

# Preventive Practices for Adult Cardiovascular Disease in Children

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**Background.** Differences between family practitioners and pediatricians regarding appropriate interventions for cardiovascular disease prevention in pediatric patients have been described by national surveys of physicians in the two specialties. The purpose of the study reported here was to determine whether similar differences existed in a more complete sample from a confined geographical area in which local standards of care might influence physicians practicing in the locale.

**Methods.** Members of the Southwestern Ohio Society of Family Physicians and the Cincinnati Pediatric Society were surveyed by questionnaire about their attitudes and practices concerning cardiovascular risk factors in children. The response rate was greater than 70% in each specialty group.

**Results.** Differences in the diagnosis and treatment of hypercholesterolemia were detected: (1) pediatricians screened patients at younger ages and used lower cutoff points for diagnosis (5.0 vs 5.5 mmol/L [192 vs 211 mg/dL]); and (2) family physicians were more

likely to treat with medication (57% vs 5%), whereas pediatricians referred hypercholesterolemic patients to specialists more often (71% vs 19%). Both family physicians and pediatricians mislabeled blood pressures at the age-specific 90th percentile as normal (21% and 14%, respectively); this occurred more commonly with younger patients. Blood pressure was the risk factor most often measured, but smoking was the risk factor that received the most counseling by physicians in both specialties.

**Conclusions.** Both family physicians and pediatricians reported feeling inadequately prepared to counsel lifestyle changes, and ranked obesity, smoking, and cholesterol as topics of greatest interest for continuing medical education courses. Physicians in both specialties did not routinely update family history of cardiovascular disease during well-child visits. This has serious implications if targeted screening is to be effective.

**Key words.** Cardiovascular diseases; family practice; risk factors, pediatrics. *J Fam Pract* 1991; 33:65-72.

Physician and public awareness of cardiovascular disease (CVD) risk factors has increased, resulting in a shift in emphasis from addressing CVD risk factors only in adults to detecting and modifying CVD risk factors in children. The 1985 Consensus Conference of The National Institutes of Health (NIH)<sup>1</sup> supported this preventive approach to CVD, stating, "It is desirable to begin prevention in childhood because patterns of lifestyle are developed in childhood." Since many of the risk factors are associated with habits adopted in childhood,

primary care physicians are in an ideal position to detect risk factors and provide preventive counseling.

In 1985 a national survey of CVD preventive practices in pediatricians was reported by Nader et al.<sup>2</sup> They surveyed 779 randomly selected primary care pediatricians in the United States by questionnaire and found that (1) blood pressure was the most commonly measured risk factor in patients over 2 years of age, but 20% of pediatricians failed to label blood pressures at the age-specific 90th percentile as elevated; (2) cholesterol was the CVD risk factor least likely to be measured, and when it was measured, it was done predominantly in high-risk children; (3) a large percentage of the pediatricians reported giving antismoking advice regardless of the age of the patient; (4) few pediatricians believed they were effective in changing patient lifestyles; and (5) obesity, smoking, and stress were the most requested continuing medical education topics.

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More recently, Kimm et al<sup>3</sup> conducted a national survey that compared 1441 primary care physicians (pediatricians, general practitioners, and family physicians) and found similar practices with regard to blood pressure and cholesterol screening, and similar perceptions about their inability to change lifestyle in their patients. Kimm et al also reported differences between pediatricians and other primary care physicians in their opinions of the age at which screening should begin and in treatment practices.

The purpose of this study was to compare the preventive practices of family physicians and pediatricians practicing in a midwestern metropolitan community to detect differences in their attitudes and approaches toward pediatric CVD risk-factor assessment and prevention. The results were then compared with the preventive attitudes and practices reported in the two national surveys by Nader et al and Kimm et al.

## Methods

A letter introducing the study was sent to all members of the Cincinnati Pediatric Society ( $n = 240$ ) and the Southwestern Ohio Society of Family Physicians ( $n = 135$ ) in September 1987. Questionnaires were mailed in October and November 1987. In January 1988 a second questionnaire was mailed to nonresponders. All primary care physicians not returning the second mailing by April 1988 were contacted by telephone. Four attempts to contact the physicians by telephone were made at various times and on different days of the week, and those physicians who were contacted were given the option of either having the questionnaire administered over the telephone or having a third form mailed to them. Reminder letters were sent to those physicians not returning the third survey form within 4 weeks. In August 1988, data collection was closed.

