

Chapter IV: High Blood Cholesterol and Other Lipid Abnormalities

Definitions

Total cholesterol

- Desirable: below 200 mg/dL
- Borderline high cholesterol: 200-239 mg/dL
- High cholesterol: 240 mg/dL or greater

HDL Cholesterol, Good Cholesterol, HDL-C

- High HDL is better than low HDL.
- There are two ways that HDL cholesterol values are interpreted; as a percent of total cholesterol or as a measured value:

HDL	Risk of heart disease is average (Desirable level)	Risk of heart disease is less than average (Good level)	Increased risk of heart disease
Percent	20% of total cholesterol	More than 20% of total cholesterol	
Measured value	Greater than 35 mg/dL	60 mg/dL or more	Less than 35 mg/dL

LDL cholesterol, Bad Cholesterol, LDL-C

- Elevated levels of LDL indicate risk for heart disease.
- Treatment for high LDL aims to the following target values:
 - LDL less than 100 mg/dL if there is heart disease or diabetes.
 - LDL less than 130 mg/dL if there are 2 or more risk factors for heart disease.
 - LDL less than 160 mg/dL if there is 0 or 1 risk factor for heart disease.

Triglycerides

- A normal level for fasting triglycerides is: less than 150 mg/dL.

Burden

- Elevated blood cholesterol is one of the major modifiable risk factors for coronary heart disease (CHD).

Screening test

- Both total cholesterol and HDL-C can be measured in venipuncture or finger-stick specimens from fasting or nonfasting individuals.

Recommendations for prevention

- Periodic screening for high blood cholesterol is recommended for all men ages 35-65 and women ages 45-65.
- There is insufficient evidence to recommend for or against routine screening of asymptomatic persons over age 65, but recommendations to screen healthy men and women ages 65-75 may be made on other grounds (see Clinical Intervention).
- There is also insufficient evidence to recommend for or against routine screening in children, adolescents, or young adults.
- Recommendations for screening adolescents and young adults with risk factors for coronary disease, and against routine screening in children, may be made on other grounds (see Clinical Intervention).
- There is insufficient evidence to recommend for or against routine screening for other lipid abnormalities.
- All patients should receive periodic screening and counseling regarding other measures to reduce their risk of coronary disease.

Management and primary prevention of coronary heart disease

- Lifestyle measures remain the first priority in the primary prevention of coronary heart disease.
- The first priority for lipid lowering drug therapy are patients with pre-existing cardiovascular disease.
- A patient should be considered for lipid lowering drug therapy for primary prevention, usually following a trial of lifestyle measures and other appropriate interventions for at least three months, when the serum total cholesterol is > 5.0 mmol/l.
- Women should be considered for lipid lowering drug therapy for primary prevention at the same risk threshold as men.
- Patients with heterozygous familial hypercholesterolaemia should be treated aggressively with dietary advice and lipid lowering therapy. Close monitoring and follow-up is essential.
- Targeted assessment should be undertaken in the age range 35-69 years, or at a younger age in patients with a family history of familial hypercholesterolaemia.
- Secondary causes of dyslipidaemia should be excluded before commencing lipid lowering drug therapy.
- For primary prevention of coronary heart disease, statins are now drugs of first choice for lowering lipids:
 - Pravastatin
 - Simvastatin
 - Lovastatin
 - Atorvastatin

Burden of Suffering

Elevated Blood Cholesterol and Coronary Heart Disease

- o Elevated blood cholesterol is one of the major modifiable risk factors for coronary heart disease (CHD).¹
- o CHD accounts for thousands of deaths each year, and angina and nonfatal myocardial infarction (MI) are a source of substantial morbidity.
- o The incidence of CHD is low in men under age 35 and in premenopausal women, but climbs exponentially during middle age for both men and women.²
- o The onset of CHD is delayed approximately 10 years in women compared with men, probably due to the effects of estrogen.³
- o Clinical events are the result of a multifactorial process that begins years before the onset of symptoms.
- o Autopsy studies detected early lesions of atherosclerosis in many adolescents and young adults.⁴⁻⁸
- o The onset of atherosclerosis and symptomatic CHD is earlier among persons with inherited lipid disorders such as familial hypercholesterolemia (FH)⁹ and familial combined hyperlipidemia (FCH).¹⁰

