Pediatric Lipid Screening

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Gwen Seemann PGY-2

Pediatric Dyslipidemia

- Normal lipid and lipoprotein values in children vary by age and sex
- Based on normative data, cutoff points are used to delineate lipid values as “acceptable”, “borderline”, and “abnormal”
- In the US, approx. 20% of children 6-19 yo have adverse levels of 1 or more lipid value
- Causes: dietary, genetic conditions, many secondary causes including obesity, DM2, nephrotic syndrome

Acceptable, borderline, and abnormal plasma lipid, lipoprotein, and apolipoprotein concentrations for children and adolescents

Category	Acceptable mg/dL (mmol/L)	Borderline mg/dL (mmol/L)	High mg/dL (mmol/L)
TC	<170 (4.4)	170 to 199 (4.4 to 5.2)	≥200 (5.2)
LDL-C	<110 (2.8)	110 to 129 (2.8 to 3.3)	≥130 (3.4)
Non-HDL-C	<120 (3.1)	120 to 144 (3.1 to 3.7)	≥145 (3.8)
ApoB	<90 (2.3)	90 to 109 (2.3 to 2.8)	≥110 (2.8)
TG			
• 0 to 9 years	<75 (0.8)	75 to 99 (0.8 to 1.1)	≥100 (1.1)
• 10 to 19 years	<90 (1 mmol/L)	90 to 129 (1 to 1.5)	≥130 (1.5)
Category	**Acceptable mg/dL (mmol/L)**	**Borderline mg/dL (mmol/L)**	**Low mg/dL (mmol/L)**
HDL-C	>45 (1.2)	40 to 45 (1 to 1.2)	<40 (1)
ApoA-1	>120 (3.1)	115 to 120 (3 to 3.1)	<115 (3)

Why Screen?

- Screening is based on the rationale that early identification and control of pediatric dyslipidemia will reduce the risk and severity of cardiovascular disease (CVD) in adulthood
- Dyslipidemia often begins in childhood and adolescence and contribute sto early atherosclerosis and premature CVD

Who should be screened?

Children without CVD risk factors:

- Routine screening **twice** during childhood and late adolescence
- First screen between age 9-11 years
- Second screen between age 17-21 years
- Screening **not** recommended between age 12-16 years due to normal changes in lipid levels during puberty

Children with CVD risk factors:

- Screening begins when risk factor first identified
- If FH of hypercholesterolemia or premature CVD, screening typically begins after age 2
- Subsequent testing is subjective per patient, typically repeated every 1-3 years

Risk factors for development of atherosclerosis and early cardiovascular disease in childhood

Traditional risk factors
Dyslipidemia
Obesity
Diabetes mellitus (type 1 or 2)
Hypertension
Family history of premature CVD*
Smoke exposure
Other conditions with increased CVD risk
Familial hypercholesterolemia
Chronic kidney disease
Kawasaki disease
Childhood cancer
Transplant vasculopathy
Certain congenital heart disease defects (eg, CoA, AS, TGA, congenital coronary artery anomalies)
Cardiomyopathy (eg, HCM)
Chronic inflammatory disorders (eg, SLE, systemic JIA)
HIV infection
Adolescent depressive and bipolar disorders

CVD: cardiovascular disease; CoA: coarctation of the aorta; AS: aortic stenosis; TGA: transposition of the great arteries; HCM: hypertrophic cardiomyopathy; SLE: systemic lupus erythematosus; JIA: juvenile idiopathic arthritis.

* Family history of premature CVD is generally defined as heart attack, treated angina, interventions for coronary artery disease, sudden cardiac death, or stroke in a male parent or sibling before 55 years of age or a female parent or sibling before 65 years of age.

Screening and Follow-Up

- Lipid screening performed by obtaining either a full fasting lipid profile or nonfasting profile. If initial nonfasting screen is abnormal, should obtain follow-up fasting profile
- Normal screen
  - No further evaluation needed, continue with regular screening as indicated previously
- Borderline screen
  - Recommendations for heart-healthy lifestyle, further testing tailored to clinical scenario and risk factors, most commonly repeat testing in 1 year
- Abnormal screen
  - Perform confirmatory testing (fasting lipid profiles, 2 weeks-3 months apart), evaluation for secondary causes of dyslipidemia