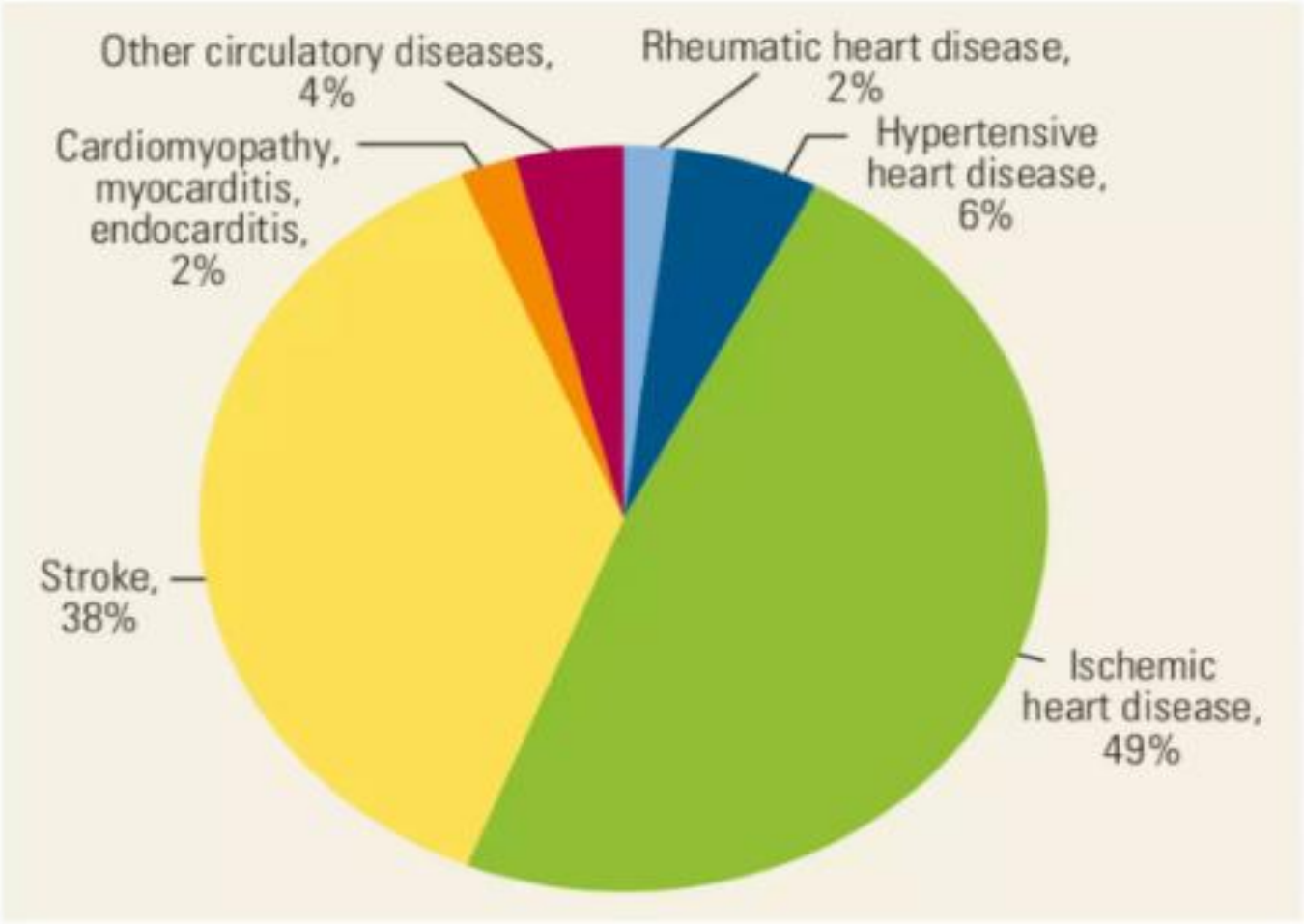
World Health Organization - Noncommunicable Diseases (NCD) Country Profiles, 2018

DISTRIBUTION OF CVD DEATHS



Global atlas on cardiovascular disease prevention and control, World Health Organisation

Cause of CVD-Related Deaths 2015



Source: WHO 2016.