Serum Cholesterol and Risk of Coronary Heart Disease

- o There is a causal relationship between blood lipids (usually measured as serum levels) and coronary atherosclerosis.^{1, 11-13}
- o CHD risk increases in a continuous and graded fashion, beginning with cholesterol levels as low as 150-180 mg/dL; this association extends to cholesterol levels measured as early as age 20 in men.^{12,17}
- o During middle age, for each 1% increase in total cholesterol, CHD risk increases by an estimated 3%.¹⁸
- o High cholesterol (240 mg/dL) is also a risk factor in middle-aged women, but most coronary events in women occur well after menopause.^{3,15,19-22}
- o Cholesterol alone is a weak predictor of CHD mortality in the elderly,^{22a,124} but high cholesterol remains a risk factor for CHD after age 65.²²
- o Expert panels have defined high (≥ 240 mg/dL) and "borderline high" (200-239 mg/dL) cholesterol to simplify clinical decisions.¹
- o Because CHD is a multifactorial process, however, there is no definition of high cholesterol that discriminates well between individuals who will or will not develop CHD.^{27,28}
- o Due to nonlipid risk factors, persons with cholesterol below 240 mg/dL account for the majority of all CHD events.^{29,30}
- o Among middle-aged men, 9-12% of those with cholesterol 240 mg/dL or greater will develop symptomatic CHD over the next 7-9 years,^{29,31} but most of them have multiple other risk factors for CHD.³⁰

- o The excess (i.e., absolute) risk due to high cholesterol (and the probable benefit of lowering cholesterol) increases with the underlying risk of CHD.
- o The increase in CHD mortality associated with a given increment in serum cholesterol was steepest at very high values (>300 mg/dL).¹⁴
- o Excess risk from high cholesterol is smaller in women, who have less than half the CHD risk as do men at any given cholesterol level.^{15, 21, 32}
- o Although the relative risk associated with high serum cholesterol declines with age^{15, 21, 24}, the excess risk generally does not, due to the much higher incidence of CHD in older persons.^{26, 33, 34}

Other Lipid Constituents and Risk of Coronary Disease

LDL-C and HDL-C

- o The risk associated with high total cholesterol is primarily due to high levels of low-density lipoprotein cholesterol (LDL-C),¹ but there is a strong, independent, and inverse association between high-density lipoprotein cholesterol (HDL-C) levels and CHD risk.³⁵⁻³⁷
- o Low HDL-C increases risk even when cholesterol is below 200 mg/dL,³⁶ a pattern present in up to 20% of men with confirmed CHD.³⁸
- o Measures of HDL-C or the ratio of total cholesterol to HDL-C are better predictors of CHD risk than is serum cholesterol alone.^{3, 20, 21, 22a, 36, 39}
- o High total cholesterol in association with high HDL-C (60 mg/dL) is common in older women (especially those taking estrogen) but is not associated with an increased risk for CHD.^{1, 36}

Triglycerides

- o The importance of triglycerides as an independent risk factor for CHD remains uncertain.^{35, 40}
- o The combination of high triglycerides and low HDL-C often occurs in association with other CHD risk factors such as hypertension and diabetes and is associated with a high risk of CHD.^{41a}

Prevalence of High Cholesterol and Low HDL-C.

- o Serum total cholesterol and LDL-C increase 1-2 mg/dL per year in men from ages 20-40, 2 mg/dL per year in women from ages 40-60,⁴² and an average 18% during the perimenopausal period, due in part to age-related increases in weight.⁴³
- o The prevalence of serum cholesterol 240 mg/dL or higher increases from 8-9% in adults under age 35 to nearly 25% for men age 55 and nearly 40% for women over 65.⁴⁴
- o Approximately 11% of men and 3% of women over age 20 have low HDL-C (<35 mg/dL) with desirable or borderline-high total cholesterol.⁴⁴

