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Heart Disease Starts in the Very Young

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Your Life Your Health

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Heart disease? Cholesterol problems? Aren't these only important as we get older? Think again. The seeds of the diseases of old age are sown in youth! Multiple studies support the conclusion that appetite and activity habits developed and practiced in youth affect health immediately and persistently. A 1998 study, published in the *New England Journal of Medicine* detailed the results of the *Bogalusa Heart Study* and the Multicenter *Pathobiological Determinants of Atherosclerosis in Youth* which affirmed that risk factors such as:

- elevations in body-mass index (obesity)
- systolic blood pressure,
- serum LDL cholesterol concentration
- serum triglyceride concentration
- cigarette smoking

are significantly related to the extent of heart disease in young people. There are too kinds of heart and artery lesions which are founding children. One is "streaking" which is a depositing of cholesterol and triglycerides in the arteries without formation of actual obstructions. However, prevalence and extent of lesions in the coronary arteries, especially fibrous-plaque lesions that narrow the lumen, increase with age. And, the extent of atherosclerotic lesions in the coronary vessels increases markedly in young people with multiple risk factors. This supports the concept that multiple risk factors have a compounding effect on death and disease from coronary heart disease in middle age and later, as has been demonstrated by epidemiologic studies such as the Framingham Study.

Cardiovascular risk factors such as:

- dyslipidemia,
- hypertension,
- hyperinsulinemia or insulin resistance, and

- obesity

often coexist in both children and young adults.

Since the clustering of these conditions — termed syndrome X, the deadly quartet, or insulin-resistance syndrome — is seen so frequently, a common mechanism involving insulin resistance has been suggested. Insulin resistance has been discussed in this column previously. See “Metabolic Syndrome” at www.jameslhollymd.com under “Your Life Your Health.

The extent of abnormalities in the coronary vessels of children and young adults is higher in cigarette smokers than in nonsmokers. Therefore, it is to be expected that cigarette smoking by young people who have multiple other risk factors will adversely influence the extent of coronary atherosclerosis.

The effects of multiple risk factors on coronary atherosclerosis give further justification for the evaluation of cardiovascular risk in young people and provide a rationale for both prevention and intervention. It may be important to focus on multiple cardiovascular risk factors early in life, rather than on a specific risk factor, such as hypercholesterolemia. Interventions related to modifiable risk factors, such as:

- the prevention of smoking
- weight control
- encouragement of physical exercise
- a prudent diet, if undertaken early in life

may retard the development of atherosclerosis.

Cholesterol in Young People

In 2005, the American Heart Association issued a Scientific Statement entitled “Managing abnormal Blood Lipids: A collaborative Approach (*Circulation*. 2005;112:3184-3209.) That statement encouraged the management of cardiovascular risk factors in the young. The statement summarized “Primary Prevention in Children,” and stated, “During the past several decades, data generated from epidemiological, clinical, and laboratory studies have provided convincing evidence that atherosclerotic-cardiovascular disease processes begin in childhood and are influenced over time by the interaction of genetic and potentially modifiable risk factors and environmental exposures.”

The AHA scientific statement was founded on the basis of the data available in 1992 when the National Cholesterol Education Program: Report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents (NCEP) issued the first guidelines for

primary prevention of CHD beginning in childhood. The NCEP recommendations emphasize assessment and management of elevated blood cholesterol levels in children and youth.

Building on the NCEP recommendations, the AHA emphasizes childhood lifestyle modification that includes:

- "heart-healthy" patterns of dietary intake
- physical activity

for the promotion of cardiovascular health and prevention of dyslipidemia and other risk factors for cardiovascular disease (CVD). The AHA dietary guidelines for children 2 years old and older emphasize the caloric and nutrient intake necessary for normal growth and developmental processes. Results from the *Dietary Intervention Study in Children* (DISC) and the *Turku Infant Study* demonstrated the safety and efficacy of saturated fat–restricted and cholesterol-restricted diets in children and youth. Current recommendations targeting primary prevention in children are:

Primary Prevention in Children and Youth

Dietary modification

Limit foods with

Saturated fats to <10% calories/d

Cholesterol to <300 mg/d

trans fatty acids

Physical activity

Increase moderate to rigorous 60 min/d

Limit sedentary activities 2 h/d

Identification of dyslipidemia

Selective screening

Family history of CHD

1 parent with blood cholesterol 240 mg/dL

No parental history but CHD risk factors present

1 of the following risk factors present: high blood pressure; smoking; sedentary lifestyle; obesity; alcohol intake; use of drugs or diseases associated with dyslipidemia

Remember, “primary prevention” refers to efforts to prevent disease before it occurs, while “secondary prevention” refers to efforts to prevent the recurrence of disease once it has occurred.

Of particular practical importance is that all young people should be screened for dyslipidemia who have:

- a family history of coronary heart disease
- One parent with a blood cholesterol greater than 240 mg/dl
- No parental history but coronary heart disease risk factors present
- One or more of the following risk factors: high blood pressure, smoking, sedentary lifestyle, obesity, alcohol intake, use of drugs or disease associated with dyslipidemia.

Given the prevalence for and trends in overweight and obesity in children and youth and the documented association between obesity and CVD risk factors, emphasis on increasing physical activity as part of weight management is an essential part of cardiovascular health promotion and risk reduction.

The current AHA recommendations encourage pediatric healthcare providers to assess patterns of physical activity at every visit and to encourage physically active lifestyles for children and youth.

Identifying Dyslipidemia in Children and Youth

The NCEP and the AHA recommend the identification of dyslipidemia (cholesterol and triglyceride abnormalities) in children and youth. A fasting lipid profile allows for a comprehensive assessment that includes measurement of total cholesterol and LDL-C, Triglycerides, high-density lipoprotein cholesterol (HDL-C). The AHA recommends the averaged results of 3 fasting lipid profiles as the baseline for guiding treatment modalities.

The AHA endorses the guidelines established by the NCEP in setting the following definitions for acceptable, borderline, and high total cholesterol and LDL-C levels in children and adolescents between 2 and 19 years of age.

Cholesterol Levels for 2- to 19-Year-Olds

Levels	Total Cholesterol, mg/dL	LDL-C, mg/dL
Acceptable	<170	<110
Borderline	170–199	110–129
High	200	130

Lifestyle modification with an emphasis on normalization of body weight and heart-healthy patterns of dietary intake and physical activity is the cornerstone of treatment for children and youth who are identified as having dyslipidemia. This approach should be supported through school-site education and heart-healthy programs as well as through

community-based activities. In the pediatric office setting or in pediatric lipid clinics, the management of dyslipidemia is best accomplished via a multidisciplinary collaborative team approach. Nurses, nurse practitioners, and dietitians experienced in the treatment of dyslipidemia in children and youth are well positioned within these settings to facilitate lifestyle modification with children and families.

The AHA recommends an "adequate" trial (i.e., 6 to 12 months) of therapeutic lifestyle change before consideration of lipid-lowering medications. Three general classes of lipid-lowering agents are available and have been used in the treatment of dyslipidemia in children and adolescents. These include the bile acid sequestrants, niacin, and the HMG-CoA reductase inhibitors (statins).

It is recommended that children have at least 60 minutes of moderately intensive exercise per day and less than two hours of sedentary activities such as computer use or television. Of course, the best way for children to be active is for them to be watching active parents.

If you have cholesterol problems, or if you have had a heart attack, or if you have cardiovascular disease, your children should be checked for abnormal cholesterol. Remember, it is your life and it is your health; it is never too early to start taking care of your health. Remember, your future and your children's health future starts now.