RISK FACTORS

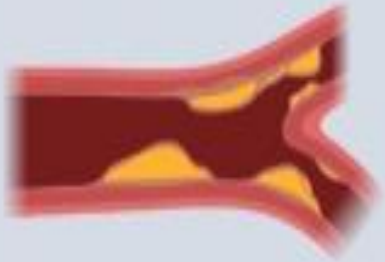
Non-modifiable	Modifiable	Lifestyle	Social
• Age • Gender • Family history of CVD • Ethnicity • Genetic evidence • Previous history of CVD	• Blood pressure • Total cholesterol • HDL cholesterol • Smoking • Blood sugar/diabetes • BMI • Markers of chronic inflammation	• Smoking • Diet • Exercise • Stress	• Income • Social deprivation • Environment

New Emerging Cardiovascular Risk Factors

The common emerging cardiovascular risk factors included:

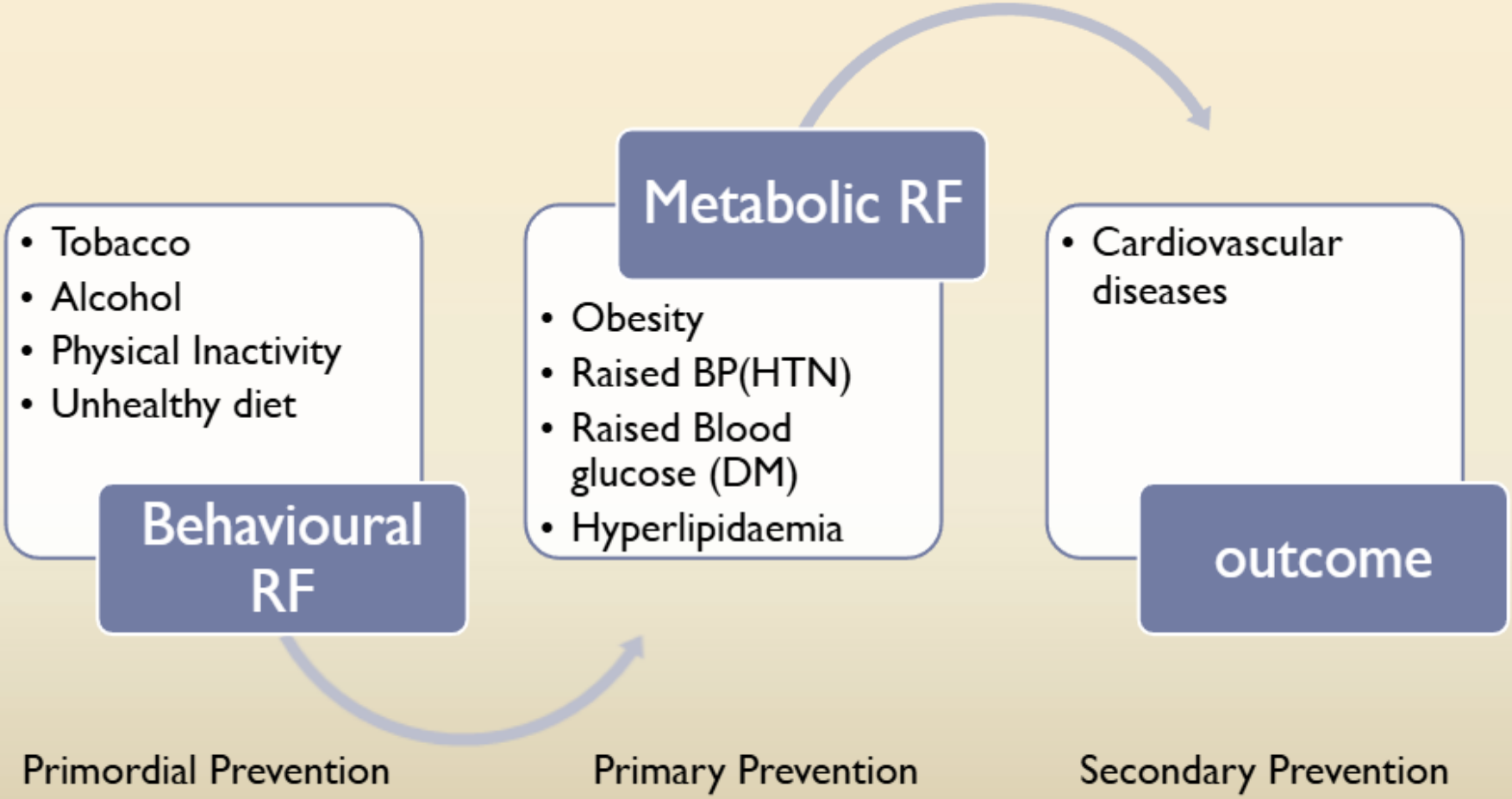
- Coronary artery calcium score
- Lipoprotein (a)
- Homocysteine
- C-reactive protein
- Fibrinogen
- Plasminogen activator inhibitor 1