The questionnaire used by Nader et al<sup>2</sup> was modified to include family physicians as well as pediatricians. Questions about the cutoff points used for diagnosis and about the treatment of hypercholesterolemia were also added. The basic survey contained questions about the physician's attitudes, knowledge, and practices regarding prevention of cardiovascular disease in children. The questionnaire had a multiple choice format in which the physician was asked to check his or her response (eg, "yes," "no," "high risk," "strongly agree," "disagree") for each of four patient age groups (0 to 1 year, 2 to 5 years, 6 to 12 years, and 13 years and older).

The chi-square statistic was used to analyze the differences between family physicians and pediatricians. Comparison of various subspecialists was precluded by

the small number of respondents within any one subspecialty group. Since multiple comparisons were performed, a probability of  $\leq .01$  was used to determine significance. When necessary, trend testing was performed, and results were considered significant if  $P \leq .05$ . All statistical analyses were performed using the SAS statistical package.

## Results

### *Response Rate and Characteristics of Respondents*

Of 240 surveys mailed to pediatricians, 171 (71%) were returned. After eliminating questionnaires from nonprimary care pediatricians, 122 physicians active in primary care pediatrics had responded. Of the 135 family physicians receiving questionnaires, 103 (76%) completed forms were returned. Of the 103 respondents in family practice, 32 (31%) reported that they were not involved in the primary care of children. Some did not see children, others were subspecialists, and the rest reported that they were in academics or education. The remaining 71 (69%) respondents provided primary pediatric care. Retired physicians were excluded from the analysis.

The respondents in each of the two specialties had similar sex distributions; 82% of family physicians and 73% of pediatricians were men ( $P = .16$ ). Although there was a slightly higher percentage of younger family physicians who responded to the survey as compared with the ages of the pediatricians, the difference was not significant (56% of family physicians and 49% of pediatricians were younger than 45 years old).

To determine whether physicians differed in attitudes or practices based on the length of time that it took them to respond, respondents were grouped as follows: (1) early responders were those responding before January 1, 1988, (2) late responders were those responding between January and April 1988, and (3) telephone responders were those responding from May through August 1988. Within each of the two specialty groups, no significant differences were found among early, late, and telephone responders. Overall, 68% of physicians in each specialty responded early, 18% responded late, and 14% responded only after telephone follow-up.

### *Family History*

Physicians were asked, "Do you or your office nurse routinely determine immediate family history of cardiovascular disease during well-child visits in the following age groups?" Table 1 shows the number answering yes to this question. Responses have been broken down by



Table 1. Number and Percentage of Physicians Who Routinely Evaluate Family History of Cardiovascular Disease, by Specialty and Age of Patient

Age of Patient (y)	Pediatricians (n = 122) No. (%)	Family Physicians (n = 71) No. (%)	P Value
0-1	78 (67)	27 (39)	≤.001
2-5	75 (65)	28 (39)	≤.001
6-12	80 (70)	32 (45)	≤.001
13+	88 (76)	43 (61)	≤.05

NOTE: Not all of the physicians provided responses in all of the age categories.

specialty and age of patient. For all patient age groups, family physicians are less likely than pediatricians to update family history. The greatest number of physicians in both specialty groups reported that they routinely update the family histories of adolescent patients. Even for this age group, however, 24% of pediatricians and 39% of family physicians reported that they do not take family history on a routine basis.

### Blood Pressure

Table 2 presents the number of physicians responding yes when asked, "Do you or your office nurse routinely take at least annual blood pressures of children in the following age groups?" Blood pressure was the risk factor most frequently measured by each specialty group. This finding mirrors the results of the national survey by Nader et al<sup>2</sup> in which more than 90% of pediatricians reported that they measure the blood pressure of their patients over age 2 years. Only a small number of physicians in our study reported taking routine blood pressures of infant patients (13% of pediatricians and 10% of family physicians). Pediatricians begin measuring blood pressure when their patients are slightly younger, but the percentages of physicians in each of the two specialty groups who measure the pressures of school-aged patients did not differ. Kimm et al<sup>3</sup> reported this same trend nationally. More than 95% of Cincinnati physicians report routinely measuring the blood pressure of their adolescent patients.

