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ABSTRACT. It is apparent from the results of the 1995 and 1998 surveys reported by Kimm et al in this issue of *Pediatrics* that pediatricians are interested in blood pressure and lipids but uncertain about the management of these coronary heart disease (CHD) risk factors. Data from longitudinal epidemiologic studies initiated in pediatric cohorts support the important role for pediatricians in the detection of children at risk for CHD, and detection should be followed by effective intervention/treatment programs. However, the latter may be difficult in most office practices, because of the intensive effort by specialized personnel required to successfully reduce CHD risk. *Pediatrics* 1998;102(5). URL: <http://www.pediatrics.org/cgi/content/full/102/5/e61>; coronary heart disease risk factors, hypertension, hyperlipidemia.

ABBREVIATION. CHD, coronary heart disease.

Within the past two decades pediatricians have been encouraged to address coronary heart disease (CHD) risk factors. In this issue of *Pediatrics*, Kimm et al¹ compare results from physician surveys in 1988 and 1995 regarding attitudes and management of hypertension and hyperlipidemia in children. Surveys of this type are often difficult because of problems in selection of representative samples and the attainment of adequate response rates. These and other problems specific to this survey (eligibility for the interview based on only a minimum of five pediatric visits/week; physicians not required to have seen any children with either hypertension or hyperlipidemia; different questionnaires used among the physicians) raise some questions about the applicability of the authors' conclusions to the general pediatric community. Nevertheless, it is apparent that the outcomes from 1995 and 1988 confirm the findings of previous surveys of pediatricians.^{2,3} First, although there continues to be an interest in blood pressure and lipids among US physicians treating children, there is considerable uncertainty about management of CHD risk factors. Second, there is a reluctance to refer at-risk children to specialists despite a sense that intervention is not as successful as it should be. Thus, despite publication within the past decade of national guidelines for diagnosis, evaluation, and treatment of hyperlipidemia and hypertension,^{4,5} there continue to be important issues about CHD prevention in children.

CHD is a major cause of premature morbidity and

mortality in adults. Prevention has focused on the well-recognized risk factors of hypertension, hyperlipidemia, and obesity. A natural extension of this campaign has been the targeting of CHD risk factors in children, with the rationale that the prevalence of CHD in adults can be reduced by early identification of at-risk subjects and introduction of effective intervention strategies. Data from longitudinal epidemiologic studies initiated in pediatric cohorts in the 1970s⁶⁻⁸ support this approach. A significant tracking effect for blood pressure and lipids is present from childhood through adolescence and into adulthood.^{9,10} Moreover, the association of these risk factors with hyperinsulinemia, known as the insulin resistance syndrome,¹¹⁻¹³ is also present during childhood. Levels of fasting insulin in children are directly associated with lipid¹⁴ and blood pressure levels,¹⁵ and in adolescents with lipid levels, blood pressure, weight, and parental levels of fasting insulin.¹⁶ The early adverse effect of these risk factors has been confirmed by autopsy studies of children in whom the degree of aortic and coronary artery atherosclerosis found at autopsy is significantly associated with levels of blood pressure and lipids obtained before death.¹⁷

The Kimm survey did not address obesity, an essential CHD risk factor linked to hypertension, hyperlipidemia, and atherosclerotic lesions.^{11-13,17} Not only do a majority of obese children become obese adults¹⁸ but overweight during adolescence is associated with an increased risk of adult CHD.^{19,20} As recently noted, the prevalence of obesity in the childhood population is increasing steadily.²¹

Pediatricians should play an important role in the detection of children at risk for CHD. Almost all pediatricians routinely measure blood pressure. Although very few cases of hypertension will be missed, the prevalence of hypertension in children is low; only 1% or less of junior high school-aged children will have elevated blood pressure,²² and even fewer cases will be found in younger children.²³ The recommendations for cholesterol screening are clear,⁵ and following the guidelines should identify most children with elevated levels.²⁴

Detection should be followed by effective intervention/treatment programs. This may not be feasible in the average office practice. Dietary modifications for sodium and potassium²⁵ and lipids²⁶ have been shown in clinical trials to reduce levels of risk. However, these results were accomplished with a dedicated group of interventionists and physicians committed to patient and family reinforcement. Few physicians have the systems in place to support the level of activity required for effective risk factor intervention. Thus, it is not surprising that the physi-

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cians interviewed in the Kimm study felt a lack of success with their management. In most instances, referral to an experienced specialist is of benefit to the patient, family, and referring physician.

The primary mission of pediatrics has always been prevention of disease and ensuring normal growth and development. Cardiovascular health should be an integral component of this mission. This can best be achieved by active participation of pediatricians in the detection of at-risk individuals followed by effective intervention programs.

