Cholesterol Screening and Treatment Practices and Preferences: A Survey of United States Pediatricians

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Objectives To determine pediatricians' practices, attitudes, and barriers regarding screening for and treatment of pediatric dyslipidemias in 9- to 11-year-olds and 17- to 21-year-olds.

Study design American Academy of Pediatrics (AAP) 2013-2014 Periodic Survey of a national, randomly selected sample of 1627 practicing AAP physicians. Pediatricians' responses were described and modeled.

Results Of 614 (38%) respondents who met eligibility criteria, less than half (46%) were moderately/very knowledgeable about the 2008 AAP cholesterol statement; fewer were well-informed about 2011 National Heart, Lung, and Blood Institute Guidelines or 2007 US Preventive Service Task Force review (both 26%). Despite published recommendations, universal screening was not routine: 68% reported they never/rarely/sometimes screened healthy 9- to 11-year-olds. In contrast, more providers usually/most/all of the time screened based on family cardiovascular history (61%) and obesity (82%). Screening 17- to 21-year-olds was more common in all categories ($P < .001$). Only 58% agreed with universal screening, and 23% felt screening was low priority.

Pediatricians uniformly provided lifestyle counseling but access to healthy food (81%), exercise (83%), and adherence to lifestyle recommendations (96%) were reported barriers. One-half of pediatricians (55%) reported a lack of local subspecialists. Although 62% and 89% believed statins were appropriate for children and adolescents with high low-density lipoprotein cholesterol (200 mg/dL) unresponsive to lifestyle, a minority initiated statins (8%, 21%).

Conclusions US pediatricians report lipid screening and treatment practices that are largely at odds with existing recommendations, likely because of lack of knowledge and conflicts among national guidelines, and concern about treatment efficacy and harms. Education regarding pediatric lipid disorders could promote guideline implementation. *(J Pediatr 2017;185:99-105).*

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Screening for and treatment of cholesterol disorders in childhood and adolescence has been recommended for several decades by the American Academy of Pediatrics (AAP) most recently in 2008,[1] by the 2011 Expert Panel of the National Heart, Lung, and Blood Institute (NHLBI),[2] by the National Lipid Association[3]; it was subsequently incorporated into the AAP Bright Futures schedule for well-child supervision in early 2014.[4] Both the AAP and the 2011 Expert Panel recommend pediatric lipid screening for lipid disorders if there is a family history of early atherosclerotic disease or high cholesterol to detect familial hypercholesterolemia, which occurs in 1 in ~250 individuals,[5,6] or if the child or adolescent has a high-risk condition such as hypertension, diabetes, or obesity (**Table I**; available at www.jpeds.com).[2] The 2011 Expert Panel also recommends universal lipid screening of all 9- to 11-year-olds and 17- to 21-year-olds because family history is not a reliable indicator of risk; 30%-60% of children with elevated low-density lipoprotein cholesterol (LDL-C) have no family history of early heart disease or stroke.[2,7] Both the AAP and NHLBI Expert Panel recommend treating children with statins starting at age 8-10 years, if LDL-C remains significantly elevated despite lifestyle counseling.[2]

The release of the 2011 NHLBI guidelines re-ignited significant controversy in the medical and popular press about whether and how to screen for pediatric lipid disorders.[8-11] The 2011 NHLBI Task Force recommended expanding to universal pediatric lipid screening, whereas the 2007 US Preventive Services Taskforce

AAP	American Academy of Pediatrics
LDL-C	Low-density lipoprotein cholesterol
NHLBI	National Heart, Lung, and Blood Institute
USPSTF	US Preventive Services Taskforce

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(USPSTF) concluded from review of essentially the same literature base that there was insufficient evidence to recommend for or against pediatric lipid screening,[7] a conclusion they reiterate in their most recent recommendations.[12] In light of this controversy, questions have been raised about the degree to which lipid screening and treatment recommendations have been embraced and implemented by practicing clinicians. Surveys of pediatric lipid screening practices in the 1990s suggested low uptake by pediatricians.[13,14] A more contemporary survey reported in 2014 that although 74% of Minnesota pediatric providers viewed lipid screening as important, only one-half screened patients selectively, and one-third did not regularly screen; more than one-half of respondents were opposed to the use of statins in children.[15] Analysis of nationally representative surveys of ambulatory well-child visits from 1995 through 2010 indicates cholesterol testing is performed at very low rates (3.4% of visits) with minimal increases over time.[16] These studies may not reflect full dissemination of the 2011 guidelines, and may not be nationally representative. Therefore, we conducted a survey with practicing AAP physician members about screening for and treatment of lipid disorders in children and adolescents.