Table 2. Number and Percentage of Physicians Taking Blood Pressure Readings Annually, by Specialty and Age of Patient

Age of Patient (y)	Pediatricians (n = 122) No. (%)	Family Physicians (n = 71) No. (%)	P Value
0-1	14 (13)	6 (10)	NS
2-5	110 (91)	42 (62)	≤.001
6-12	118 (97)	63 (89)	NS
13+	117 (96)	68 (99)	NS

NS—not significant.

NOTE: Not all of the physicians provided responses in all of the age categories.

To determine whether the guidelines of the Second Task Force on Blood Pressure in Children were being followed,<sup>4</sup> physicians in both specialties were asked to rate blood pressures at various ages as "normal," "suspect," or "high." The blood pressures listed were the average of three blood pressures measured at three separate office visits, and all were at the age-specific 90th percentile. Therefore, a response of "normal" was considered incorrect. Table 3 summarizes the number of physicians who rated blood pressures as "normal," by specialty and age of the patient. There was no significant difference in the number of pediatricians and family physicians who answered this question incorrectly. Further, the percentage of physicians who responded incorrectly decreased as the age of the patient to which the question referred increased. The trend test yielded a *P* value of .001, revealing a statistical trend that suggests that more physicians recognize elevated blood pressures as the age of the child approaches adolescence and adult standards can be used. The percentage of physicians who responded incorrectly for each patient age group was similar to that reported nationally in the survey by Nader et al.<sup>2</sup> Because the current survey used a modified version of the survey of Nader et al, their results have been included in Table 3 for comparison. It should be noted that physicians who incorrectly answered "normal" were as likely to routinely measure the blood pressures of their patients as those who answered the question correctly (ie, "suspect" or "high").

When asked to rate their agreement with the statement "Children in the highest ranks of blood pressure at young ages tend to stay in the highest ranks," 73% of the respondents said they "strongly" agreed or "somewhat" agreed with the statement; 22% were uncertain, and 5% disagreed with the statement. The response patterns among family physicians and pediatricians were similar.

### Smoking

Participants were asked: "Do you routinely advise against smoking on the part of children or parents during a well-child visit for any of the following age groups?" While blood pressure was the most frequently measured risk factor, smoking was the risk factor for which physicians indicated that they gave the most counseling. Larger numbers of physicians indicated that they advise against smoking as the age of the patient increases; however, even for their infant patients, over 50% of the physicians discuss the topic of smoking with the children's parents (54% of family physicians and 62% of pediatricians; there was no significant difference between specialties.). Similar percentages of physicians in each specialty give antismoking advice to parents of young



Table 3. Number and Percentage of Physicians Responding 'Normal' to Blood Pressure Levels at the Age-Specific 90th Percentile, by Specialty\* and Age of Patient, Compared with National Survey

Age of Patient (y)	Average Blood Pressure (3 Visits)	Cincinnati Survey		National Survey† (Percent)
		Pediatricians (n = 122) No. (%)	Family Physicians (n = 71) No. (%)	
3-5	110/70	17 (14)	14 (21)	(23)
6-9	120/75	17 (14)	12 (18)	(18)
10-13	130/80	13 (11)	4 (6)	(13)
14-19	140/85	3 (3)	0 (0)	(6)

\*No within-age-group comparison between pediatricians and family physicians was significant.

†As reported in Nader et al.<sup>2</sup>

NOTE: Not all of the physicians provided responses in all of the age categories.

children (55% of family physicians and 59% of pediatricians) and to school-aged children and parents (73% of family physicians and 66% of pediatricians). Family physicians were marginally more likely to counsel adolescents about smoking than pediatricians, however (94% of family physicians and 81% of pediatricians).

