

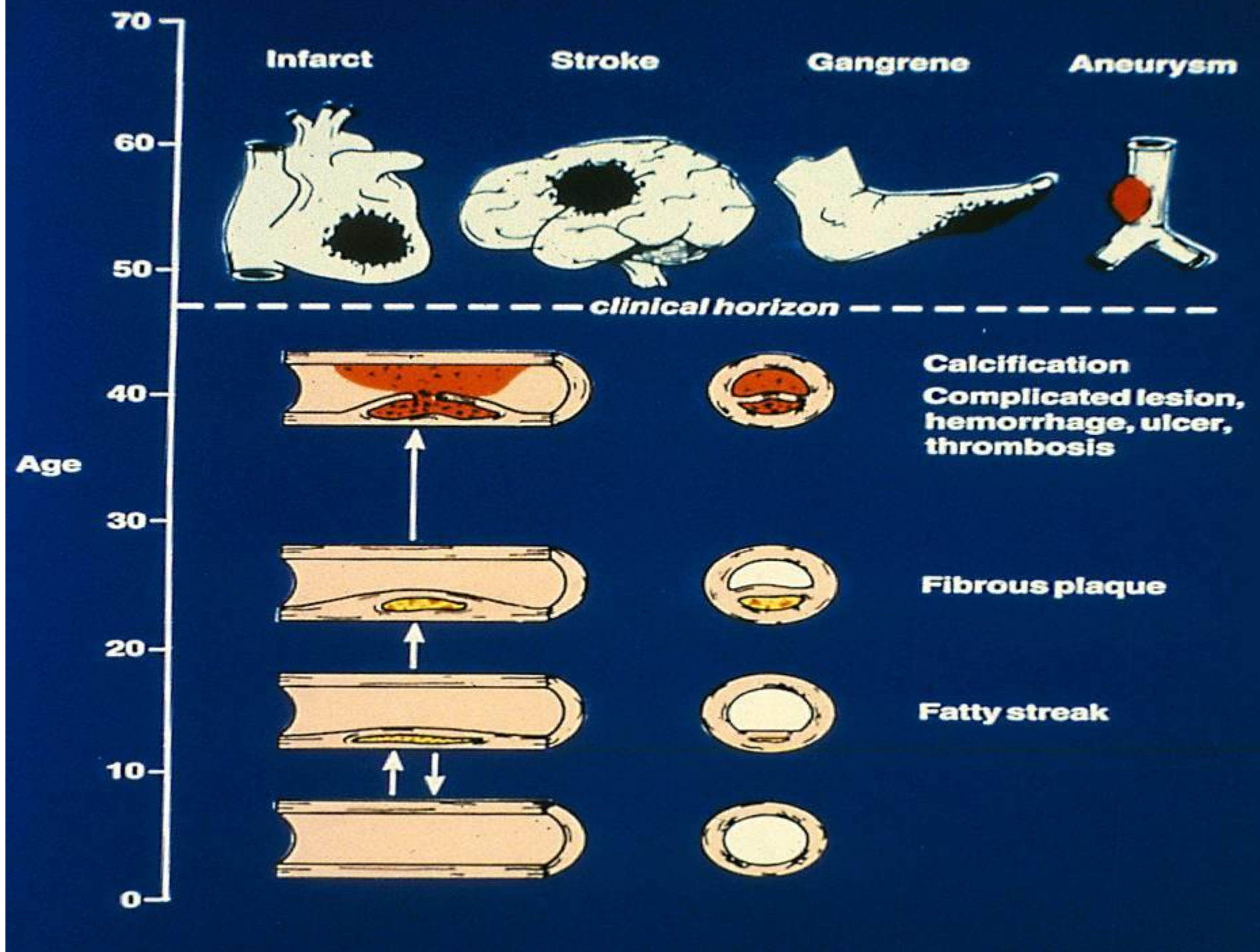
PREVENTION OF CARDIOVASCULAR DISEASE



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Rationale for targeting high-risk groups

- ▶ The **debilitating** and often **fatal** complications of cardiovascular disease (CVD) are usually seen in middle-aged or elderly men and women.
- ▶ However, **atherosclerosis** – the **main** pathological process leading to coronary artery disease, cerebral artery disease and peripheral artery disease – **begins early** in life and **progresses gradually** through adolescence and early adulthood
- ▶ It is usually **asymptomatic** for a long period



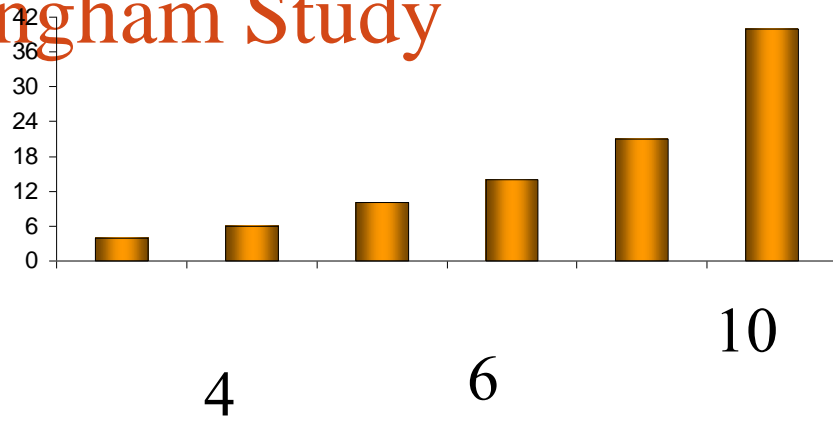
- ▶ The **rate of progression** of atherosclerosis is influenced by cardiovascular risk factors: **tobacco** use, an **unhealthy** diet and physical **inactivity** (which together result in **obesity**), hypertension, dyslipidaemia and diabetes
- ▶ Continuing exposure to these risk factors leads to further progression of atherosclerosis, resulting in **unstable atherosclerotic plaques**, **narrowing** of blood vessels and obstruction of blood flow to vital organs, such as the heart and the brain