Traditional Risk Factor	Sex-Based Differences	Goals – Primary Prevention	Intervention
 **Hypertension**	• Higher prevalence of HTN in elderly women compared to men • 3-fold higher risk of heart failure in women vs 2-fold higher risk in men • Less HTN control in women • Increases after menopause	• BP <120-129/80 • BP >130/80: Initiate pharmacotherapy in diabetic patients • BP 130-139/80-89: recommend lifestyle changes in low-risk adults and pharmacotherapy at 3-6 months if uncontrolled • BP ≥140/90: Initiate treatment*	• Pharmacotherapy • Encourage regular BP monitoring • Educate on effects on BP from diet (e.g. sodium), exercise, sleep, stress, and alcohol • DASH diet
 **Diabetes**	• 3-fold higher risk of CVD than non-diabetic women • Increased risk of heart failure • 3-7 fold increased risk in women vs 2-3 fold risk in men • Higher risk of future CVD with gestational diabetes	• Fasting glucose of 70-99 mg/dl • HgA1c <5.7% • HgA1c <7.0% in diabetic patients	• Regular monitoring of HgA1c, glucose, and insulin • Aggressive management of diabetes to lower risk • Encourage increased frequency and intensity of physical activity • Encourage low sugar and diets balanced

 **Hyperlipidemia**	• Menopause increases LDL, triglycerides, and decreased HDL	• Total cholesterol <200 mg/dL, LDL <100 mg/dL, HDL >60 mg/dL, triglycerides <150 mg/dL • For familial hyperlipidemia: LDL <70 mg/dL	• Screening • Statin therapy and non-statin options • Encourage dietary modifications by decreasing high fat foods and increasing healthy fats in diet • soluble high fiber foods and healthy fats
 **Smoking**	• More potent risk factor in heart failure in women • 25% increased risk of developing CAD in women vs men • 3-fold increased risk for myocardial infarction	• Smoking cessation • Avoidance of second-hand smoke	• Routine assessment of smoking status • Education on consequences of smoking • Nicotine replacement • Other pharmacotherapy or behavioral therapy

 **Obesity**	• Stronger factor in women than men in leading to CAD • Increased DM incidence • Increased subcutaneous fat mass • Stronger relationship with HFpEF development • CHF risk higher for women vs. men as BMI increases • Associated with pulmonary embolism in women	• BMI 18.5-24.9 kg/m^2 • Initial goal of weight loss is about 5-10% from baseline • Healthy weight loss	• Regular assessment of BMI • Weight management recommendation based on balance of activity and diet • Identification of barriers • Recommend 60-90 minutes of moderate-intensity physical activity everyday
 **Physical Inactivity**	• More women are inactive (32.2%) vs men (29.9%) • Women with lower fitness have high insulin resistance • Higher prevalence of inactivity and sedentary behaviors in women than men	• Increasing daily physical activity to have at least 150 min/ wk of moderate exercise and 75 min/ wk	• Clinician encouragement for increasing physical activity

Conceptual framework of risk factors and level of prevention and management of Cardiovascular Diseases:



What Increases **YOUR RISK?**

Certain factors raise your chance of developing heart disease. Some you can't change – your age, sex, race – and others you can change such as:

BLOOD PRESSURE

CHOLESTEROL

DIABETES

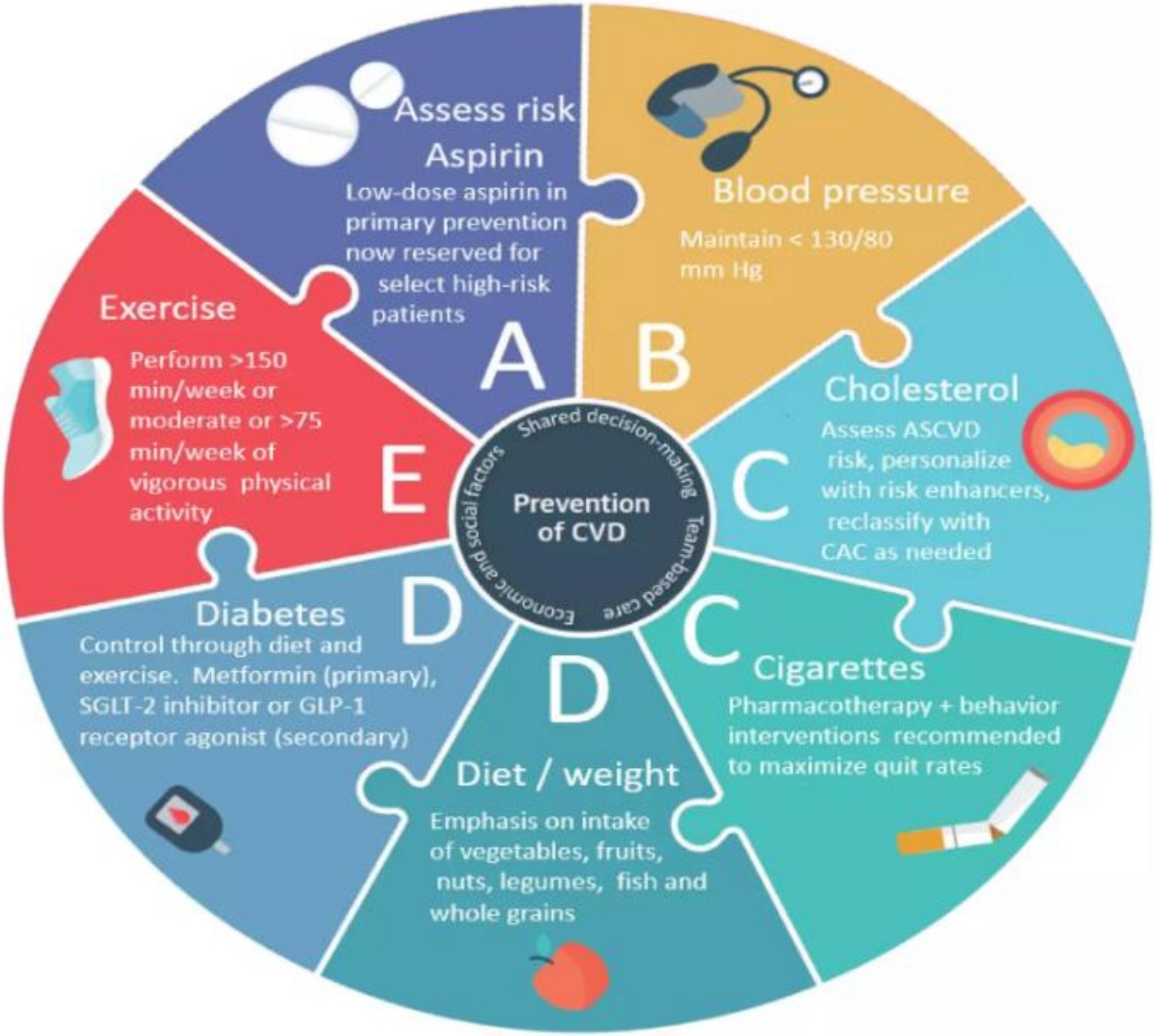
WEIGHT

DIET

PHYSICAL ACTIVITY

SMOKING

Figure 1. ABCDE of Primary Prevention: Lifestyle Changes and Team-Based Care



Latest Status of Cardiovascular Diseases in Iraq

Cardiovascular diseases are a major public health concern and account for about 27% of all deaths in Iraq.

Overall noncommunicable diseases cause around 55% of total deaths, with CVD representing the largest share.

Iraq recorded approximately 87,555 deaths from CVD in 2021, with an age-standardized mortality rate of 478 per 100,000 population, placing the country among those with relatively high mortality rates globally.

Coronary heart disease and stroke are leading individual causes of death, responsible for about 25% and 14% of deaths respectively.

Risk factors are widespread:

roughly 30% of adults have hypertension, 14% have diabetes, over 30% are obese, and smoking remains common.