### Cholesterol

Table 4 displays the number and percentage of physicians who answered "yes" or "high risk" when asked, "Do you or your office nurse routinely measure blood cholesterol and/or serum lipid levels as a screening test during well-child visits for any of the following age groups?" Similar to what Nader et al.<sup>2</sup> and Kimm et al.<sup>3</sup> reported, physicians in this study indicated that cholesterol was most commonly evaluated in children from high-risk families. Significantly more pediatricians than family physicians

Table 4. Number and Percentage of Physicians Performing Cholesterol Screening Either Routinely or in High-Risk Patients, by Age of Patient

Age of Patient (y)	Cincinnati Survey		P Value*	National Survey† (Percent)
	Pediatricians (n = 122) No. (%)	Family physicians (n = 71) No. (%)		
0-1	31 (28) (1 routine, 30 high risk)	8 (12) (0 routine, 8 high risk)	≤.05	(29)
2-5	74 (62) (11 routine, 63 high risk)	5 (22) (0 routine, 15 high risk)	≤.001	(37)
6-12	82 (68) (11 routine, 71 high risk)	32 (46) (1 routine, 31 high risk)	≤.005	(55)
13+	86 (72) (18 routine, 68 high risk)	48 (68) (17 routine, 31 high risk)	NS	(65)

\*All P values represent comparisons between Cincinnati pediatricians and family physicians.

†As reported in Nader et al.<sup>2</sup>

NS—not significant.

NOTE: Not all of the physicians provided responses in all of the age categories.

screen for cholesterol in younger children, a finding similar to that reported by Kimm et al. A slightly higher percentage of family physicians routinely screen adolescents for hypercholesterolemia; pediatricians were more likely to screen only high-risk teenaged patients. It should be noted that 25% to 30% of the physicians surveyed do not measure the cholesterol levels of any children or adolescents.

Of 134 physicians in both specialties who reported screening for cholesterol, 75% use outside laboratories, 16% use office analyzers, and 4% use both office analyzers and professional laboratories. Six percent did not specify which method was used. Eighty percent of physicians in both specialty groups reported rechecking the cholesterol level of patients with abnormal results, and 50% to 60% in each specialty group perform additional studies to rule out secondary causes of elevated cholesterol. The response patterns were similar in both specialty groups.

Ninety-nine of the 134 who reported that they measure cholesterol responded to the question: "What do you consider an elevated cholesterol?" Responses varied by the physician's age and specialty. Twenty percent of physicians in each specialty group responded that they considered a cholesterol level above the 95th percentile for age to be elevated. The remainder of the respondents listed a specific numerical value used as a cutoff point. The mean cutoff point used by pediatricians was significantly lower than that used by family physicians ( $4.96 \pm .25$  mmol/L [ $191.7 \pm 9.49$  mg/dL] vs  $5.45 \pm 0.44$  mmol/L [ $210.9 \pm 17.02$  mg/dL];  $P < .001$ ). Twenty of 58 (34%) pediatricians used a cholesterol level of  $\leq 4.65$  mmol/L ( $\leq 180$  mg/dL) to define hypercholesterolemia in children, whereas only 3 of 41 family practitioners (7%) used this level. Older physicians tended to use higher cutoff points than younger physicians. When stratified by age, the mean cutoff point for physicians <45 years old was  $5.05 \pm 0.25$  mmol/L ( $195.3 \pm 9.74$  mg/dL) compared with  $5.36 \pm .29$



mmol/L ( $207.3 \pm 11.09$  mg/dL) used by physicians  $\geq 45$  years ( $P = .003$ ).

Management of hypercholesterolemic pediatric patients also differed between pediatricians and family physicians. Family physicians were more likely than pediatricians to advise dietary changes (100% vs 90%,  $P = .02$ ), and exercise (92% vs 66%,  $P < .001$ ), and to prescribe medication (57% vs 5%,  $P < .001$ ). Pediatricians, on the other hand, were more likely than family physicians to refer their patients to other physicians for management (71% vs 19%,  $P < .001$ ).

Several large pediatric studies<sup>5-7</sup> report significant consistency over time in cholesterol levels of children, ie, cholesterol "tracks" in this population. Seventy-five percent of all respondents in this survey agreed with those findings. There was no significant difference of opinion on this point between physicians in the two specialties. Physician beliefs about tracking were not associated with whether they measured cholesterol levels in children.