- ▶ The clinical manifestations of these diseases include **angina**, myocardial **infarction**, transient cerebral ischaemic attacks and **strokes**
- ▶ Given this continuum of **risk exposure** and disease, the division of prevention of cardiovascular disease into **primary**, **secondary** and **tertiary** prevention is arbitrary, but may be useful for development of services by different parts of the health care system
- ▶ The concept of a specific **threshold** for hypertension and hyperlipidaemia is also based on an arbitrary dichotomy

- ▶ **Total CVD risk** is defined as the **probability** of an individual's experiencing a CVD event (e.g. myocardial infarction or stroke) over a given period of time, for example 10 years

Effect of Multiple Risk Factors on Probability of CAD: Framingham Study

10-Year % Probability of Event



SBP	150-160	+	+	+	+	+	+	+	+	+
Cholesterol	6.2-6.8	-	+	+	+	+	+	+	+	+
HDL-C	0.8-0.9	-	-	+	+	+	+	+	+	+
Diabetes		-	-	-	+	+	+	+	+	+
Cigarettes		-	-	-	-	-	+	+	+	+
ECG-LVH		-	-	-	-	-	-	-	+	+


14

21


40

7

- ▶ Timely and sustained **lifestyle** interventions and, when needed, **drug treatment** will **reduce** the risk of **CVD events**, such as heart attacks and strokes, in people with a high total risk of CVD, and hence will reduce premature **morbidity**, mortality and disability
- ▶ **Many** people are **unaware** of their risk status; opportunistic and other forms of **screening** by health care providers are therefore a potentially **useful** means of **detecting risk factors**, such as raised blood pressure, abnormal blood lipids and blood glucose

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- ▶ The **predicted risk** of an individual can be a **useful guide** for making clinical decisions on the **intensity of preventive interventions**: when **dietary** advice should be strict and specific, when suggestions for **physical activity** should be intensified and individualized, and when and which **drugs** should be prescribed to control risk factors
 - ▶ Such a **risk stratification** approach is particularly suitable to settings with **limited resources**, where saving the greatest number of lives at lowest cost becomes imperative

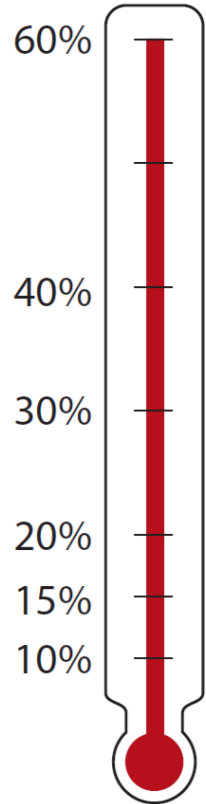
- ▶ If **BP reduced** by 10–15 mmHg (systolic) and 5–8 mmHg (diastolic) and blood **cholesterol by about 20%** through combined treatment with antihypertensives and statins, then **cardiovascular** disease morbidity and mortality would be reduced by **up to 50%**
- ▶ People at very **high CVD risk** would **benefit more**, in terms of number of events avoided, because the relative risk reduction would be applied to a higher baseline risk. Therefore, **targeting** patients with a **high risk** is the **first priority** in a risk stratification approach

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- ▶ It should be noted that patients who already have symptoms of atherosclerosis, such as **angina** or intermittent claudication, or who have had a myocardial **infarction**, transient ischaemic attack, or **stroke** are at **very high risk** of coronary, cerebral and peripheral vascular events and death
 - ▶ These people are the **top priority** in clinical practice for **prevention** efforts

- ▶ They **require** both **lifestyle** and **pharmacological** interventions to help them to quit using tobacco, eat a healthy diet, increase physical activity, and manage their weight, blood pressure, blood lipids and blood glucose
- ▶ Although cardiovascular events are less likely to occur in people with low levels of risk, **no level** of risk can be considered “**safe**”

- ▶ As the **threshold** for intervention is **lowered**, the number of individuals eligible to **benefit increases**, but so do the **costs** and the number of adverse events caused by drug treatments

Total CVD risk (over 10 years)



The chances of developing fatal and nonfatal cardiovascular events increase with increasing cardiovascular risk.

