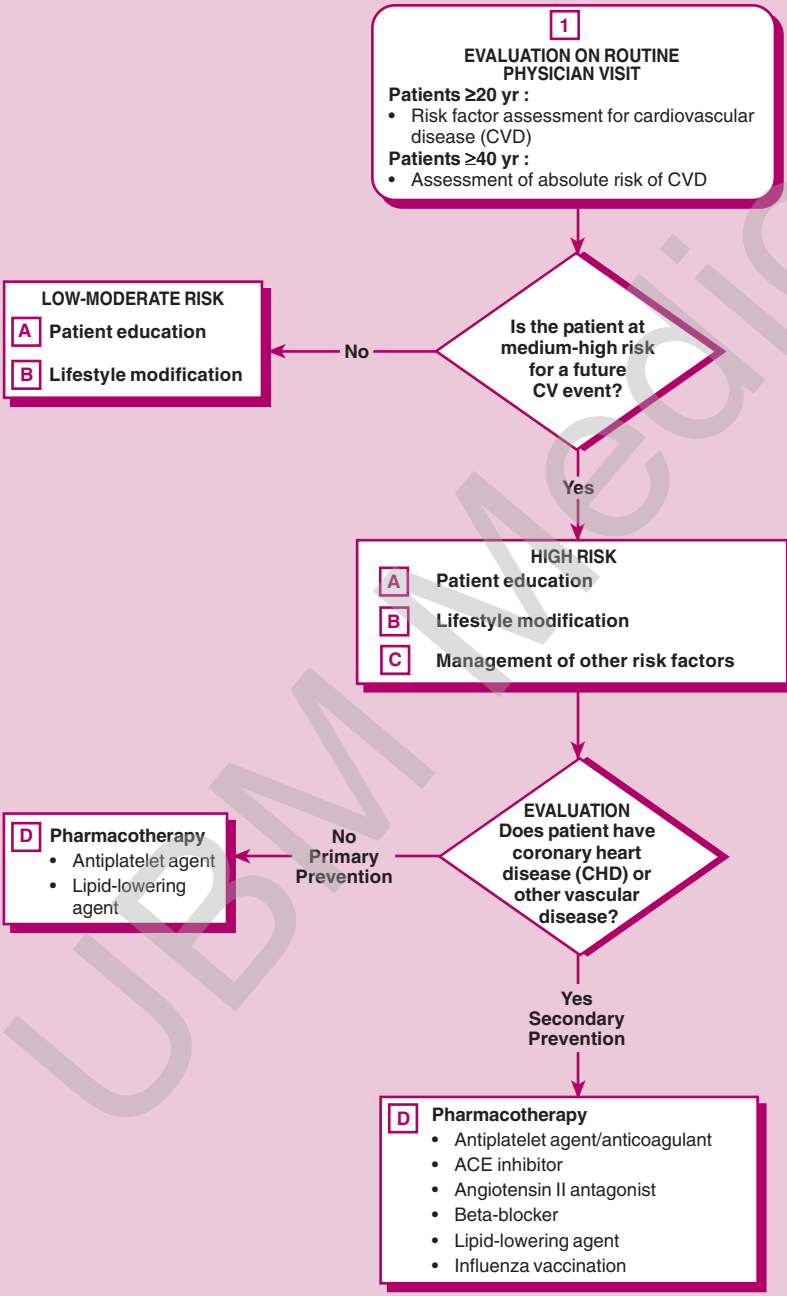
Cardiovascular Disease Prevention (1 of 6)



1 EVALUATION ON ROUTINE PHYSICIAN VISIT

- Patients ≥20 yr should receive a risk factor assessment for cardiovascular disease (CVD) at every routine physician visit

Risk Factor Assessment for CVD

History

- Family history of high blood pressure (BP), diabetes mellitus (DM), dyslipidemia, coronary heart disease (CHD), stroke, renal disease & premature CVD
  - Risk of CHD increases as number of family members w/ CHD increases & the younger the age at which family members develop the disease
- Current symptoms of atherosclerosis (eg angina, intermittent claudication, myocardial infarction (MI), transient ischemic attack (TIA), or stroke)
- Personal history of diabetes, gout, sexual dysfunction, bronchospasm, kidney disease & heart failure (HF)
- Use of drugs known to raise BP (eg oral contraceptives, NSAIDs, licorice, cocaine, amphetamine, erythropoietin, ciclosporin & steroids)
- Smoking history & status
- Alcohol consumption
- Assess intensity & frequency of physical activity
- Nutritional habits (eg salt & fat intake)
- Personal, psychosocial, occupational & environmental factors that can influence long-term care (eg depression, anxiety, lack of social support, social isolation & stressful conditions at work)