### Diet

The physicians surveyed indicated that their counseling of patients about fat intake increases as the age of the patient increases. About 18% in each group responded that they recommend a low-fat diet in infancy, and an additional 13% of respondents in both groups recommend low-fat diets for infants who have an increased risk of CVD because of a positive family history. About 30% of physicians in both specialty groups recommend diets reduced in fat for children over 2 years of age. Pediatricians were more likely than family physicians to recommend low-fat diets only for high-risk children (25% vs 7%,  $P = .008$ ); family physicians were more likely to routinely recommend low-fat diets. Forty-five percent of physicians in both groups routinely recommend low-fat diets to their school-aged patients, and an additional 19% of family physicians and 29% of pediatricians (not significant) recommend low-fat diets only to high-risk school-aged children. According to the survey results, similar percentages of pediatricians and family physicians counsel adolescents about low-fat diets, with 49% overall recommending low-fat diets routinely and an additional 28% recommending such diets for high-risk patients only. Twenty-three percent of the physicians in both specialties never counsel their pediatric patients about reducing their dietary intakes of fat.

Physicians who indicated that they measure cholesterol were more likely to counsel patients about a low-fat diet ( $P < .01$ ). Further, those physicians who recommend low-fat diets were more likely to counsel patients about low-salt diets ( $P < .001$ ) as well. Approximately 25% of the pediatricians surveyed routinely recommend

low-salt diets to their patients regardless of the patient's age. In contrast, family physicians recommend low-salt diets more often as the age of the patient increases (13% for infants, 25% for adolescents).

### Lifestyle

Since many risk factors for CVD are linked to habits acquired in childhood, physicians were asked which habits, if avoided, would be most beneficial in preventing CVD in adults. There were additional items that asked physicians to evaluate their effectiveness in promoting lifestyle changes involving these habits. While approximately 65% of physicians responded that they believe regular exercise, weight control, and decreasing saturated fat in the diet are habits that are likely to have an impact on a patient's risk of developing CVD, only about 25% believed that their counseling is effective. There is an even larger discrepancy between the perceived beneficial effect that smoking prevention has on CVD risk (89%) and the perceived effectiveness of physician counseling in preventing patients from smoking (32%).

### Continuing Education

Physicians were asked to choose the one topic they would most like to see offered as a continuing medical education (CME) course from the following list: blood pressure, obesity, stress, low-fat or low-sodium diet, exercise, cholesterol, and smoking prevention. Obesity was the most requested topic among both family physicians (34%) and pediatricians (37%). Obesity was also the most commonly requested topic in the national surveys by Nader et al<sup>2</sup> (36%) and Kimm et al<sup>3</sup> (33%). The next most frequently chosen topics were smoking and cholesterol. For family physicians, smoking was second (28%), followed by cholesterol (16%). For pediatricians, the order was reversed, with cholesterol second (22%) and smoking third (9%). Significantly more family physicians than pediatricians requested smoking as a CME topic ( $P = .001$ ).

### Discussion

Our survey shows that there are notable differences between family physicians and pediatricians with respect to the age at which cholesterol screening is begun, the cutoff points used for diagnosis, and management practices. Pediatricians begin screening patients at younger ages, have lower cutoff points, and are more likely to refer patients with elevated cholesterol levels to other specialists. Family physicians are more likely to advise dietary



changes and increased exercise, and to prescribe medication for pediatric patients with elevated cholesterol levels. The following are some of the possible explanations for these differences:

1. Family physicians may be more familiar with the drugs available for treatment and therefore feel more comfortable with prescribing them since they frequently have adult patients who use them.

2. Family physicians may treat more older children (ie, adolescents) who, from a medical standpoint, are more similar to adults (the survey did not ask the average age of the patients receiving medication).

3. Pediatricians may be reluctant to restrict dietary fat since there is no clear consensus regarding the percentage of calories in a child's diet that should be derived from fat (the Academy of Pediatrics has recommended 30% to 40%, and the 1985 NIH Consensus Conference recommended 30%,<sup>1</sup> recommendations that continue to be widely supported).