AHA Life's Simple 7

Life's Simple 7

1. Get active
2. Eat better
3. Lose weight
4. Stop smoking
5. Control cholesterol
6. Manage blood pressure
7. Reduce blood sugar

1. ≥150 minutes moderate activity /week or ≥75 minutes vigorous activity/week
2. Eat a healthy diet (4–5 components of healthy diet score*)
3. Have a normal body weight (BMI<25)
4. Never smoked or quit >1 year ago
5. Total cholesterol <200 mg/dL
6. Blood pressure <120/<80 mm Hg
7. Fasting blood glucose <100 mg/dL

*1) 4.5 cups or more of fruits and vegetables per day; 2) two or more 3.5-oz servings of fish per week; 3) three servings per day of whole grains; 4) less than 1500 mg of sodium per day; and 5) 36 ounces or less of sugar-sweetened beverages per

PRIMARY PREVENTION GUIDELINES

Top 10 Messages

1. Promote a healthy lifestyle throughout life.

2. Clinicians should evaluate the social determinants of health that affect individuals to inform treatment decisions.

3. Adults who are 40 to 75 years of age and are being evaluated for CVD prevention should undergo a 10-year ASCVD risk estimation and have a clinician-patient risk discussion before starting on pharmacological therapy, such as antihypertensive therapy, a statin, or aspirin.

4. All adults should consume a healthy diet :

Vegetables, fruits, nuts, whole grains, lean vegetable or animal protein, and fish and minimizes the intake of *trans* fats, red meat and processed red meats, refined carbohydrates, and sweetened beverages.

5. **Adults should engage in :**

at least 150 minutes per week of accumulated moderate-intensity physical activity

Or 75 minutes per week of vigorous-intensity physical activity.

Table 4. Definitions and Examples of Different Intensities of Physical Activity

Intensity	METs	Examples
Sedentary behavior*	1–1.5	Sitting, reclining, or lying; watching television
Light	1.6–2.9	Walking slowly, cooking, light housework
Moderate	3.0 –5.9	Brisk walking (2.4–4 mph), biking (5–9 mph), ballroom dancing, active yoga, recreational swimming
Vigorous	≥6	Jogging/running, biking (≥10 mph), singles tennis, swimming laps

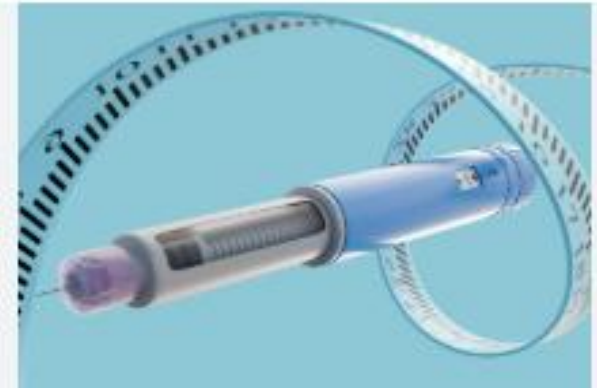
*** *Sedentary behavior* is defined as any waking behavior characterized by an energy expenditure ≤1.5 metabolic equivalent (METs) while in a sitting, reclining, or lying posture.**
Standing is a sedentary activity in that it involves ≤1.5 METs, but it is not considered a component of sedentary behavior.

6. **For adults with type 2 diabetes mellitus, lifestyle changes, such as improving dietary habits and achieving exercise recommendations, are crucial.**

If medication is indicated

metformin is first-line therapy

followed by consideration of a sodium-glucose cotransporter 2 inhibitor –SGLT-2



or a glucagon-like peptide-1 receptor agonist. –GLP-1

7.All adults should be assessed at every healthcare visit for tobacco use, and those who use tobacco should be assisted and strongly advised to quit.

8.Aspirin should be used infrequently in the routine primary prevention of ASCVD because of lack of net benefit.

Aspirin Therapy in Primary Prevention of ASCVD

AMERICAN COLLEGE of CARDIOLOGY

PROBLEM

- ✖ The use of aspirin in primary prevention of atherosclerotic cardiovascular disease (ASCVD) has faced increasing controversy.
- ✖ A recently published four-trial series evaluating the use of aspirin therapy in the primary prevention of ASCVD has yielded potential challenges to decades-old research as reflected in the current U.S. Preventive Services Task Force guidelines.
  - In three of the four trials, aspirin failed to show benefit of primary cardiovascular prevention, while suggesting potential harm including higher all-cause mortality and major hemorrhage with reduced disability-free survival.
  - A fourth trial showed modest reduction in serious vascular events which were "largely counterbalanced" by the observed rate of major bleeding events within the trial.

?

SOLUTION

- ✔ Low-dose aspirin SHOULD NOT be routinely administered for primary prevention of ASCVD to individuals >70 years of age and those at increased risk of bleeding irrespective of age (risk may outweigh benefit), or <40 years of age (insufficient data for determining risk-to-benefit).
- ✔ Low-dose aspirin MAY be considered for primary prevention of ASCVD among adults aged 40-70 years who possess higher ASCVD risk but remain at low probability for bleeding events.