Physical Exam

- Height, weight, waist circumference
  - Calculate body mass index (BMI) by dividing patient's wt (kg) by the square of the height (m^2)
- BP, Pulse rate, Ankle-brachial index
- Comprehensive physical examination
  - CV: Heart size, apex beat displacement, signs of heart failure, disease in the carotid, renal & peripheral arteries, coarctation of aorta
  - Lungs: Signs of congestion or lung disease
  - Abdomen: Bruits, enlarged kidneys, liver & other masses
  - Eyes: Optic fundi
  - CNS: Evidence of CVD & complications of diabetes (ie neuropathy)
- Examination for features of secondary hypertension (pheochromocytoma, Cushing's syndrome)

Labs

The following should be performed based on patient's risk for dyslipidemia & diabetes (at least every 5 yr or if risk factors are present, every 2 yr)

- Fasting serum lipoprotein profile [total cholesterol (TC), low density lipoprotein-cholesterol (LDL-C), high density lipoprotein-cholesterol (HDL-C) & triglycerides (TG)]
  - If patient has not fasted prior to lipid profile: TC & HDL-C can still be measured
- Fasting blood glucose

Patients ≥40 yr

- All patients ≥40 yr should be evaluated for the absolute risk of CVD at routine physician visit
  - Evaluation should be done every 5 yr or more frequently if risk factors change

Estimation of Absolute Risk for CVD

CVD development is closely related to lifestyle characteristics & associated risk factors. There is overwhelming scientific evidence that lifestyle modifications & reduction of risk factors can slow the development of CVD both before & after the occurrence of a CV event.

Selection of Patients for Clinical Intervention

- High-risk patients are those who have already experienced a CV event or have very high levels of individual risk factors
  - Intensive lifestyle modification & appropriate drug treatment are required
  - Monitor risk profile every 3-6 mth
- Moderate-risk patients require monitoring of risk profile every 6-12 mth
- Low-risk patients may be given conservative management, focusing on lifestyle interventions

Patients w/ the following conditions are considered high-risk for future CVD event:

- Established CVD: Angina, CHD, MI, TIA, stroke or peripheral vascular disease
- Left ventricular (LV) hypertrophy or hypertensive retinopathy
- Patients w/o established CVD who have:
  - TC ≥8 mmol/L (320 mg/dL) or LDL-C ≥6 mmol/L (240 mg/dL) or TC:HDL-C ratio >8
  - Persistent elevation of BP: >160-170/100-105 mmHg
- Type 1 or 2 DM w/ overt nephropathy or other significant kidney disease
- Metabolic syndrome
- Secondary hypertension

Coronary Risk Charts for Determination of CVD Risk

- Coronary risk charts may be used to estimate CVD risk for patients who have not experienced symptomatic CVD or other atherosclerotic diseases
- Gender, smoking status, age, SBP, & TC are used to determine the CVD risk
- Please see **Coronary Risk Charts** for details

Note that CVD risk may be higher than indicated in the coronary risk chart in the following:

- Patients approaching the next age, BP or cholesterol category
- Sedentary or obese patients
- Those w/ family history of premature CHD or stroke in a 1st degree relative (male <55 yr; female <65 yr)
- Patients w/ low HDL-C or high TG
- Patients w/ DM or impaired glucose tolerance
- Those already on antihypertensive therapy
- Patients w/ evidence of preclinical atherosclerosis

A PATIENT EDUCATION

- Counseling should be part of the patient encounter as they tend to respond more favorably
  - Inform the patient that multiple risk factors contribute to atherosclerosis which causes CVD; therefore, the aim is to decrease the total risk from all these factors
  - If a goal w/ a risk factor cannot be reached, this can be remedied by more reduction in other risk factors
- Lifestyle counseling is the foundation of primary prevention & has the potential to either reduce or prevent the development of risk factors
- It would help to include family members in the educational process so they can assist the patient in achieving lifestyle modifications
- Develop a plan w/ the patient & hold discussions over time so that patient is not overwhelmed by changing several behaviors all at one time (eg smoking, diet, exercise, etc)
- Re-educate the patient about food selection & stress the importance of physical activity
- Monitor progress through follow-up contact & have regular re-evaluation & behavioral interventions to maintain adherence