Goal of treatment: Reduction of total cardiovascular risk

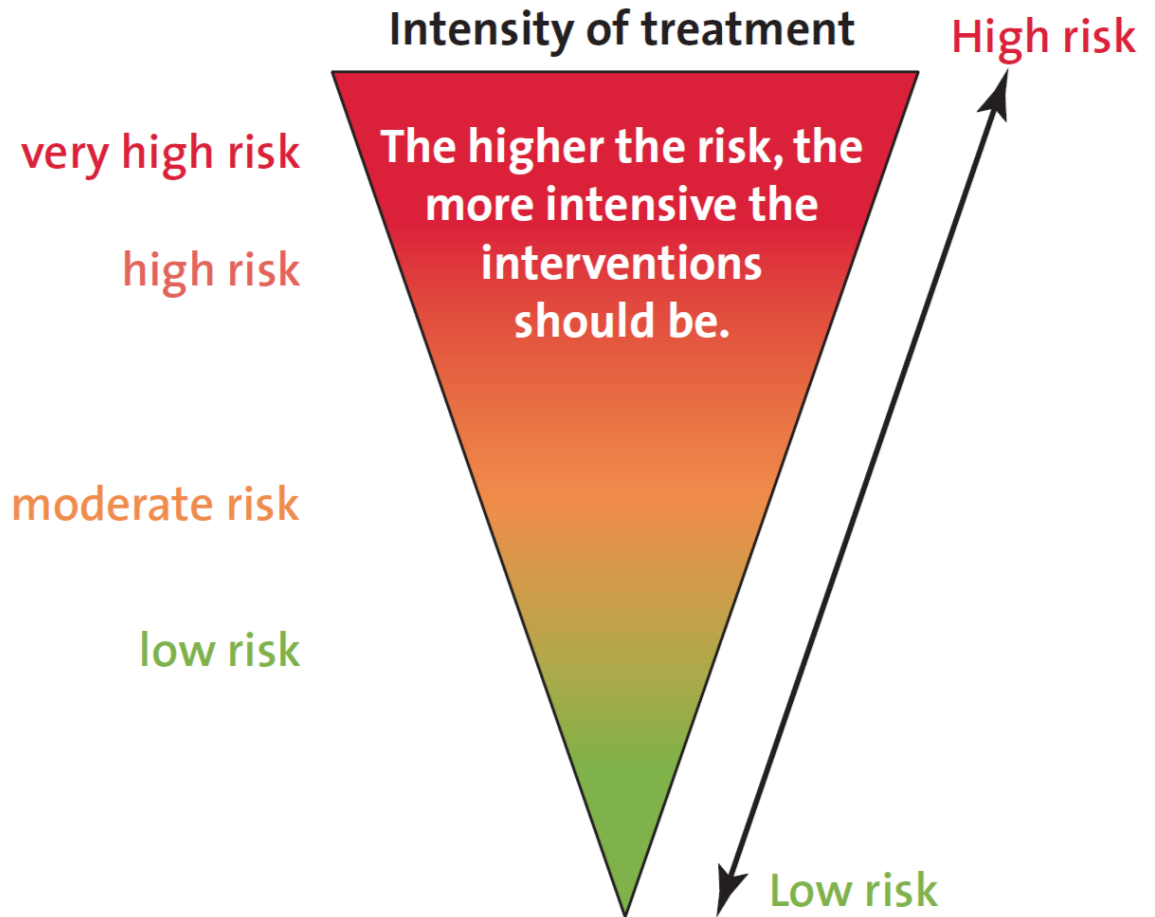


FIGURE 2

Intensity of interventions should be proportional to the total cardiovascular risk

Clinical assessment of cardiovascular risk

- ▶ Clinical assessment should be conducted with four aims:
- ▶ ● to search for **all** cardiovascular **risk factors** and clinical conditions that may influence prognosis and treatment;
- ▶ ● to determine the presence of **target organ damage** (heart, kidneys and retina);
- ▶ ● to identify those at **high risk** and in need of **urgent intervention**;
- ▶ ● to identify those who need **special investigations** or referral (e.g. those with secondary hypertension)

Clinical history

- ▶ A comprehensive clinical **history** should include:
- ▶ ● **current symptoms** of coronary heart disease, heart failure, cerebrovascular disease, peripheral vascular disease, diabetes, and renal disease;
- ▶ ● information on the **use of drugs** known to **raise blood** pressure (oral contraceptives, **nonsteroidal** anti-inflammatory drugs, liquorice, cocaine, amphetamine, erythropoietin, cyclosporins and steroids);

- ▶ ● the **family history** of high blood pressure, diabetes, dyslipidaemia, coronary heart disease, stroke and renal disease;
- ▶ ● the personal history of coronary heart disease, heart failure, cerebrovascular disease, peripheral vascular disease, diabetes, gout, bronchospasm, sexual dysfunction, and renal disease;
- ▶ ● symptoms suggestive of secondary hypertension, i.e. hypertension caused by an underlying condition
- ▶ ● information on behavior, including **tobacco use**, **physical activity** and dietary intake of fat, salt and alcohol;
- ▶ ● personal, **psychosocial**, occupational and environmental factors that could influence the course and outcome of long-term care.

Physical examination

- ▶ A full physical examination is essential, and should include careful measurement of **blood pressure**

Other important elements of the physical examination include:

- ▶ ● measurement of height and weight, and calculation of body mass index (**BMI**) ; measurement of **waist** and hip circumference
- ▶ for calculation of waist–hip ratio

- ▶ ● **examination of the cardiovascular system**, evidence of heart failure, evidence of disease in the carotid, renal and peripheral arteries, and physical signs suggestive of coarctation of the aorta, particularly in young people with hypertension;
- ▶ ● examination for features of secondary hypertension (phaeochromocytoma, Cushing syndrome, etc.)
- ▶ ● examination of the lungs for congestion ;
- ▶ ● examination of the abdomen for bruits, enlarged kidneys and other masses;
- ▶ ● examination of the optic fundi and of the central and peripheral nervous system for evidence of cerebrovascular disease and complications of diabetes.

Goals of applying the prevention recommendations

- ▶ The **purpose** of applying the recommendations elaborated in these guidelines is to **motivate** and
- ▶ assist **high-risk** individuals to **lower their** cardiovascular risk by:
 - ▶ ● quitting **tobacco use**, or reducing the amount smoked, or not starting the habit;
 - ▶ ● making **healthy food** choices;
 - ▶ ● being physically **active**;
 - ▶ ● reducing **body mass index** (to less than 25 kg/m²) and waist–hip ratio (to less than 0.8 in women and 0.9 in men
 - ▶ ● lowering **blood pressure** (to less than 140/90 mmHg);
 - ▶ ● lowering blood cholesterol (to less than 5 mmol/l or 190 mg/dl);
 - ▶ ● lowering **LDL-cholesterol** (to less than 3.0 mmol/l or 115 mg/dl);
 - ▶ ● **controlling glycaemia**, especially in those with impaired fasting glycaemia and impaired glucose tolerance or diabetes;

- ▶ The **above goals** represent the **minimum** that should be achieved. They are given for broad guidance in managing cardiovascular risk
- ▶ In some subgroups of high-risk people, particularly those with established cardiovascular disease or diabetes, a case can be made for lower targets for blood pressure (< 130/80 mmHg), total cholesterol and LDL-cholesterol, which **may require more intensive treatment**