Accuracy of Screening Tests

Variation in Measurement

- o Both total cholesterol and HDL-C can be measured in venipuncture or finger-stick specimens from fasting or nonfasting individuals.
- o Due to normal physiologic variation and measurement error, a single measurement may not reflect the patient's true (or average) cholesterol level.
- o Following factors may cause serum cholesterol to vary 4-11% within an individual:⁴⁵
 - Stress,
 - Minor illness,
 - Posture, and
 - Seasonal fluctuations.
- o Laboratory assays are subject to:⁴⁶
 - Random errors, due to:
 - Variation in sample collection,
 - Handling, and
 - Reagents.
 - Systematic errors (bias), due to methods that consistently overestimate or underestimate cholesterol values.
- o Desktop analyzers can produce reliable results, but some devices may not meet standards for accuracy.⁴⁷
- o Variation in training and operating technique can introduce additional error when instruments are used outside clinical laboratories.⁴⁸
- o Average bias for measurements based on capillary specimens compared to venous specimens was +4-7%.⁴⁹
- o As a result of these considerations, a single measure of serum cholesterol could vary as much as 14% from an individual's average value under acceptable laboratory conditions.⁴⁵
- o For an individual with a "true" cholesterol level of 200 mg/dL, the 95% range of expected values is 172-228 mg/dL.⁵⁰
- o Some authorities therefore recommend advising patients of their "cholesterol range," rather than a single value.⁵⁰
- o Where more precise estimates are necessary, an average of at least two measurements on two occasions has been recommended, and a third if the first two values differ by more than 16%.⁴⁵

Screening Children by Family History.

- o Many children with elevated serum cholesterol (defined as serum cholesterol \geq 200 mg/dL or LDL-C \geq 130 mg/dL)⁵¹ do not have high cholesterol as adults.⁵²⁻⁵⁴
- o Because of the familial aggregation of CHD and hypercholesterolemia,^{51,55,56} some experts recommend screening for family history of either premature cardiovascular disease (age 55 or younger) or parental hypercholesterolemia (\geq 240 mg/dL) to identify a

subset of children who are more likely to be at risk from hypercholesterolemia as adults.⁵¹

- o Under this definition, only 25% of all children would be screened, but the predictive value of family history is limited: 81-90% of children with such histories have normal cholesterol.⁵⁷⁻⁶⁰
- o Even when parental cholesterol has been measured and found to be elevated, most children have normal cholesterol values.^{51,61,62}
- o Parental and childhood cholesterol levels are highest in heterozygous FH (estimated prevalence 1 in 500), which is strongly associated with premature CHD.
- o Up to 50% of men with FH develop clinical CHD by the age of 50.^{63,64}
- o Screening based on family history, as defined above, does not appear to be an efficient strategy for detecting FH, however. Many children would be screened, and few of those identified and treated for high cholesterol would have FH.⁶⁵
- o By itself, a parental history of premature CHD is likely to detect less than half of all children with FH.⁶⁴
- o Tracing and screening families of index cases with FH may be more cost-effective than population screening for FH.⁶⁶

Screening for Other Lipid Abnormalities.

- o Measurements of HDL-C and triglycerides are less reliable than measurement of total cholesterol due to greater biologic and analytic variability.^{67,68}
- o The 95% range of expected values for an individual with HDL-C of 37 mg/dL is 29-45 mg/dL.⁶⁹
- o Triglycerides must be measured on fasting specimens. Even then, intraindividual variation is greater than 20%, and a single measure is inadequate to categorize levels as high or normal.^{67,68}
- o Measurement of apolipoproteins (e.g., apoB) has been evaluated as a screening test for FH, familial coronary disease, and high LDL-C, but these assays are not yet widely available or adequately standardized.⁵¹

Effectiveness of Early Detection

Cholesterol Screening and Cholesterol-Lowering Interventions

- o Patients receiving risk-factor screening and targeted dietary advice had slightly lower average cholesterol levels (1-3%) than did the unscreened.⁷⁰⁻⁷²
- o The primary evidence to support cholesterol screening is the ability of cholesterol-lowering interventions to reduce the risk of CHD in patients with high cholesterol.
- o These benefits are now well established for persons with preexisting atherosclerotic vascular disease.
- o In persons with angina or prior myocardial infarction (MI), cholesterol-lowering treatments:
 - Slow the progression of atherosclerosis,⁷³

- Reduce the incidence of CHD,^{74,75} and
- Reduce overall mortality.⁷⁶
- o Treatment with statins "HMG-CoA reductase inhibitors" over years reduces coronary mortality and all-cause mortality in men and women with coronary disease.⁷⁷
- o The absolute benefit of treating high cholesterol in persons without cardiovascular disease, however, is much smaller due to the much lower risk of death or MI.⁷⁸
- o Lowering cholesterol can reduce combined CHD incidence (fatal and nonfatal events) in asymptomatic persons.^{31,79,80,81,82}

Dietary Advice in Outpatients

- o Dietary advice in conjunction with smoking cessation lower cholesterol and reduce CHD incidence.⁸⁵
- o Reducing dietary saturated fat and/or increasing polyunsaturated fat intake can reduce elevated total and LDL-C as much as 10-20%.⁸⁶⁻⁸⁸