Most children have yearly well-child checkups, and these visits provide an excellent chance for the physician to identify pediatric patients who are at high risk for developing CVD later in life. Guidelines for screening adult patients for hypercholesterolemia have been outlined in the 1985 NIH Consensus Conference report.<sup>1</sup> No NIH Consensus guidelines for cholesterol screening in children have been published, although their development is currently underway. Lipid experts and the various advisory boards (American Academy of Family Physicians, American Academy of Pediatrics, National Cholesterol Education Program) have not agreed on the most appropriate recommendations for childhood screening given the available data. Newman et al<sup>8</sup> summarize some of the arguments against cholesterol screening in children, emphasizing that while cholesterol levels tend to track over time, tracking is imperfect, and that studies linking high cholesterol in childhood to CVD in adulthood have not been done. Such studies are not likely to be forthcoming in the near future.

The American Academy of Family Physicians has not made an official statement about cholesterol screening for individuals younger than 20 years of age, making it necessary for individual physicians to establish their own approach to screening. The specific approach taken by physicians depends on their objectives of screening, their beliefs about the effects of long-term hypercholesterolemia in children, and their opinion as to whether or not hypercholesterolemia is a predisposing factor for adult CVD. If the link between high cholesterol levels during childhood and adult CVD is believed to be strong, and if treatment in childhood is believed to be effective, then it is important to identify all children with elevated cholesterol. Universal screening is the only way

to accomplish this goal, since Griffin et al<sup>9</sup> and, more recently, Starc et al<sup>10</sup> have shown that family history alone fails to identify a significant number of children with elevated cholesterol levels. Conversely, if the link between hypercholesterolemia in childhood and adult CVD is not believed to be clear, or if treatment in childhood is not believed to be effective, then failing to identify hypercholesterolemic children who do not have familial or genetic tendencies to develop CVD need not be a concern. Physicians who take this latter position would support a more focused approach to screening. Such selective screening practices, based on a child's family history, have been recommended by the American Academy of Pediatrics.

The Committee on Nutrition of the American Academy of Pediatrics<sup>11</sup> recommends screening children over 2 years of age for hypercholesterolemia only in the presence of a positive family history of CVD. This recommendation is based on the premise that pediatric primary care physicians continually update family history so that high-risk children can be identified. Accordingly, our survey results indicate that the majority of physicians who perform cholesterol screening do so in high-risk children. However, 25% to 35% of pediatricians and 40% to 60% of family physicians do not routinely update a patient's family history (depending on the patient's age), thus precluding identification of potentially high-risk patients. The higher percentage of family physicians who do not update patient family history may reflect that they are caring for the entire family, and are therefore aware of changes in the family history of CVD. Nonetheless, for targeted screening programs to be effective, it will be necessary for primary care physicians to update patients' family histories of CVD risk factors on a routine basis.

Interest in learning about cholesterol has escalated in the past decade. Our survey showed that physicians' interest in CME courses on cholesterol (26%) was much greater than that which was shown in the 1985 survey by Nader et al (6%).

In our study, primary care physicians indicated that blood pressure was the risk factor that they most frequently assess. This mirrors what was reported by Nader et al and Kimm et al in their national surveys. The 1987 Second Task Force Guidelines on Blood Pressure Control state that "assessment of blood pressure from infancy through age two years can be difficult and sometimes unreliable." Thus, it is not until age 3 years that annual monitoring of blood pressure is recommended.<sup>4</sup> The responses to the questionnaire indicated that this task force recommendation is being followed by most primary care physicians. Only small numbers of physicians reported routinely taking the blood pressures of infant



patients (13% of pediatricians and 10% of family physicians). Although pediatricians begin measuring the blood pressure of patients when their patients are slightly younger, more than 95% of all physicians surveyed measure the blood pressure of adolescent patients. Also, the majority of the physicians surveyed believe that blood pressure does track to some degree, which is in agreement with several major published studies.<sup>12-14</sup>

That physicians measure blood pressure does not ensure that elevated values will be recognized. As many as 14% of pediatricians and 21% of family physicians incorrectly indicated that 110/70 mm Hg represented a normal blood pressure reading for a patient in the youngest (3 to 5 years) age group. Physician recognition of elevated blood pressure was more accurate for adolescents, for whom adult standards are applicable. This finding suggests that younger children may have a higher risk of unrecognized hypertension.

