



serum is cloudy. After refrigeration, a white surface layer depicts excess chylomicrons, whereas a dispersed, opaque infranatant reflects a VLDL dysfunction.

Current guidelines recommend selective screening of children who have a family history of lipoprotein abnormality or premature vascular disease and adults who have an increased risk for CHD. The U.S. Preventive Services task force recommended universal screening starting at 35 years of age for men and at 45 years of age for women; there is a paucity of data supporting long-term benefits from screening of younger individuals. Either a fasting or a nonfasting total cholesterol and HDL measurement can be the initial screen. If the total cholesterol value is greater than 200 mg/dL or the HDL value is less than 40 mg/dL, then a repeat fasting lipid panel is required. If the total cholesterol value is less than 200 mg/dL and the HDL value is greater than 40 mg/dL, then retesting is recommended every 5 years. Individuals with CHD, risk factors for CHD, or CHD equivalents (i.e., symptomatic carotid artery disease, peripheral arterial disease, abdominal aortic aneurysm, or diabetes) should be screened more frequently based on risk assessment, as shown in Table 69-4. CHD risk factors include age (men >45 years, women >55 years), family history of premature CHD (affected male first-degree relative <55 years or female first-degree relative <65 years of age), smoking, hypertension, and low HDL (<40 mg/dL). HDL concentrations higher than 60 mg/dL are cardioprotective. Overall, the level of evidence to support screening is fair (level B) but increases with age, male gender, and CHD (level A).

## TREATMENT

Treatment is initiated after two abnormal lipid findings. Treatment of elevated total cholesterol and LDL-cholesterol can slow the development and progression of CHD. Meta-analysis of primary and secondary prevention trials indicates that CHD mortality decreases by approximately 15% for every 10% reduction in serum cholesterol. LDL-cholesterol treatment strategies are based on risk indicators (Table 69-5). There is strong evidence that dietary modifications can reduce LDL-cholesterol and triglyceride levels (Table 69-6). However, evidence that lifestyle-induced lipid modifications improve cardiovascular outcomes is limited (level C). If target goals are not achieved, then pharmacologic therapy is considered (Table 69-7). Ample

evidence supports statin use in primary and secondary prevention of CHD (level A). Treatment effects of statin can be assessed after 1 to 2 months. Additional agents can be considered if target goals are not achieved with maximal drug dosing.

A fasting lipid panel is required to diagnose hypertriglyceridemia. Triglyceride levels higher than 200 mg/dL are classified as abnormal. Borderline triglyceride levels range from 150 to 200 mg/dL, and normal values are lower than 150 mg/dL. A diet and exercise program is recommended for all individuals with abnormal triglyceride levels (level C). However, pharmacologic treatments to reduce triglyceride levels may be considered if fasting levels are higher than 200 mg/dL, especially if the individual is at risk for CHD or pancreatitis (see Table 69-7). Fibrates, fish oil, and nicotinic acid should be considered if the triglyceride level is higher than 500 mg/dL (level C). However, for levels lower than 500 mg/dL, statins are first-line therapy (level B).

Low HDL concentrations (<40 mg/dL) can also increase the risk for CHD. In the Framingham Heart Study, every decrease in HDL of 5 mg/dL increased the risk for myocardial infarction. Both lifestyle modifications (e.g., diet low in saturated fat, exercise) and pharmacologic therapy (e.g., nicotinic acid, fibrate) can improve HDL levels. However, target goals and treatment recommendations have not been established due to a lack of evidence.

**TABLE 69-5 THERAPEUTIC APPROACH TO REDUCE LEVELS OF LOW-DENSITY LIPOPROTEIN-CHOLESTEROL\***

RISK CATEGORY	TREATMENT GOAL: LDL (mg/dL)	LIFESTYLE CHANGES: LDL (mg/dL)	DRUG THERAPY: LDL (mg/dL)
≤One risk factor	<160	≥160	≥160-190
≥Two risk factors	<130	≥130	≥130-160
CHD or CHD risk equivalent	<100 (optional <70)	≥100	≥100-130

CHD, Coronary heart disease; HDL, high-density lipoprotein-cholesterol; LDL, low-density lipoprotein-cholesterol.

\*Recommendations of the Adult Treatment Panel III, National Cholesterol Education Program (NCEP), as modified in 2004. CHD risk factors include age (men >45 yr, women >55 yr), family history of premature CHD (male first-degree relative <55 yr, female first-degree relative <65 yr), smoking, hypertension, diabetes mellitus, and HDL <40 mg/dL. Subtract a risk factor if HDL >60 mg/dL. CHD risk equivalents include symptomatic carotid artery disease, peripheral arterial disease, abdominal aortic aneurysm, and diabetes mellitus.

**TABLE 69-4 RECOMMENDATIONS FOR SCREENING FOR DYSLIPIDEMIA\***

1. A fasting lipid profile is recommended at age 20 yr
2. Rescreen every 5 yr if
  - LDL <160 mg/dL in patients with 0-1 risk factor
  - LDL <130 mg/dL in patients with ≥2 risk factors
3. Rescreen every year if
  - LDL 130-159 mg/dL in patients with ≥2 risk factors
  - LDL <100 mg/dL in patients with CHD or CHD risk equivalent

CHD, Coronary heart disease; HDL, high-density lipoprotein-cholesterol; LDL, low-density lipoprotein-cholesterol.

\*Recommendations of the Adult Treatment Panel III, National Cholesterol Education Program (NCEP), as modified in 2004. CHD risk factors include age (men >45 yr, women >55 yr), family history of premature CHD (male first-degree relative <55 yr, female first-degree relative <65 yr), smoking, hypertension, and HDL <40 mg/dL. Subtract a risk factor if HDL >60 mg/dL. CHD risk equivalents include symptomatic carotid artery disease, peripheral arterial disease, abdominal aortic aneurysm, and diabetes mellitus.

**TABLE 69-6 RECOMMENDATIONS FOR NUTRITIONAL INTAKE\***

NUTRIENT	RECOMMENDED INTAKE
Total Fat	25-35% of total calories
Saturated	<7%
Polyunsaturated	<10%
Monounsaturated	<20%
Carbohydrates	50-60% of total calories
Protein	15% of total calories
Cholesterol	<200 mg/day
Fiber	20-30 g/day

\*Recommendations of the Adult Treatment Panel III, National Cholesterol Education Program (NCEP), as modified in 2004.