Cholesterol-Lowering benefits

- o There is a dose-response relationship between change in serum cholesterol and reduction in CHD incidence (fatal and nonfatal events combined).^{16,76,91}
- o The benefits of lipid-lowering medications on nonfatal CHD are more pronounced but must be weighed against the unpleasant and occasionally serious side effects of some drugs.^{79,90,92}
- o The newest class of lipid-lowering drugs, HMG-CoA reductase inhibitors or "statins" lowers cholesterol more effectively and appears to be well-tolerated.^{77,83} These drugs are more likely to have significant effects on mortality in patients without CHD.⁹³

Cholesterol Reduction in Women

- o Lipid-lowering medications and diet effectively lower cholesterol in women.⁹⁴
- o The benefits of cholesterol reduction on angiographic or clinical endpoints are similar in women and men.^{77,84,95}
- o "Statins" reduce CHD incidence, but not mortality, in women with CHD.⁷⁷

Cholesterol Reduction in Older Adults

- o The benefit of lowering cholesterol in older persons has been questioned due to the weak association between serum cholesterol and all-cause mortality after age 60.^{15,24,25}
- o Associations between cholesterol and mortality in unselected elderly populations, however, are likely to be confounded by the increasing prevalence of chronic illnesses which increase mortality and independently lower serum cholesterol.^{23,96,97}
- o Cholesterol-lowering diets and medications reduced overall mortality 26-30% in persons over 60 with clinical CHD.^{77,98,99}
- o Newer cholesterol-lowering agents are efficacious and well-tolerated in older patients.^{77,100}

Cholesterol Reduction in Adolescents and Young Adults

- o Determining the benefits of lowering cholesterol in children, adolescents, and young adults is difficult, due to their low near-term risk of clinical coronary disease.
- o The assumption that early treatment is more effective than treatment begun later in life⁵¹ rests on observations that early atherosclerosis is present in many adolescents and young adults;
 - Is associated with elevated lipid levels,
 - Progresses with age,⁴ and
 - Is difficult to reverse in middle age.⁷³
- o New evidence, however, suggests that much of the clinical benefit of lowering cholesterol can be achieved within 2-5 years of initiating therapy.¹⁶
 - These benefits have been attributed to stabilizing "lipid-rich" lesions⁷⁴ and improving endothelial function,¹⁰¹ and they suggest that the additional benefits of early drug therapy for hypercholesterolemia (i.e., before middle age) may not justify the added expense and possible risks of longer treatment.
- o Intensive diet or drug intervention for adolescents and young adults with FH has become standard treatment due to the very high levels of LDL-C and dramatically increased risk of premature CHD in persons with FH.^{9,65}
- o Even in FH, however, most clinical events occur in middle age (i.e., after age 40), and risk is variable: MI was rare before age 30 in men, and onset of CHD is later in women and nonsmokers with FH.^{63,102}
- o Modified diets lower cholesterol in young adults, but the contribution of universal screening in motivating risk reduction in young persons is uncertain.
- o There is no evidence that screening and dietary advice can lead to long-term reduction in cholesterol levels in younger men (under age 35-40).^{89,103}

Cholesterol Reduction in Children

- o Dietary fat intake in children is associated with total cholesterol and LDL-C levels,^{104,105} but there is no confirmation that individual dietary counseling is effective in children.¹⁰⁶⁻¹⁰⁸
- o Physical activity and fitness are associated with higher levels of HDL-C in children and adolescents, but effects of exercise interventions on lipids are uncertain.¹¹⁰⁻¹¹⁵
- o Drug therapy effectively lowers cholesterol in children, but side effects limit compliance with bile-acid resins, the only therapy currently recommended for routine use in children.⁵¹

Potential Adverse Effects of Screening and Intervention

- o Measurement of serum cholesterol is safe and relatively inexpensive, but widespread screening may have some undesirable consequences.
- o In populations in which the potential benefits of early detection may be small (e.g., low-risk young persons), the possibility of harm may influence decisions about universal screening.¹¹⁶
- o Possible adverse effects of screening include:¹¹⁷