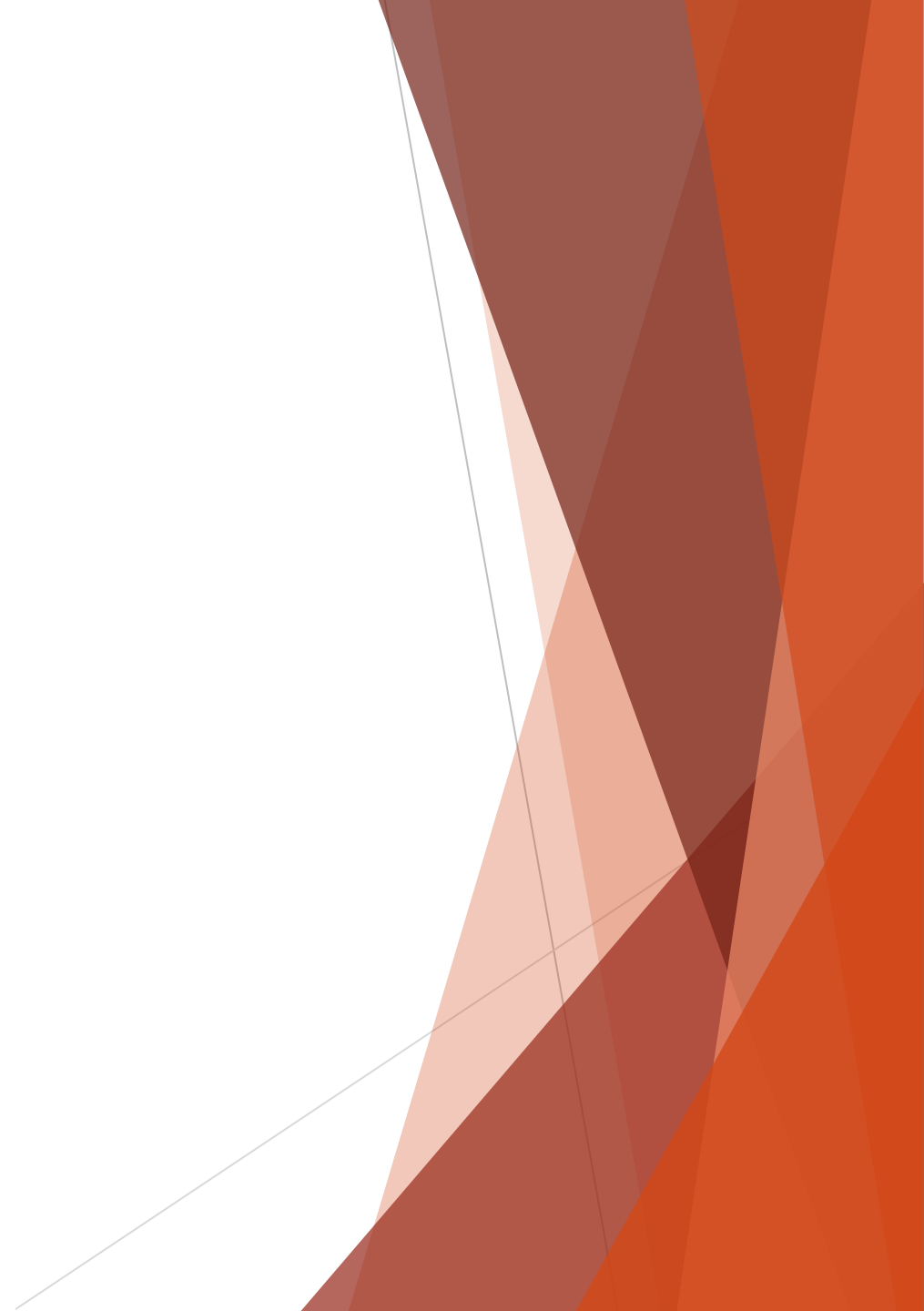
TABLE 6

Prevention of cardiovascular disease according to individual total risk^a

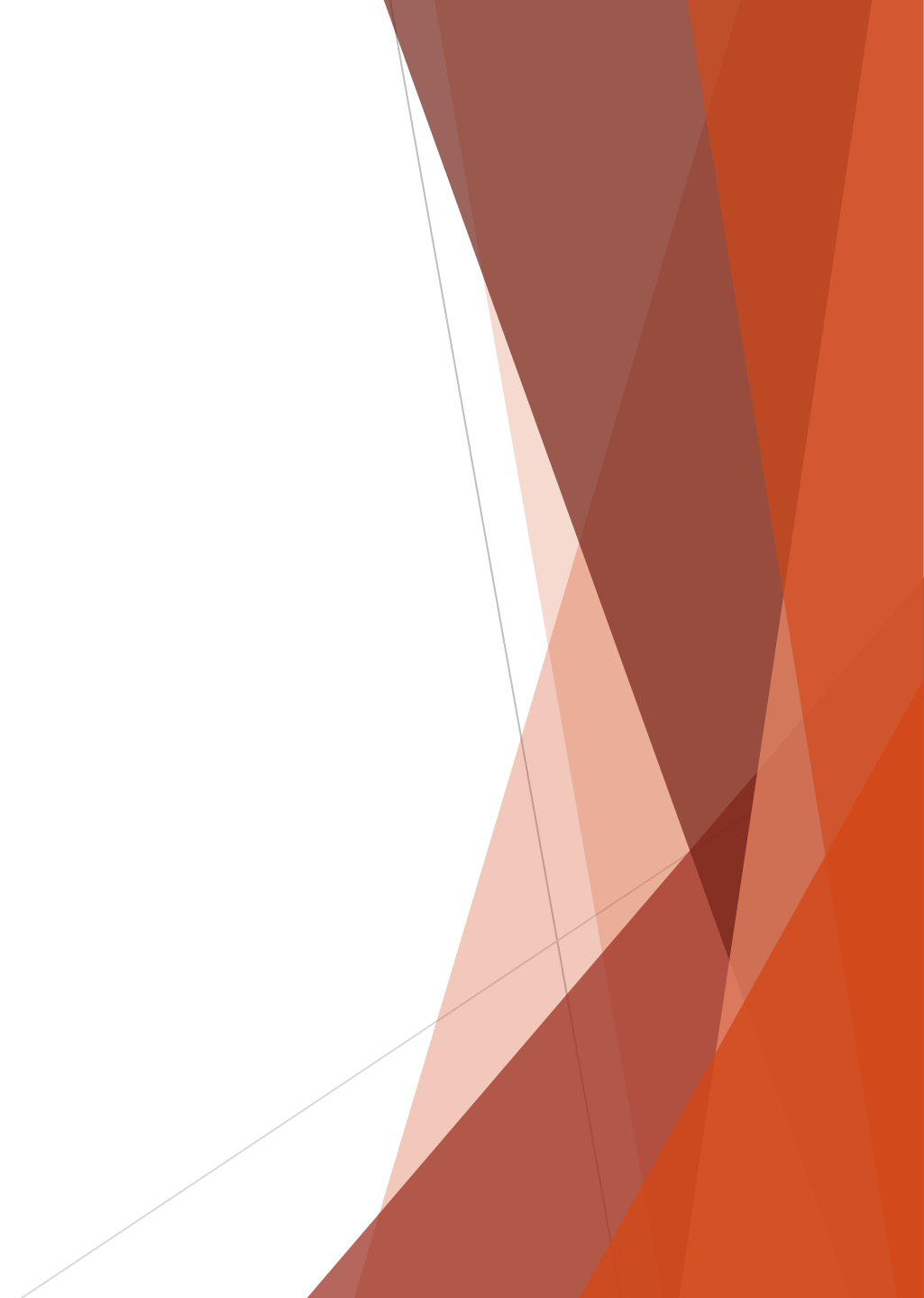
10-year risk of cardiovascular event >30%	10-year risk of cardiovascular event 20–30%	10-year risk of cardiovascular event 10–20%	10-year risk of cardiovascular event <10%
Individuals in this category are at very high risk of fatal or nonfatal vascular events. Monitor risk profile every 3–6 months	Individuals in this category are at high risk of fatal or nonfatal vascular events. Monitor risk profile every 3–6 months	Individuals in this category are at moderate risk of fatal or nonfatal vascular events. Monitor risk profile every 6–12 months	Individuals in this category are at low risk. Low risk does not mean “no” risk. Conservative management focusing on lifestyle interventions is suggested ^b .
When resources are limited, individual counselling and provision of care may have to be prioritized according to cardiovascular risk.			
SMOKING CESSATION			
All nonsmokers should be encouraged not to start smoking. All smokers should be strongly encouraged to quit smoking by a health professional and supported in their efforts to do so. (1++, A) It is suggested that those who use other forms of tobacco be advised to stop. (2+, C)			
Nicotine replacement therapy and/or nortriptyline or amfebutamone (bupropion) should be given to motivated smokers who fail to quit with counselling. (1++, B)	Nicotine replacement therapy and/or nortriptyline or amfebutamone (bupropion) should be given to motivated smokers who fail to quit with counselling. (1++, B)		