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REFERENCES

1. Kimm SYS, Payne GH, Stylianou MP, Waclawiw MA, Lichtenstein C. National trends in the management of cardiovascular disease risk factors in children: second NHLBI survey of primary care physicians. *Pediatrics*. 1998;102:(5). URL: <http://www.pediatrics.org/cgi/content/full/102/5/e50>
2. Arneson T, Luepker R, Pirie P, Sinaiko A. Cholesterol screening by primary care pediatricians: a study of attitudes and practices in the Minneapolis-St. Paul metropolitan area. *Pediatrics*. 1992;89:502-505
3. Nader PR, Taras HL, Sallis JF, Patterson TL. Adult heart disease prevention in childhood: a national survey of pediatrician's practices and attitudes. *Pediatrics*. 1987;79:843-850
4. Update on the Task Force (1987) on high blood pressure in children and adolescents. A working group from the National High Blood Pressure Education Program. *Pediatrics*. 1996;98:649-658
5. NCEP Expert Panel on Blood Cholesterol Levels in Children and Adolescents. National Cholesterol Education Program (NCEP). Highlights of the report of the expert panel on blood cholesterol levels in children and adolescents. *Pediatrics*. 1992;89:495-501
6. Prineas RJ, Gillum RF, Horibe H, Hannan PJ. The Minneapolis Children's Blood Pressure Study Parts I & II. *Hypertension*. 1980;2(suppl 1):I-18-I-28
7. *Cardiovascular Profile of 15,000 Children of School Age in Three Communities, 1971-1975*. Bethesda, MD: National Heart, Lung, and Blood Institute; 1978. Department of Health, Education, and Welfare Publication (NIH) 78-1472
8. Berenson GS, McMahan CA, Voors AW, et al. Cardiovascular risk factors in children. In: Andrews C, Hester, HE, eds. *The Early Natural History of Atherosclerosis and Essential Hypertension*. New York, NY: Oxford University Press; 1980;1-450
9. Mahoney LT, Clarke WR, Burns TL, Lauer RM. Childhood predictors of high blood pressure. *Am J Hypertension*. 1991;4:6085-6105
10. Lauer RM, Lee J, Clarke WR. Factors affecting the relationship between childhood and adult cholesterol levels: The Muscatine Study. *Pediatrics*. 1988;82:309-318
11. DeFronzo RA, Ferrannini E. Insulin resistance. A multifaceted syndrome responsible for NIDDM, obesity, hypertension, dyslipidemia and atherosclerotic cardiovascular disease. *Diabetes Care*. 1991;14:173-94
12. Reaven GM. Pathophysiology of insulin resistance in human disease. *Physiol Rev*. 1995;75:473-486
13. Haffner SM, Miettinen H. Insulin resistance implications for type II diabetes mellitus and coronary heart disease. *Am J Med*. 1997;103:152-162
14. Jiang X, Srinivasan SR, Webber LS, Wattigney WA, Berenson GS. Association of fasting insulin level with serum lipid and lipoprotein levels in children, adolescents, and young adults: The Bogalusa Heart Study. *Arch Intern Med*. 1995;155:190-196
15. Taittonen L, Uhari M, Turtinen J, Pokka T, Akerblom HK. Insulin and blood pressure among healthy children. Cardiovascular risk in young Finns. *Am J Hypertension*. 1996;9:193-199
16. Sinaiko AR, Gomez-Marin O, Prineas RJ. Relation of fasting insulin to blood pressure and lipids in adolescents and parents. *Hypertension*. 1997;30:1554-1559
17. Berenson GS, Srinivasan SR, Bao W, Newman WP, Tracy RE, Wattigney WA. Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. *N Engl J Med*. 1998;338:1650-1656
18. Clarke WR, Lauer RM. Does childhood obesity track into adulthood? *Crit Rev Food Sci Nutr*. 1993;33:423-430
19. Must A, Jacques PF, Dallal GE, Bajema CJ, Dietz WH. Long-term morbidity and mortality of overweight adolescents. *N Engl J Med*. 1992;327:1350-1355
20. DiPietro L, Mossberg HO, Stunkard AJ. A 40-year history of overweight children in Stockholm: life-time overweight, morbidity, and mortality. *Int J Obesity*. 1994;18:585-590
21. Troiano RP, Flegal KM, Kuczmarski RJ, Campbell SM, Johnson CL. Overweight prevalence in trends for children and adolescents. The National Health and Nutrition Examination Surveys, 1963-1991. *Arch Pediatr Adolesc Med*. 1995;149:1085-1091
22. Sinaiko AR, Gomez-Marin O, Prineas RJ. Prevalence of "significant" hypertension in junior high school-aged children. *J Pediatr*. 1989;114:664-669
23. Sinaiko AR, Gillum RF, Jacobs DR, Sopko G, Prineas RJ. Renin-angiotensin and sympathetic nervous system activity in grade school children. *Hypertension*. 1982;4:299-306
24. Diller PM, Husten GA, Leach AD, Laskarzewski PM, Sprecher DL. Definition and application of the discretionary screening indicators according to the National Cholesterol Education Program for children and adolescents. *J Pediatr*. 1995;126:345-352
25. Sinaiko AR, Gomez-Marin O, Prineas RJ. Effect of low sodium diet or potassium supplementation on adolescent blood pressure. *Hypertension*. 1993;21:989-994
26. The Writing Group for the DISC Collaborative Research Group. Efficacy and safety of lowering dietary intake of fat and cholesterol in children with elevated low-density lipoprotein cholesterol. *J Am Med Assoc*. 1995;273:1429-1435

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