- Decreased well-being in persons diagnosed with high cholesterol (i.e., "labeling"),
 - Inconvenience and expense of screening and follow-up,
 - Opportunity costs to the busy clinician,
 - Misinformation due to inaccurate results, and
 - Reduced attention to diet in persons with "desirable" cholesterol levels.
- o The safety of cholesterol-lowering interventions is especially important in children and young persons.
 - o Most studies found no adverse effects on growth, sexual development, psychological measures, iron status, or blood micronutrients and support the safety of properly performed dietary intervention in children.^{108,109,118,119}
 - o The elderly may be at risk from modified diets if adequate intake of calories, calcium, and essential vitamins is not maintained.
 - o The inappropriate use of drug therapy is of greater concern, especially in young persons in whom the benefit of early drug treatment may not justify the costs and possible risks.^{16,116}
 - o Fibrate medications (e.g., clofibrate and gemfibrozil) have been associated with an increase in gallstone disease,⁷⁹ adverse trends in CHD mortality^{80,120} and cancer mortality^{80,121} and a significant increase in noncoronary mortality.⁹¹
 - o HMG-CoA reductase inhibitors have not been associated with important adverse effects.⁷⁷ The safety of lifelong therapy with these agents cannot yet be determined; several medications in this class have been reported to cause liver tumors in animal studies.

Early Detection of Other Lipid Abnormalities

- o The importance of detecting low HDL-C or high triglycerides remains unproven, especially in persons with normal serum cholesterol.
- o Following lifestyle interventions can raise HDL-C and/or lower triglyceride levels:
 - Weight loss in obese subjects,^{94,122}
 - Smoking cessation, and
 - Exercise.^{123,123a}
- o Some of these lifestyle interventions have only small effects, however, and most can be recommended independent of lipid levels.

Clinical intervention

Screening

- o Periodic screening for high blood cholesterol, using specimens obtained from fasting or nonfasting individuals, is recommended for all men ages 35-65 and women ages 45-65.
- o There is insufficient evidence to recommend for or against routine screening in asymptomatic persons after age 65, but screening may be considered on a case-by-case basis.
- o Older persons with major CHD risk factors (smoking, hypertension, diabetes) who are otherwise healthy may be more likely to benefit from screening, based on:

- Their high risk of CHD, and
 - The proven benefits of lowering cholesterol in older persons with symptomatic CHD.
- o Cholesterol levels are not a reliable predictor of risk after age 75.
 - o There is insufficient evidence to recommend routine screening in children, adolescents, or young adults.
 - o Screening may be recommended for adolescents and young adults who have:
 - A family history of very high cholesterol,
 - Premature CHD in a first-degree relative (before age 50 in men or age 60 in women), or
 - Major risk factors for CHD
 - o Screening for previous categories of adolescents and young adults may be recommended on other grounds, including:
 - The greater absolute risk attributable to high cholesterol in such persons, and
 - The potential long-term benefits of early lifestyle interventions in young persons with high cholesterol.
 - o Recommendations against routine screening in children may be made on other grounds, including:
 - The costs and inconvenience of screening and follow-up,
 - Greater potential for adverse effects of treatment, and
 - The uncertain long-term benefits of small reductions in childhood cholesterol levels.
 - o The appropriate interval for periodic screening is not known.
 - o Periodic screening is most important when cholesterol levels are increasing (e.g., middle-aged men, perimenopausal women, and persons who have gained weight).
 - o An interval of 5 years has been recommended by experts, but longer intervals may be reasonable in low-risk subjects (including those with previously desirable cholesterol levels).
 - o There is insufficient evidence to recommend for or against routine measurement of HDL-C or triglycerides at initial screening.
 - o For high-risk persons (middle-aged persons with high cholesterol or multiple nonlipid risk factors for CHD), measurement of HDL-C or lipoprotein analysis can be recommended to help identify individuals at highest risk of CHD, in whom individual diet or drug therapy may be indicated.

Management and Primary Prevention of Coronary Heart Disease¹²⁵

Lipid lowering in context: lifestyle and other measures

- o Lifestyle measures remain the first priority in the primary prevention of coronary heart disease.
- o Before considering lipid lowering drug therapy for primary prevention, lifestyle measures to reduce cardiovascular risk should normally be pursued for a period of 3-6 months.
- o Patients at very high risk, including those with familial hypercholesterolaemia (FH) and some diabetics, may justify drug therapy at an earlier stage.
- o Lifestyle measures should continue beyond three months, irrespective of the need for pharmacological treatment.

Smoking

- o All patients should be actively discouraged from smoking.
- o Repeated brief and supportive advice on smoking cessation should be given to patients by members of the primary care team.
- o Nicotine replacement therapy should be considered routinely in smokers attempting to quit.

