

What is the recommended age to begin monitoring a lipoprotein profile in pediatric patients?

Atherosclerotic cardiovascular disease (ASCVD) remains 1 of the leading causes of death in North America.¹ A variety of risk factors and behaviors can appear in childhood which may accelerate the development of atherosclerosis. It has been suggested that blood cholesterol screening is an important practice that may allow health care providers to accurately identify and monitor patients who are at high risk for CVD. A lipid profile is a set of laboratory parameters that may be used to diagnose and monitor dyslipidemia, a common finding in the development and progression of atherosclerosis.² Typical lipid profiles include total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglycerides. LDL-C is generally calculated from the measured values for total cholesterol, triglycerides, and HDL-C.

Various organizations have published guidelines with recommendations on pediatric screening of blood cholesterol, including the National Lipid Association (NLA), the National Heart, Lung, and Blood Institute (NHLBI), and the United States Preventive Services Task Force (USPSTF).^{1,3,4} The NLA discusses pediatric monitoring of cholesterol levels in their 2011 clinical guidance focused on the screening, diagnosis, and management of familial hypercholesterolemia.³ The NHLBI also addresses pediatric monitoring in their 2012 guideline on cardiovascular health and risk reduction.¹ The recommendations of the NLA and NHLBI are detailed in Table 1.^{1,3} Of note, the NHLBI recommendations have been endorsed by the American Academy of Pediatrics (AAP).⁵

Table 1. Guideline recommendations for lipid screening in pediatric patients.

Organization, Year of Publication	Recommendations regarding pediatric cholesterol monitoring
NLA 2011 ³	<ul style="list-style-type: none"> • Universal screening for children aged 9-11 years with a fasting lipid profile or non-fasting HDL-C measurement to identify all children with familial hypercholesterolemia. <ul style="list-style-type: none"> ○ A non-fasting non-HDL-C result ≥ 145 mg/dL would indicate the need for follow-up and further evaluation of a fasting lipid profile • Screening is recommended earlier (in children aged ≥ 2 years) if there is a positive family history for hypercholesterolemia or premature CHD, or other major CHD risk factors • Screening before 2 years of age is not recommended.
NHLBI 2012 ^{1,a}	<ul style="list-style-type: none"> • Universal screening for children aged 9-11 years • No lipid screening is recommending before 2 years of age. • Measuring fasting lipid panel 2-8 years of age is only recommended if child meets criteria listed in Table 2. <ul style="list-style-type: none"> ○ If child meets any of the listed criteria, two fasting lipid profile measurements should be conducted with the second being at least 2 weeks following the first but within 3 months. • No routine screening is recommended in children aged 12-16 years unless new knowledge of criteria listed in Table 2. • Second universal screening is recommended in patients aged 17-21 years

CHD=coronary heart disease; HDL-C=high-density lipoprotein cholesterol; NHLBI=National Heart, Lung, and Blood Institute; NLA=National Lipid Association

^aThe American Academy of Pediatrics endorses the recommendations from the NHLBI 2012 guideline.⁵

The recommendations of the NLA and NHLBI are similar; both recommend universal screening of all children aged 9-11 years, but the NHLBI also recommends a second universal screening of all patients aged 17-21 years.^{1,3} Both guidelines also recommend earlier lipid screening (<9 years of age) in children with risk factors for CVD; the NHLBI offers more specific criteria for potential lipid screening in patients aged 2-8 years and 12-16 years. These criteria are outlined in Table 2 and Table 3.¹

Table 2. Criteria requiring lipid monitoring in patients aged 2-8 years or 12-16 years, adapted from the NHLBI 2012 guideline.¹

Criteria
Parent, grandparent, aunt/uncle, or sibling with myocardial infarction, angina, stroke, coronary artery bypass graft at age <55 years in males and <65 years in females
Parent with TC >240 mg/dL or known dyslipidemia; child has diabetes, hypertension
Child has diabetes, hypertension, BMI ≥95 th (or ≥85 th) percentile, ^a or smokes cigarettes
Child has a moderate or high risk medical condition ^b

BMI=body mass index; TC=total cholesterol

^aFor children aged 12-16 years, BMI ≥85th percentile is a criterion.

^bModerate or high risk medical conditions are outlined in Table 3.

Table 3. High and moderate risk medical conditions in children, adapted from the NHLBI 2012 guideline.¹

Level of risk for CVD	Criteria
High	Diabetes mellitus, type 1 and type 2
	Chronic kidney disease, end-stage renal disease, or post-renal transplant
	Post-orthotopic heart transplant
	Kawasaki disease with current aneurysms
Moderate	Kawasaki disease with regressed coronary aneurysms
	Chronic inflammatory disease (systemic lupus erythematosus, juvenile rheumatoid arthritis)
	Human immunodeficiency virus infection
	Nephrotic syndrome

CVD=cardiovascular disease

The USPSTF published recommendations on screening for lipid disorders in pediatric patients in 2016.⁴ Unlike the NLA and NHLBI, the USPSTF suggests that a recommendation for or against screening of cholesterol in asymptomatic children and adolescents cannot be made.^{1,3,4} The USPSTF reviewed the evidence on screening for lipid disorders in patients aged ≤20 years and found inadequate direct evidence on the benefits for screening for familial hypercholesterolemia or multifactorial dyslipidemia.⁴ Per the USPSTF, short-term trials (<2 years) showed that pharmacotherapy interventions resulted in substantial reductions in levels of LDL-C and total cholesterol in children with familial hypercholesterolemia but did not show whether short-term pharmacotherapy led directly to a reduced incidence of premature cardiovascular disease. In discussing potential harms of early detection and treatment, the USPSTF states that most children with elevated lipid levels will not progress to a clinically important lipid disorder or develop pre-mature cardiovascular disease and are therefore subject to over diagnosis. Screening could also result in the labeling of children with a “non-disease,” parental or child anxiety, or unnecessary or harmful testing and treatment.

In summary, pediatric patients can present with a variety of risk factors for the development of dyslipidemia with potential progression to atherosclerotic cardiovascular disease.¹ Lipid screening in children can potentially identify patients at high risk for CVD and allow for early initiation of treatment. Lipid screening in children is addressed in multiple guidelines but they differ in their recommendations.^{1,3,4} Both the NLA and NHLBI recommend universal cholesterol screening for all children aged 9-11 years with the NHLBI recommending a second universal screening among patients aged 17-21 years.^{1,3} The NHLBI recommendations are further endorsed by the AAP.¹ Unlike these organizations, the USPSTF states that there is currently insufficient evidence to make a recommendation for or against screening for cholesterol in pediatric patients.⁴ Based on these recommendations, clinicians are advised to consider the potential benefits and harms when deciding to monitor cholesterol levels in pediatric patients and to tailor this decision to the individual patient.

References

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