GENERALLY NO

OCCASIONALLY YES

9. **Statin therapy is first-line treatment for the primary prevention of ASCVD in patients with**

Elevated LDL-C levels (≥190 mg/dL) those with diabetes mellitus who are 40 to 75 years of age

10. **Nonpharmacological interventions are recommended for all adults with elevated blood pressure or hypertension.**

For those requiring pharmacological therapy, the target blood pressure should generally be <130/80 mm Hg.

Secondary prevention

Secondary prevention refers to the effort to treat known, clinically significant ASCVD, and to prevent or delay the onset of disease manifestations.

Target Population

The target population for secondary prevention of ASCVD is patients who have been diagnosed with ASCVD.

This guideline addresses treatment of underlying ASCVD only, and does not address treatment of any associated conditions.

Antiplatelets Secondary Prevention CVD

ACS

Aspirin - Initially 300mg
75mg thereafter indefinitely
DAPT aspirin with:
Clopidogrel 75mg OD
Ticagrelor 90 mg BD
(60mg BD if >12 months duration)
Prasugrel 5mg OD
(30mg if <75 years old and >60kg)

Peripheral arterial disease (PAD)

Clopidogrel 75mg OD
Those at higher risk of ischaemic events:
Rivaroxaban 2.5mg AND aspirin 75mg OD

Stroke, or transient ischaemic attack (TIA)

Clopidogrel 75mg OD
Ticagrelor 90mg BD
If clopidogrel not tolerated:
Aspirin 75mg OD
MR Dipyridamole 200mg BD with aspirin
MR Dipyridamole monotherapy

Percutaneous coronary intervention (PCI)

Aspirin 75mg OD with clopidogrel 75mg OD for 6 months
Those with high ischaemic risk who have tolerated without issues can be continued for 36 months

Preventive factors of Cardiovascular Diseases

SECONDARY PREVENTION:

- Treatment with the following Medications are necessary:
  - Aspirin
  - Beta-Blockers
  - Angiotensin-Converting Enzyme Inhibitors
  - Statins

Preventive factors of Cardiovascular Diseases

SECONDARY PREVENTION:

- Angioplasty
- Coronary Artery Bypass Graft (CABG)

Table 3. Risk-Enhancing Factors for Clinician-Patient Risk Discussion

Risk-Enhancing Factors
• **Family history of premature ASCVD** (males, age <55 y; females, age <65 y) • **Primary hypercholesterolemia** (LDL-C 160–189 mg/dL [4.1–4.8 mmol/L]; non–HDL-C 190–219 mg/dL [4.9–5.6 mmol/L])* • **Metabolic syndrome** (increased waist circumference [by ethnically appropriate cut points], elevated triglycerides [>150 mg/dL, nonfasting], elevated blood pressure, elevated glucose, and low HDL-C [<40 mg/dL in men; <50 mg/dL in women] are factors; a tally of 3 makes the diagnosis) • **Chronic kidney disease** (eGFR 15–59 mL/min/1.73 m^2 with or without albuminuria; not treated with dialysis or kidney transplantation) • **Chronic inflammatory conditions,** such as psoriasis, RA, lupus, or HIV/AIDS

Table 3. Risk-Enhancing Factors for Clinician-Patient Risk Discussion (cont'd)

Risk-Enhancing Factors
• **History of premature menopause (before age 40 y) and history of pregnancy-associated conditions that increase later ASCVD risk, such as preeclampsia** • **High-risk race/ethnicity** (e.g., South Asian ancestry) • **Lipids/biomarkers**: associated with increased ASCVD risk • Persistently elevated,* primary hypertriglyceridemia (≥175 mg/dL, nonfasting); • **If measured:** ▪ **Elevated high-sensitivity C-reactive protein** (≥2.0 mg/L) ▪ **Elevated Lp(a):** A relative indication for its measurement is family history of premature ASCVD. An Lp(a) ≥50 mg/dL . ▪ **Elevated apoB** (≥130 mg/dL): A relative indication for its measurement would be triglyceride ≥200 mg/dL. A level ≥130 mg/dL corresponds to an LDL-C >160 mg/dL and constitutes a risk-enhancing factor ▪ **ABI** (<0.9)= ankle brachial index

Lipid screening tests

Lipid panel: for most patients

The results of a **lipid panel** are total cholesterol, HDL, and LDL, and the patient's 10-year risk calculation for cardiovascular disease is included.