continued ...

10-year risk of cardiovascular event > 30%	10-year risk of cardiovascular event 20–30%	10-year risk of cardiovascular event 10–20%	10-year risk of cardiovascular event < 10%
DIETARY CHANGES			
<p>All individuals should be strongly encouraged to reduce total fat and saturated fat intake (1+, A). Total fat intake should be reduced to about 30% of calories, saturated fat intake should be limited to less than 10% of calories and trans-fatty acids eliminated. Most dietary fat should be polyunsaturated (up to 10% of calories) or monounsaturated (10–15% of calories). (1+, A)</p> <p>All individuals should be strongly encouraged to reduce daily salt intake by at least one-third and, if possible, to <5 g or 90 mmol per day. (1+, A)</p> <p>All individuals should be encouraged to eat, at least 400 g a day, of a range fruits and vegetables, as well as whole grains and pulses. (2+, A)</p>			
PHYSICAL ACTIVITY			
<p>All individuals should be strongly encouraged to take at least 30 minutes of moderate physical activity (e.g. brisk walking) a day, through leisure time, daily tasks and work-related physical activity. (1+, A)</p>			
WEIGHT CONTROL			
<p>All individuals who are overweight or obese should be encouraged to lose weight through a combination of a reduced-energy diet (dietary advice) and increased physical activity. (1+, A)</p>			
ALCOHOL INTAKE			
<p>Individuals who take more than 3 units of alcohol^c per day should be advised to reduce alcohol consumption. (2++, B)</p>			