B LIFESTYLE MODIFICATION

- Medical nutrition therapy, physical activity & comprehensive lifestyle approaches have been shown to improve the control of risk factors & intermediate markers of CVD risk

Diet Modification

- Counsel the patient on a diet consisting of fruits, vegetables, low-fat dairy products, fiber, whole grains & protein sources that are low in trans-fat, saturated fat & cholesterol:
  - Total dietary intake of fats <30% of total energy intake
  - Intake of saturated fats <10% of total fat intake
  - Intake of dietary cholesterol <300 mg/day
- Replace saturated fats w/ monounsaturated & polyunsaturated fats from vegetable or marine sources
- Reduce dietary salt intake to ≤1.5 g/day (approximately 1 tsp of table salt)
  - Advise about the hidden salt content in processed foods
- Minimize intake of beverages & foods w/ added sugar
- Increase consumption (≥2 servings per wk) of fish high in omega-3 fatty acids
- Patients w/ CVD or identified risk factors, such as diabetes, dyslipidemia, hypertension or obesity, may benefit from personalized diet advice or referral to a dietitian

Increased Physical Activity

- Contributes to wt loss, glycemic control, improved BP, lipid profile & Insulin sensitivity
- All should be encouraged to have moderate physical activity (eg walking 3 km or another equivalent form of exercise) at least 30 min per day, 4-7 days a wk
- Patients w/ CVD or CVD equivalents should be assessed prior to beginning a vigorous physical activity for conditions that might contraindicate certain types of exercise or predispose to injury

Weight Management

- Risk of coronary disease & mortality is increased in obese patients
  - Obesity also contributes to other CHD risk factors (eg hypertension, low HDL-C, glucose intolerance)
  - The presence of abdominal obesity particularly raises CV risk & waist circumference along w/ waist:hip ratio should be evaluated
  - Waist:hip ratio of >1.0 in men or >0.85 in women is indicative of central obesity
  - Gender specific waist circumference cutoff points for increased CVD risk have been established in Asians: >80 cm in women & >90 cm in men
- Weight reduction results in lower BP, lower LDL-C & TG, higher HDL-C & improvements in hyperinsulinemia & hyperglycemia; it is recommended in overweight & obese patients
- Goal BMI for Asian adults: 18.5-22.9 kg/m^2
  - Minimum reduction in overweight individuals is 5% decrease in body wt
- Wt control can be achieved by restriction of total caloric intake & regular physical activity
- Successful wt reduction requires sustained personal & family motivation, together w/ long term professional support

B LIFESTYLE MODIFICATION (CONT'D)

Smoking Cessation

- Evidence supports the beneficial effect of smoking cessation on CHD mortality
- All nonsmokers should be encouraged not to start smoking
- All smokers should be strongly encouraged to quit smoking by a health professional & be supported in their efforts to do so
  - Assess the tobacco user's willingness to quit
  - Assist by counseling & develop a plan for quitting
  - Pharmacologic intervention (eg Nicotine replacement therapy, Bupropion or Varenicline) should be given to motivated smokers who fail to quit by counseling
  - Arrange follow-up & referral to special programs
- Goal: Complete smoking cessation & no exposure to environmental tobacco smoke

Moderation of Alcohol Consumption

- Alcohol consumption above 3 units per day increases BP, risk of cardiac arrhythmias, cardiomyopathy & sudden death
- Patients should be advised to reduce alcohol consumption
- Goal: Limit alcohol intake to 10-30 g/day of ethanol (1-3 units/day) for men & 10-15 g/day (1-1.5 units/day) for women
  - 1 unit is equivalent to 150 mL of wine, 250 mL of beer or 30-50 mL of spirits

C MANAGEMENT OF OTHER RISK FACTORS

BP Control

- Goal: BP <140/90 mmHg; <130/80 in HF, DM, or renal insufficiency patients
- BP should be recorded at each visit
  - Start lifestyle modification in all patients: wt reduction, eating fruits, vegetables & low-fat dairy products, reducing salt intake, drinking alcohol moderately, & increasing physical activity
  - If BP goals are not achieved w/ lifestyle modifications, start drug therapy individualized for each patient, considering age, race or need for drugs w/ specific benefits
- See Hypertension Management Chart for details