It is recommended that the patient be non-fasting for the lipid panel, as this is much easier for the patient and does not require a return visit.

Any patient with a triglyceride level > 400 mg/dL (regardless of LDL level) must return for a fasting lipid panel.

hs-CRP: consider for patients at 7.5–14.9% risk

Table 1. Lipid screening for patients not already on statins

Eligible population	Test	Frequency
Under age 40	Routine screening is not recommended unless patient has a major cardiovascular risk factor (e.g., diabetes, hypertension, family history, smoking).	
Age 40–75	Non-fasting lipid panel	Every 5 years at a minimum [1]
Over age 75	Routine screening is not recommended.	Upon patient request or based on other ASCVD risk factors

Consider re-screening intervals based on ASCVD risk:

- **Every 5 years if ASCVD risk < 7.5% over 10 years**
- **Every 2 years if ASCVD risk 7.5–14.9% over 10 years**
- **Annually if ASCVD risk ≥ 15% over 10 years and not on statin**

Statin Therapy

Table 3. Overview of statin therapy recommendations for primary prevention of ASCVD	
Population	**Statin therapy**
ASCVD risk 5–7.4% over 10 years	**Use shared decision-making. Consider treatment with a moderate-intensity statin.**
ASCVD risk 7.5–14.9% over 10 years	**Use shared decision-making. Consider treatment with a moderate- to high-intensity statin.**
ASCVD risk ≥ 15% over 10 years	**Initiate or continue moderate- to high-intensity statin.**
People with diabetes, aged 40–75, with ASCVD risk ≥ 7.5% over 10 years	**Initiate or continue moderate-intensity statin. Consider use of a high-intensity statin.**
People with diabetes, aged 40–75, with LDL cholesterol 70–189 mg/dL	**Initiate or continue moderate-intensity statin.**
LDL cholesterol ≥ 190 mg/dL	**Initiate or continue high-intensity statin.**

Eat **BETTER**

Eat more **FRUITS, VEGETABLES, NUTS, WHOLE GRAINS, FISH OR LEAN MEATS.**

LIMIT OR AVOID	EXAMPLES
 **Saturated fat**	Red meat, Whole-fat dairy products
 **Processed meats**	Deli meat, hot dogs, sausages, bacon
 **Refined carbohydrates**	Candy, cakes and ice cream
 **Sugar-sweetened beverages**	Soda pop, juices
 **Salt**	Often found in frozen meals, canned foods, pickles, chips

Move **MORE**

Adults should get **AT LEAST 150 MINUTES OF MODERATE-INTENSITY EXERCISE OR 75 MINUTES OF VIGOROUS EXERCISE** each week to promote good health. If you can't reach that goal at first, some activity – **EVEN JUST 10 MINUTES AT A TIME** – can help.

INTENSITY	EXAMPLES
Light	Walking slowly, cooking, light housework
Moderate	Brisk walking (2.4 mph–4 mph), ballroom dancing, recreational swimming
Vigorous	Jogging, biking (≥10 mph), singles tennis, swimming laps

MANAGE Stress

Too much **STRESS MAY BE HARMFUL TO THE HEART.** Handling stress in a healthy way and staying connected are key to heart health.

DE-STRESS: For some people, taking deep breaths, meditating or yoga can help.

GET ENOUGH SLEEP: Try to get at least seven hours of sleep each night. Not sleeping enough has been linked to a greater risk for heart disease, obesity, and other health issues.

CONNECT MORE: Loneliness has been linked to poorer health. If you have no one to talk to in times of need or feel alone, ask your health care professional about support groups.

https://tools.acc.org/ascvd-risk-estimator-plus/#!/calculate/estimate/

Current Age *

Age must be between 20-79

Sex *

Male | Female

Race *

White | African American | Other

Systolic Blood Pressure (mm Hg) *

Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *

Value must be between 60-130

Total Cholesterol (mg/dL) *

Value must be between 130 - 320

HDL Cholesterol (mg/dL) *

Value must be between 20 - 100

LDL Cholesterol (mg/dL)

Value must be between 30-300

History of Diabetes? *

Yes | No

Smoker? *

Current | Former | Never

On Hypertension Treatment? *

Yes | No

On a Statin?