10-year risk of cardiovascular event >30%	10-year risk of cardiovascular event 20–30%	10-year risk of cardiovascular event 10–20%	10-year risk of cardiovascular event <10%
ANTIHYPERTENSIVE DRUGS ✓			
All individuals with blood pressure at or above 160/100 mm Hg, or lesser degree of raised blood pressure with target organ damage should have drug treatment and specific lifestyle advice to lower their blood pressure and risk of cardiovascular disease (2++, B) .			
<p>Individuals with persistent blood pressure $\geq 130/80$ mmHg should be given one of the following drugs to reduce blood pressure and risk of cardiovascular disease: thiazide-like diuretic, ACE inhibitor, calcium-channel blocker, beta-blocker.^d</p> <p>A low-dose thiazide-like diuretic, ACE inhibitor, or calcium-channel blocker is recommended as first-line therapy. (1++, A).</p>	<p>Individuals with persistent blood pressure $\geq 140/90$ mmHg^e who are unable to lower blood pressure through life style strategies with professional assistance within 4–6 months, should be considered for one of the following drugs to reduce blood pressure and risk of cardiovascular disease: thiazide-like diuretic, ACE inhibitor, calcium-channel blocker, beta-blocker.^d</p> <p>A low-dose thiazide-like diuretic, ACE inhibitor, or calcium-channel blocker is recommended as first-line therapy. (1++, A)</p>	<p>Individuals with persistent blood pressure $\geq 140/90$ mmHg,^e should continue life style strategies to lower blood pressure and have their blood pressure and total cardiovascular risk reassessed annually depending on clinical circumstances and resource availability.</p>	<p>Individuals with persistent blood pressure $\geq 140/90$ mmHg,^e should continue life style strategies to lower blood pressure and have their blood pressure and total cardiovascular risk reassessed every two to five years depending on clinical circumstances and resource availability.</p>



10-year risk of cardiovascular event >30%	10-year risk of cardiovascular event 20–30%	10-year risk of cardiovascular event 10–20%	10-year risk of cardiovascular event <10%
LIPID-LOWERING DRUGS (STATINS) ✓			
All individuals with total cholesterol at or above 8 mmol/l (320 mg/dl), should be advised to follow a lipid-lowering diet and given a statin to lower the risk of cardiovascular disease (2++, B) .			
<p>Individuals in this risk category should be advised to follow a lipid-lowering diet and given a statin. (1++, A)</p> <p>Serum cholesterol should be reduced to less than 5.0 mmol/l (LDL-cholesterol to below 3.0 mmol/l), or by 25% (30% for LDL cholesterol) which ever is greater.^f</p>	<p>Adults over the age of 40 years with persistently high serum cholesterol (>5.0 mmol/l), and or LDL-cholesterol >3.0 mmol/l, despite a lipid-lowering diet, should be given a statin. (1+, A)</p>	<p>Should be advised to follow a lipid lowering diet^g</p>	
HYPOGLYCEMIC DRUGS ✓			
<p>Individuals with persistent fasting blood glucose >6 mmol/l despite diet control should be given metformin. (1+, A)</p>		<p>Recommendations as for moderate risk, as resources permit.</p>	

10-year risk of cardiovascular event >30%	10-year risk of cardiovascular event 20–30%	10-year risk of cardiovascular event 10–20%	10-year risk of cardiovascular event <10%
ANTIPLATELET DRUGS ✓			
Individuals in this risk category should be given low-dose aspirin. (1++, A)	For individuals in this risk category cardiovascular risk, the balance of benefits and harms from aspirin treatment is not clear. ^h Aspirin should probably not be given to individuals in this risk category. (1++, A)	For individuals in this risk category, the benefits of aspirin treatment are balanced by the harm caused. Aspirin should not be given to. (1++, A)	For individuals in this risk category, the harm caused by aspirin treatment outweighs the benefits. Aspirin should not be given to individuals in this low risk category. (1++, A)
DRUGS THAT ARE NOT RECOMMENDED			
Hormone replacement, vitamin B, C, E and folic acid supplements, are not recommended for reduction of cardiovascular risk.			

Tobacco



- ▶ ● Does quitting use of tobacco products reduce cardiovascular risk?
- ▶ ● How can smokers be helped to stop smoking?

Evidence

- ▶ There is a large body of evidence from prospective cohort studies regarding the **beneficial** effect of smoking **cessation** on coronary heart disease **mortality**. However, the magnitude of the effect and the **time required** to achieve beneficial results are unclear
- ▶ Some studies suggest that, about 10 years after stopping smoking, coronary heart disease mortality risk is reduced to that of people who have never smoked

- ▶ It has also been shown that cigarette smokers who **change** to a pipe and those who continue to smoke but reduce the number of cigarettes, have a **greater mortality** risk than those who **quit smoking**
- ▶ Recent evidence from the Interheart study has highlighted the **adverse effects** of use of **any tobacco** product and, importantly, the harm caused by even **very low consumption** (1–5 cigarettes a day)

- ▶ Data from observational studies suggest that **passive** cigarette smoking produces **increase** in cardio vascular risk

Diet

- ▶ Are there specific dietary changes that can reduce cardiovascular risk?
- ▶ Effect on cardiovascular risk of saturated fat, unsaturated fat, trans-fatty acids and cholesterol in the diet

- ▶ The relationship between dietary fat and coronary heart disease has been extensively investigated
- ▶ **Saturated fats** as a whole have been shown to **raise LDL-cholesterol** levels

- ▶ When substituted for saturated fatty acids in metabolic studies, n-6 polyunsaturated fatty acids (which are abundant in soybean and sunflower oil) and monounsaturated fatty acids (which are abundant in olive oil) **lower total cholesterol**, LDL cholesterol and triglyceride concentrations

- ▶ **Trans-fatty acids** come from both animal and vegetable sources and are produced by partial hydrogenation of unsaturated oils. Dietary intake of **trans-fatty acids increases** LDL-cholesterol and, at high intakes, lowers HDL cholesterol
- ▶ Metabolic and epidemiological studies have indicated that trans-fatty acids **increase the risk of coronary** heart disease

- ▶ A **high intake** of fat (more than **one-third** of total calories) generally increases intake of saturated fat and is associated with consumption of excess calories and **weight gain**
- ▶ A **low intake** of fats and oils (less than one-fifth of total calories) increases the risk of **inadequate intakes of vitamin E** and **essential fatty acids**, and may contribute to unfavourable changes in **HDL-cholesterol** and triglycerides
- ▶ It has also been demonstrated that **replacing** saturated and trans-unsaturated fats with monounsaturated and polyunsaturated fats is **more effective** in **preventing coronary** heart disease events than reducing overall fat intake