Methods

The AAP 2013-2014 Periodic Survey was developed in collaboration with members of the AAP Committee on Nutrition and the Department of Research, and researchers at Tufts Medical Center Institute for Clinical Research and Health Policy Studies and Boston Children's Hospital based on knowledge of content and survey methodology, and previous experience with AAP Periodic Surveys using general questions to assess knowledge, attitudes and barriers (eg, knowledge of guidelines, and attitudes toward and barriers to screening and treatment). The survey was approved by the AAP Institutional Review Board as exempt from human subjects review and pilot-tested for clarity with a random sample of 200 AAP members. Patient scenarios were used to better understand treatment practices. Pediatricians were asked what kinds of treatment(s) they would recommend for 2 hypothetical patients who, despite 6 months of lifestyle counseling, had persistent elevations in LDL-C of 140 mg/dL (3.6 mmol/L), a level one might see with lifestyle-related lipid abnormalities, and 200 mg/dL (5.2 mmol/L), a severe elevation more typical of a genetic lipid disorder such as familial hyperlipidemia. We posed each question for 2 different aged patients, a 9- to 11-year-old and a 17- to 21-year-old, to see if responses differed based on patient age; we focused on these ages as they are when the 2011 NHLBI guidelines recommend universal screening. Provider and practice characteristics were also assessed.

Following institutional review board approval by the AAP, surveys containing a token of appreciation ($2 bills) and a cover letter from the Executive Director of the AAP were mailed to a randomly selected sample of 53 859 nonretired US AAP members between December 2013 and June 2014. Those who did not respond were re-approached with up to 6 follow-up mail contacts and 2 e-mail contacts directing them toward an online version of the survey.

Statistical Analyses

Survey responses were analyzed for all respondents who completed the survey and reported providing direct patient care. To assess nonresponse bias, the age and sex of respondents were compared with those of nonrespondents using the AAP administrative database. Additional analyses were conducted for the subset of respondents who provided health supervision (ie, primary care) and for the subset providing health supervision to both 9- to 11-year-olds and 17- to 21-year-olds to facilitate comparisons by patient age. Descriptive statistics of physician and practice characteristics, knowledge, screening and treatment practices, attitudes, and barriers were summarized as means and SEs, or frequencies and percentages. Physician and practice characteristics were compared by whether or not the respondent provided health supervision using 2-sample t tests or χ^2 tests. Responses were collapsed into "never/rarely/sometimes" and "usually/most/all of the time" and compared across child age using the McNemar test (to account for clustering of pediatrician responses).

Logistic regression was used to assess predictors of responses to screening and treatment practices. Using the previously collapsed responses ("usually/most/all of the time" vs "sometimes/rarely/never"), the following binary outcomes were defined: (1) screening healthy children and (2) referring to lipid specialist or starting statins for patients with a persistently elevated LDL-C of 200 mg/dL (5.2 mmol/L). Multivariable models were built for each outcome that included all relevant physician and practice characteristics. Separate adjusted models were then built for child age and each relevant knowledge, attitude, and barrier variable. These models all adjusted for physician and practice characteristics. We included respondent as a cluster in the logistic regression models because physicians provided responses to each outcome for children aged 7-11 years and 17-21 years.

Alpha was set to 0.01 to account for multiple testing and 99% CIs were reported for the ORs. All analyses were conducted using SAS v 9.4 (SAS Institute, Cary, North Carolina). To account for differences in age and AAP membership status (ie, resident or not) by response status, all analyses were weighted by the inverse of the response rate. These weights were taken into account using the SURVEY procedures or by using the weighting option in other procedures.

Results

Survey Respondents

Of the 1627 nonretired AAP members who were sent the 2014 Periodic Survey, 705 (43%) returned surveys (75, 11% of these were returned electronically), of which 621 (38%) were complete. When survey respondents were compared with nonrespondents, no difference was found in the percent female (63% vs 60%, $P = .335$) or region of the country. Respondents were slightly older than nonrespondents (mean = 47 years vs mean = 44 years, $P < .001$), and more nonrespondents were