Lipid Management

- Reduction of plasma TC by 10% decreased the incidence of CAD by 25% after 5 years, & a reduction of LDL-C by 1 mmol/L (40 mg/dL) was accompanied by 20% reduction in CHD events
- General goal: TC <5 mmol/L (190 mg/dL) & LDL-C <3 mmol/L (15 mg/dL)
- Goal for high-risk individuals: TC <4.5 mmol/L (175 mg/dL) w/ an option of 4 mmol/L (155 mg/dL) if feasible & LDL-C <2.5 mmol/L (100 mg/dL) w/ an option of 2 mmol/L (80 mg/dL) if feasible
- Therapeutic lifestyle changes should be advised for all patients above the goal range
  - Consume diet <7% of calories from saturated fat & <200 mg/day of cholesterol
  - Dietary options can be added (plant stanols/sterols <2 g/day; soluble fiber 10-25 g/day)
- Stress the importance of wt reduction & physical activity
- Lipid-lowering therapy may be initiated
  - Secondary causes of dyslipidemia (eg hypothyroidism, alcohol abuse, Cushing's syndrome, diseases of liver & kidneys) should be ruled out before initiating therapy
  - Statins are usually used, but bile-acid-binding resin or Niacin may also be considered
- See Dyslipidemia Management Chart for more details

Diabetes Management

- Diabetic patients (Type 1 or Type 2) are at increased risk for CVD & have worse outcomes after surviving a CVD event
- Good glycemic control substantially reduces the risk of CV events
- The goal, in general, is HbA1c <7%; however, a goal of HbA1c <6% may be aimed for by an individual patient, as long as this would not result in hypoglycemia
- Recommendations apply for both Type 1 and 2 DM patients
- Start appropriate therapy to achieve near-normal fasting plasma glucose (<7 mmol/L) or as indicated by near-normal HbA1c, starting w/ diet & exercise
- If lifestyle modification fails, oral antidiabetic medications or insulin should be added to the treatment regimen

D PHARMACOTHERAPY

Antiplatelet Agents

- Antiplatelet agents have been shown to reduce vascular mortality, nonfatal reinfarction of the myocardium, nonfatal stroke in patients w/ unstable angina (UA), acute MI (AMI), stroke, TIAs or other evidence of CVD

Aspirin

Primary prevention

- Risk-benefit profile should be assessed before using Aspirin for primary prevention
  - In patients w/ low CVD risk, Aspirin is not indicated due to the associated risk of major bleeding & hemorrhagic stroke
- Patient at high risk for developing CVD may be started on low-dose aspirin provided that BP is controlled to <150/90 mmHg
- Recommended for use in men ≥45 yr, primarily to protect against MI; & women ≥55 yr, primarily to protect against stroke

Secondary prevention

- Good evidence shows that Aspirin therapy can prevent MI, stroke & vascular death in men & women w/ established CVD
- Low-dose Aspirin should be given indefinitely to patients w/ established CVD, unless contraindicated

Clopidogrel

- Considered for patients intolerant to Aspirin
- May be used in combination w/ Aspirin for up to 12 mth in patients after acute coronary syndrome (ACS) or percutaneous coronary intervention w/ stent placement
- There is concern about drug interaction w/ proton pump inhibitors that may reduce effectiveness of Clopidogrel

Anticoagulant

Warfarin

- May be used in post-MI patients when clinically indicated (eg atrial fibrillation or LV thrombus, dilated LV w/ poor systolic function)
- May be considered for paroxysmal or chronic atrial fibrillation or atrial flutter
- Warfarin w/ either Aspirin or Clopidogrel increases risk of bleeding & should be monitored closely by checking PT/INR
- Maintain international normalized ratio (INR) w/in 1.5-2.5 when using Warfarin

ACE Inhibitors[1]

- Should be used in all patients w/ left ventricular ejection fraction (LVEF) ≤40%, hypertension, DM, or chronic kidney disease, unless contraindicated
- Optional for lower-risk patients

Angiotensin II Antagonists[1]

- Indicated for patients who have heart failure, MI w/ LVEF ≤40%
- For use in patients intolerant of ACE inhibitors
- May be used in combination w/ ACE inhibitors in systolic dysfunction heart failure

Beta-blockers[1]