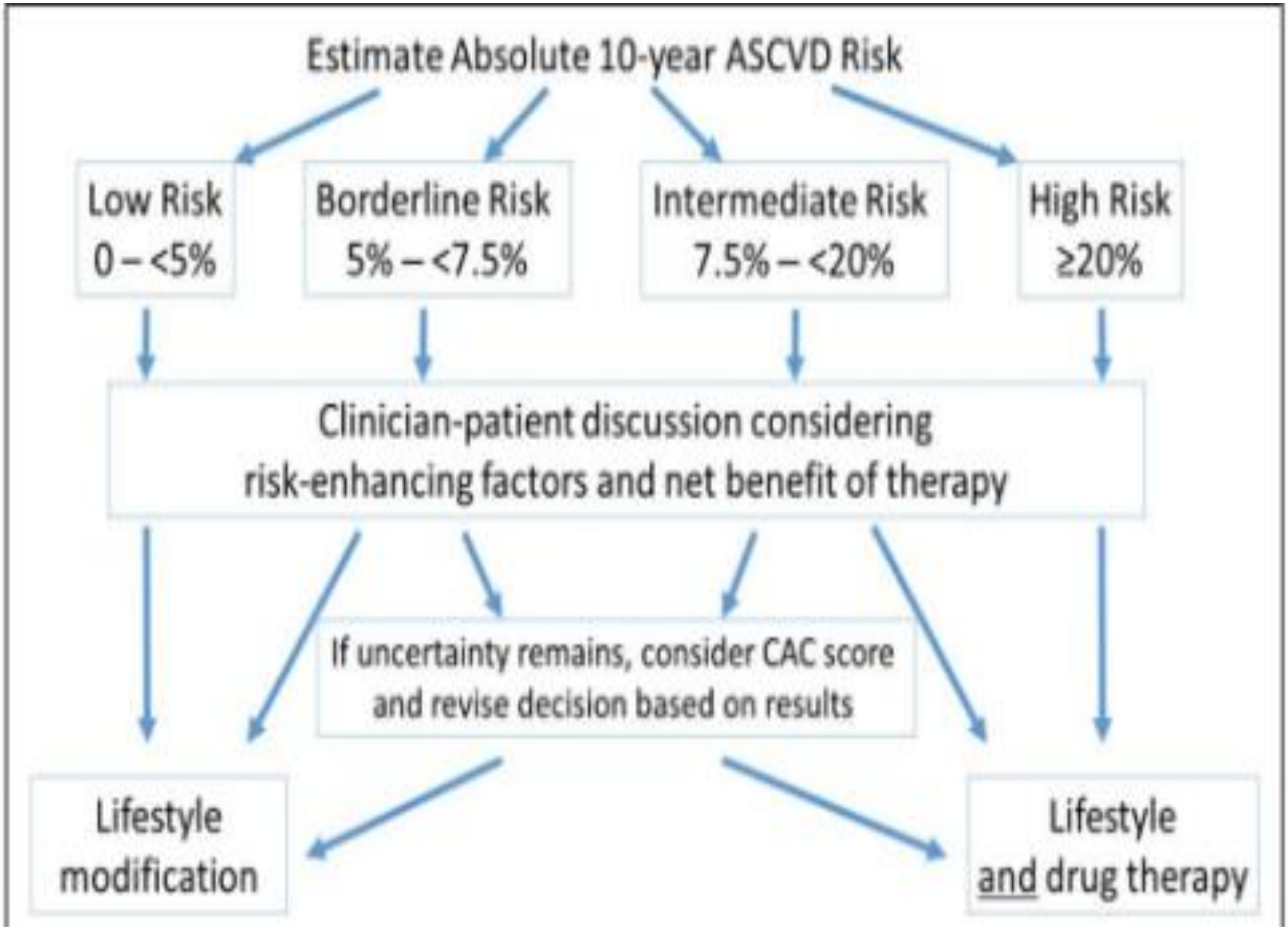
Yes | No

On Aspirin Therapy?

Yes | No

Do you want to refine current risk estimation using data from a previous visit?

Yes | No


Estimate Absolute 10-year ASCVD Risk
Low Risk
0 – <5%
Borderline Risk
5% – <7.5%
Intermediate Risk
7.5% – <20%
High Risk
≥20%
Clinician-patient discussion considering
risk-enhancing factors and net benefit of therapy
If uncertainty remains, consider CAC score
and revise decision based on results
Lifestyle
modification
Lifestyle
and drug therapy

THANK YOU