Dietary advice

- o Diets naturally rich in antioxidants (fruit and vegetables) may be protective against CHD. A higher intake of fruit and vegetables is recommended.
- o Vitamin supplementation with vitamin E (alpha-tocopherol) or beta carotene is not recommended for the primary prevention of CHD.
- o Dietary sodium intake should be reduced towards recommended levels of 100 mmol or 6g salt per day.
- o Advice for a healthy diet will include increasing starchy carbohydrate, fruit and vegetables, while reducing saturated fat, sugar and salt. This advice can be given by printed diet regimen in the first visit.
- o More intensive dietary advice will require a detailed assessment of food intake by qualified dietitians or by other health professionals who have undergone appropriate training.

Obesity and overweight

- o Realistic targets of 5-10 kg monthly weight loss should be set for overweight and obese individuals until target body weight is achieved.
- o A successful strategy for weight loss will include advice not only on diet and exercise, but also on behavioral change, support systems, and maintenance of reduced weight.

Physical activity

- o Counseling patients to incorporate regular physical activity into their daily routines is recommended to prevent coronary heart disease, hypertension, obesity, and diabetes.

- o For those who are currently inactive or not regularly active, aim to accumulate 30 minutes of moderate intensity physical activity on most days.
- o For those who are already active, vigorous intensity exercise of 20-30 minutes three times per week is recommended.

Other measures for preventing CHD

- o Treatment of hypertension is recommended to reduce the risk both of CHD and stroke.
- o Low dose aspirin should be considered for all patients whose risk of a coronary event is high enough to justify the use of lipid lowering drug therapy.

Lipid lowering drug therapy

- o For primary prevention of CHD, statins are drugs of first choice for lowering lipids: pravastatin, simvastatin, lovastatin and atorvastatin.
- o Drug choice should be made on the balance of evidence, safety and cost-effectiveness considerations; also by the degree of cholesterol lowering required to reach target levels in patients with severe hypercholesterolaemia.
- o Benefits of drug therapy are likely to justify costs and potential risks only in persons at high risk of CHD (e.g., middle-aged men and postmenopausal women with very high cholesterol or multiple risk factors).
- o The starting point for prevention is CHD event risk, and not simply cholesterol level, which is a poorer predictor of risk.
- o The first priority for lipid lowering drug therapy are patients with pre-existing cardiovascular disease.
- o Patients should receive information on the potential benefits, costs, and risks of long-term therapy before beginning treatment on cholesterol-lowering drugs.

Guidelines for selecting patients for statin therapy

- o A patient should be considered for lipid lowering drug therapy for primary prevention, usually following a trial of lifestyle measures and other appropriate interventions for at least three months, when the serum total cholesterol is >5.0 mmol/l.

Primary prevention in women

- o As in men, lipid lowering drug therapy should be considered for primary prevention in women.
- o In postmenopausal women with high cholesterol, estrogen therapy can lower LDL-C and raise HDL-C and is associated with lower risk of CHD in epidemiologic studies.

Primary prevention in elderly people

- o Patients on lipid lowering therapy should not have their drugs stopped on account of age.

Primary prevention in heterozygous familial hypercholesterolaemia

- o Patients with heterozygous familial hypercholesterolaemia should be treated aggressively with dietary advice and lipid lowering therapy. Close monitoring and follow-up is essential.
- o Referral to a specialist clinic is recommended, not only for treatment but also for genetic counselling.

Practical issues: risk assessment, follow-up and referral

- o All patients with clinical evidence of cardiovascular disease should be offered a blood lipid measurement on a priority basis.
- o Lipid measurement is recommended if clinical and risk assessment suggests that a high total cholesterol/HDL ratio might influence future management.
- o Targeted assessment should be undertaken in the age range 35-69 years, or at a younger age in patients with a family history of familial hypercholesterolaemia.
- o The total cholesterol/HDL ratio is preferred to total cholesterol when calculating risk.
- o Eligibility for treatment and follow-up of response should be determined by the level of total cholesterol.
- o A minimum of two blood lipid measurements, at least one of which should be fasting, should be made before commencing lipid lowering drug therapy.
- o Management decisions should not be based solely on results of point of care (near patient) testing.
- o Secondary causes of dyslipidaemia should be excluded before commencing lipid lowering drug therapy.

Follow-up: target cholesterol levels

- o The treatment target total cholesterol level for primary prevention in patients on drug therapy should be < 5.0 mmol/l, together with a fall in total cholesterol of at least 1mmol/l.
- o Liver function should be monitored according to the data sheet for the chosen drug.

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