- Recommended for use in patients who have had MI, ACS or LV dysfunction, unless contraindicated
- Start in all post MI & acute ischemic patients unless contraindicated
  - Use as required in all other patients to manage angina, rhythm, BP & treatment in HF
- **Effect:** Shown to favorably alter prognosis in patients w/ CHD, reduce risk of sudden death, improve LV function & slow atherosclerotic progression

Lipid-lowering agents[2]

- Includes statins, fibrates, bile acid binding resins, Niacin & selective cholesterol absorption inhibitors; statins are first drugs of choice
- Have been shown not only to reduce hyperlipidemia but also to reduce CV events & mortality as well as the need for coronary artery by-pass grafting (CABG) & various forms of coronary angioplasty
- May halt progression or induce regression of coronary atherosclerosis

Influenza vaccination

- Patients w/ CVD should have an annual influenza vaccination

[1]Many ACE inhibitors, Angiotensin II antagonists & Beta-blockers are available. Specific prescribing information may be found in the latest MIMS. See Hypertension & Myocardial Infarction w/ ST-Segment Elevation Management Charts for specific dosing recommendations.

[2]Many lipid-lowering agents are available. Specific prescribing information may be found in the latest MIMS. See Dyslipidemia Chart for specific dosing recommendations.

Not all products are available or approved for above use in all countries.
Specific prescribing information may be found in the latest MIMS.

Dosage Guidelines

ANTIPLATELET AGENTS

Drug	Dosage	Remarks
Aspirin[1]	75-162 mg PO 24 hrly	**Adverse Reactions** • GI effects (GI upset which may be minimized by administering w/ food & w/ use of enteric-coated formulation, also GI irritation including erosion, ulceration, etc); Hematologic effects (increase in bleeding time, decrease in platelet adhesiveness, hemorrhage); Hypersensitivity reactions **Special Instructions** • Contraindicated in patients w/ active pathological bleeding (eg peptic ulcer, intracranial hemorrhage), known allergy, hemophilia, hemorrhagic disorders, severe renal or hepatic impairment • Ensure that benefit outweighs the risk prior to use in combination w/ Warfarin, Heparin, thrombolytics, NSAIDs & other drugs that increase the risk of bleeding
Clopidogrel	75 mg PO 24 hrly	**Adverse Reactions** • Hematologic (hemorrhage, purpura, epistaxis; blood dyscrasias, including neutropenia, thrombotic thrombocytopenic purpura have occurred); Dermatologic effects (rash, pruritus); GI effects (abdominal pain, N/V, dyspepsia, constipation) **Special Instructions** • Contraindicated in patients w/ active bleeding or severe liver impairment • Concurrent use of drugs known to inhibit CYP2C19 (eg Omeprazole, Esomeprazole, Cimetidine, Fluconazole, Ketoconazole, Voriconazole, Etravirine,Felbamate, Fluoxetine, Fluvoxamine & Ticlopidine) should be avoided - Separating the time of administration between the drugs does not reduce the chance of interaction • If possible, discontinue use 5-7 days prior to elective surgery

[1]Aspirin is available in combination w/ glycine. Specific prescribing information may be found in the latest MIMS.

ORAL ANTICOAGULANT

Drug	Dosage	Remarks
Vit K Antagonist		
Warfarin	2-5 mg PO 24 hrly Subsequent dose should be adjusted to INR=1.5-2.5	**Adverse Reactions** • Hemorrhage can occur even w/in therapeutic international normalized ratio (INR) levels • Other less common effects: Cholesterol embolization (skin necrosis & purple discoloration of the toes); GI effects (N/V, diarrhea); Misc effects (alopecia, skin reactions, hepatic dysfunction, pancreatitis) **Special Instructions** • Dosage adjustments must be guided by regular monitoring of INR • Patients should be counseled on the risks of therapy along w/ drug & food interactions • Avoid in patients w/ active hemorrhage & generally should not be given to patients at risk of hemorrhage, peptic ulcer disease (PUD), severe wounds, cerebrovascular disorders & bacterial endocarditis • Use w/ extreme caution or not at all in patients w/ severe renal or hepatic impairment

All dosage recommendations are for non-pregnant & non-breastfeeding women, & non-elderly adults w/ normal renal & hepatic function unless otherwise stated.

Not all products are available or approved for above use in all countries.

Products listed above may not be mentioned in the disease management chart but have been placed here based on indications listed in regional manufacturers' product information.

Specific prescribing information may be found in the latest MIMS.

Please see the end of this section for reference list.

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