Omega-3 fatty acids, fish and cardiovascular risk

- ▶ The main dietary sources of omega-3 fatty acids are **fish** and fish oils (which contain eicosapentaenoic acid and docosahexaenoic acid), and certain nut and plant oils, such as canola, soybean, flaxseed and walnut (which contain alpha-linoleic acid)
- ▶ Epidemiological studies and clinical trials **suggest** that people at risk of coronary heart disease **benefit** from consuming omega-3 fatty acids
- ▶ The proposed **mechanisms** for a cardioprotective role include altered lipid profile, **reduced thrombotic tendency**, and antihypertensive, anti-**inflammatory** and antiarrhythmic effects

Increasing the intake of fruits and vegetables

- ▶ Does increased fruit and vegetables consumption reduce the risk of cardiovascular disease?
- ▶ Fruits and vegetables may promote **cardiovascular health** through a variety of micronutrients, **antioxidants**, phytochemicals, flavonoids, **fibre** and potassium
- ▶ On the basis of the available evidence, a daily intake of at least 400 g of fruit and vegetables is recommended



Summary

- ▶ Dietary intakes of fat, cholesterol, fruits and vegetables, fish and sodium are linked to cardiovascular risk
- ▶ There is a **considerable body of evidence** regarding the **nutritional background** of **atherosclerosis** in general and CHD in particular.

- ▶ A **cardioprotective diet** should consist of a variety of foods, and should aim to achieve four major goals: a healthy overall diet, a healthy body **weight**, a **desirable lipid** profile, and a **desirable blood pressure**, Blood Glucose

Physical activity

- ▶ Does regular physical activity reduce cardiovascular risk?



EXERCISE

A graphic illustration where the word "EXERCISE" is formed by large, colorful letters. Each letter is held up by a hand of a different skin tone, symbolizing diversity and community. The letters are: 'E' (red), 'X' (green), 'E' (blue), 'R' (pink), 'C' (yellow), 'I' (purple), 'S' (red), and 'E' (blue). The hands are positioned below the letters, supporting them from underneath. The background is white, and the image is framed by orange geometric shapes at the top and bottom corners.

Evidence

- ▶ It has been estimated that inadequate physical activity is responsible for about **one-third** of **deaths** due to **coronary** heart disease and type 2 **diabetes**

- ▶ Physical activity **improves endothelial function**, which enhances vasodilatation and vasomotor function in the blood vessels. In addition, physical activity contributes to **weight loss, glycaemic control**, improved **blood pressure, lipid** profile and **insulin sensitivity**
- ▶ Overall, the evidence points to the benefit of continued **regular moderate** physical activity, which does not need to be strenuous or prolonged, and can include daily leisure activities, such as walking or gardening
- ▶ Taking up regular light or moderate physical activity in middle or older age **significantly reduces CVD** and all-cause mortality, and **improves the quality** of life



- ▶ In summary, a **sedentary lifestyle** is associated with **increased risk** of cardiovascular disease
- ▶ **Moreover**, physical activity is associated with **reduced risk** of coronary heart disease and CVD mortality, in **both men and women**, and in middle-aged and older individuals

Body weight

- ▶ Does losing weight reduce the cardiovascular risk for those who are overweight or obese?



Evidence

- ▶ Obesity is a **growing health problem** in both developed and developing countries
- ▶ Prospective epidemiological studies have shown a **relationship** between overweight or obesity and cardiovascular morbidity, CVD mortality and **total mortality**
- ▶ **Obesity** is strongly related to major cardiovascular **risk factors**, such as raised blood pressure, glucose intolerance, type 2 diabetes, and dyslipidaemia

- ▶ Weight loss programmes using **dietary**, physical **activity**, or behavioural interventions have been shown to produce **significant reductions** in weight among people with pre-diabetes, and a significant decrease in **diabetes incidence**

Psychosocial factors

- ▶ Are there specific psychosocial interventions that can reduce cardiovascular risk

Evidence

- ▶ Observational studies have indicated that some psychosocial factors, such as **depression** and **anxiety**, lack of social support, social isolation, and stressful conditions at work, independently influence the **occurrence** of major risk factors and the course of **coronary heart disease**, even after adjusting for confounding factors
- ▶ Other psychosocial factors, such as hostility and type A behaviour patterns, and anxiety or **panic disorders**, show an **inconsistent** association

Blood pressure lowering

- ▶ Does lowering blood pressure reduce cardiovascular risk?



Evidence

- ▶ Raised blood pressure is estimated to cause about **7 million premature deaths** throughout the world, and 4.5% of the disease burden (64 million disability-adjusted life years (DALYs))
- ▶ It is a **major risk factor** for cerebrovascular disease, coronary heart disease, and cardiac and renal failure
- ▶ **Treating** raised blood pressure has been associated with a 35–40% **reduction** in the risk of **stroke** and at least a 16% reduction in the risk of myocardial **infarction**

Lipid lowering

- ▶ Does treatment with statins reduce cardiovascular risk?