Because most physicians routinely measure blood pressure, this practice does not necessarily identify physicians who are more oriented toward pediatric risk prevention. For example, physicians who indicated that they routinely measure blood pressure were no more likely than those who do not take such measurements to screen for hypercholesterolemia or provide counseling for low-fat diets. More specific for identifying a "preventive mentality for CVD" was whether a physician screens for cholesterol. Those physicians who reported routine cholesterol screening were more likely to give counseling about low-fat diets. Furthermore, those who provide counseling about low-fat diets were more likely to counsel about low-salt diets as well.

Generally speaking, physicians in the Cincinnati area are not convinced of the efficacy of enforcing low-salt diets in childhood with the intention of preventing heart disease. In the national study by Nader et al, 43% of physicians surveyed believed that establishing the habit of eating a diet low in salt would likely prevent heart disease, but in the study reported herein only 14% of pediatricians and 9% of family physicians indicated that they believe that low-salt diets are likely to be effective ( $P < .001$ ).

The physicians surveyed indicated that smoking is the risk factor that receives most attention in terms of counseling, with more than 50% of the physicians reporting that they discuss smoking with the parents of infants, and larger numbers (81% of pediatricians and 95% of family physicians) reporting that they discuss smoking with their adolescent patients. These results were similar to those found in the national survey by Nader et al. Also similar to that survey, over 80% of Cincinnati physicians in both specialty groups believe that prevention of smoking is likely to be effective in the

prevention of CVD. Fortmann et al<sup>15</sup> surveyed 318 physicians in Monterey, California, and reported that respondents believed that reducing smoking was more likely to decrease CVD risk than increasing physical activity or reducing weight. Based on a survey of over 1000 primary care physicians in Maryland, Valente et al<sup>16</sup> also reported that more physicians believed that the benefits derived from eliminating smoking were greater than the health-promoting benefits derived from aerobic exercise.

A recent review of data from seven National Health Interview surveys conducted in the United States between 1974 and 1985 showed a decline in smoking prevalence from 36.7% in 1974 to 30.4% in 1985. While decreases occurred among both sexes, men showed the greatest decline in smoking. The decline seemed to be due to fewer people, particularly men, ever initiating the habit of smoking rather than to smoking cessation.<sup>17</sup> Smoking initiation is greatest during adolescence, and most individuals who become regular smokers begin by age 20 years.<sup>17</sup> Thus, smoking prevention techniques are most effective and important during childhood, and physicians' skills in this area need to be further developed. Physician awareness of this need is underscored by the finding that smoking prevention was the second most requested topic for CME courses among the Cincinnati family physicians and among the pediatricians surveyed nationally, and was the third most requested topic among Cincinnati pediatricians.

In the study by Valente et al,<sup>16</sup> it was reported that physicians believed they could be more effective in patient lifestyle modification if they were given support through CME courses. It is to be hoped that health educators can take this information and the results reported here as a cue to provide useful CME courses for practicing physicians. Such courses will need to cover the methods used to promote lifestyle changes, since only 20% to 30% of physicians surveyed believe they are effective in facilitating such changes in their patients. Unlike the findings in other studies,<sup>15,16,18</sup> in the Cincinnati study we did not find that the age of physicians influenced either their attitudes toward lifestyle changes or their perceived effectiveness in initiating them.

In our survey, the greatest number of physicians in each specialty (>33%) selected obesity as the CME topic of greatest interest. It is interesting to note that this was the most requested topic in the surveys by Nader and Kimm and their colleagues as well. Thus, obesity continues to be an area in which physicians in primary care specialties believe they lack the necessary knowledge and skills to provide for the needs of their pediatric patients.

Physician surveys reflect an increasing interest in and concern about cardiovascular risk factors in children, but



also suggest that many physicians lack confidence in risk assessment and counseling. Since managing CVD risk factors often involves the patient making difficult lifestyle changes, it is not surprising that a majority of physicians report feeling inept at effecting such changes permanently in their patients.<sup>2,16,19,20</sup> Professional interest in health promotion is widespread; continuing education courses are needed to ensure that physicians are equipped with the necessary knowledge and skills related to cardiovascular prevention.

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