Evidence

- ▶ Many studies have shown that the benefits of cholesterol-lowering therapy depend on the initial level of cardiovascular risk: the **higher the total risk**, the **greater** the benefit
- ▶ This is because the relative reductions in risk as a consequence of lipid lowering are approximately the same at different levels of cardiovascular risk
- ▶ The **effectiveness of statins** in patients with **established atherosclerotic** disease (principally coronary artery disease) is well established. Primary prevention trials, on the other hand, are more limited

Intervention strategies

Total CV risk (SCORE) %	LDL-C levels				
	<70 mg/dL <1.8 mmol/L	70 to <100 mg/dL 1.8 to <2.6 mmol/L	100 to <155 mg/dL 2.6 to <4.0 mmol/L	155 to <190 mg/dL 4.0 to <4.9 mmol/L	≥190 mg/dL ≥4.9 mmol/L
<1	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle advice	Lifestyle advice, consider drug if uncontrolled
Class/Level	I/C	I/C	I/C	I/C	IIa/A
≥1 to <5	Lifestyle advice	Lifestyle advice	Lifestyle advice, consider drug if uncontrolled	Lifestyle advice, consider drug if uncontrolled	Lifestyle advice, consider drug if uncontrolled
Class/Level	I/C	I/C	IIa/A	IIa/A	I/A
≥5 to <10, or high-risk	Lifestyle advice	Lifestyle advice, consider drug if uncontrolled	Lifestyle advice and drug treatment for most	Lifestyle advice and drug treatment	Lifestyle advice and drug treatment
Class/Level	IIa/A	IIa/A	IIa/A	I/A	I/A
≥10 or very high-risk	Lifestyle advice, consider drug ^a	Lifestyle advice and concomitant drug treatment	Lifestyle advice and concomitant drug treatment	Lifestyle advice and concomitant drug treatment	Lifestyle advice and concomitant drug treatment
Class/Level	IIa/A	IIa/A	I/A	IA	I/A

^aIn patients with myocardial infarction, statin therapy should be considered irrespective of total cholesterol levels.

Control of glycaemia

- ▶ Does control of glycaemia reduce cardiovascular risk in patients with diabetes?



Evidence

- ▶ **Cardiovascular** disease accounts for about **60% of all mortality** in people with **diabetes**. The risk of cardiovascular events is 2–3 times higher in people with type 1 or type 2 diabetes
- ▶ Epidemiological evidence also suggests that the association between blood glucose and cardiovascular disease begins before diabetes manifests itself
- ▶ The United Kingdom Prospective Diabetes Study (UKPDS) found that **glycaemic control** in people with type 2 diabetes **reduced the frequency** of microvascular complications, such as blindness, amputation, and end-stage renal disease

Treatment targets and goals for cardiovascular disease prevention

Smoking	No exposure to tobacco in any form.
Diet	Healthy diet low in saturated fat with a focus on whole grain products, vegetables, fruit and fish.
Physical activity	2.5–5 h moderately vigorous physical activity per week or 30–60 min most days.
Body weight	BMI 20–25 kg/m ² , waist circumference <94 cm (men) and <80 cm (women).
Blood pressure	<140/90 mmHg.
Lipid LDL-C is the primary target	Very high-risk: LDL-C <1.8 mmol/L (70 mg/dL) or a reduction of at least 50% if the baseline is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL).
	High-risk: LDL-C <2.6 mmol/L (100 mg/dL) or a reduction of at least 50% if the baseline is between 2.6 and 5.2 mmol/L (100 and 200 mg/dL).
	Low to moderate risk: LDL-C <3 mmol/L (115 mg/dL).
	Non-HDL-C secondary targets are <2.6, 3.4 and 3.8 mmol/L (100, 130 and 145 mg/dL) for very high-, high- and moderate-risk subjects, respectively.
	HDL-C: no target, but >1.0 mmol/L (40 mg/dL) in men and >1.2 mmol/L (48 mg/dL) in women indicates lower risk.
	TG: no target but <1.7 mmol/L (150 mg/dL) indicates lower risk and higher levels indicate a need to look for other risk factors.
Diabetes	HbA1c: <7% (<8.6 mmol/L).

Aspirin therapy

- ▶ Does long-term treatment with aspirin reduce cardiovascular risk?

Evidence

- ▶ Surprisingly, one of the **most controversial** areas in preventive medicine is whether or not people without known cardiovascular disease should take a daily aspirin for primary prevention
- ▶ Several RCTs and meta-analyses have evaluated the role of aspirin in the primary prevention of cardiovascular disease
- ▶ When considering the use of aspirin, the **benefits** must be **weighed** against the possible risks associated with its use, particularly the risk of haemorrhagic stroke but also gastrointestinal bleeding

Aspirin has unquestioned benefit for secondary prevention

- ▶ In people who have had a heart attack or certain types of stroke, the use of aspirin to prevent a second event — potentially a fatal one — is firmly established

- ▶ Primary prevention refers to trying to prevent the first event, such as heart attack or stroke. In this setting, the actual risks of a cardiovascular event are much lower, though the bleeding risks persist. Therefore, the **margin of potential benefit** is much **more narrow**.
- ▶ Higher-risk population with a greater rate of cardiovascular events, aspirin may have been useful.

Recommendation Summary

Population	Recommendation	Grade (What's This?)
Adults aged 50 to 59 years with a $\geq 10\%$ 10-year CVD risk	The USPSTF recommends initiating low-dose aspirin use for the primary prevention of cardiovascular disease (CVD) and colorectal cancer (CRC) in adults aged 50 to 59 years who have a 10% or greater 10-year CVD risk, are not at increased risk for bleeding, have a life expectancy of at least 10 years, and are willing to take low-dose aspirin daily for at least 10 years.	B
Adults aged 60 to 69 years with a $\geq 10\%$ 10-year CVD risk	The decision to initiate low-dose aspirin use for the primary prevention of CVD and CRC in adults aged 60 to 69 years who have a 10% or greater 10-year CVD risk should be an individual one. Persons who are not at increased risk for bleeding, have a life expectancy of at least 10 years, and are willing to take low-dose aspirin daily for at least 10 years are more likely to benefit. Persons who place a higher value on the potential benefits than the potential harms may choose to initiate low-dose aspirin.	C
Adults younger than 50 years	The current evidence is insufficient to assess the balance of benefits and harms of initiating aspirin use for the primary prevention of CVD and CRC in adults younger than 50 years.	I
Adults aged 70 years or older	The current evidence is insufficient to assess the balance of benefits and harms of initiating aspirin use for the primary prevention of CVD and CRC in adults aged 70 years or older.	I

▶ *Any Question?*