Clinicians facing middle-aged or elderly patients with coronary heart disease know that atherosclerosis precedes the clinical event by many years, but they rarely stop to think when the process actually begins. There is abundant evidence from autopsies in youngsters dying violent deaths, and from animal experiments, that coronary atheroma originates early in life, starting first as fatty streaks, then going on to fibrous plaques in adolescence, and finally culminating in atherosclerosis in early adult life [1]. The rate at which it forms is thought to depend on the presence of coronary risk factors, notably smoking, lipids, raised blood pressure, lack of physical activity, psychological factors, and family history. Angina or myocardial infarction become clinically apparent only when 60% or more of the coronary surface has been covered by atheroma. Coronary atherosclerosis appears to be reversible, thus encouraging efforts to eliminate those risk factors that are behavioural in origin [2]. Trials using behavioural or pharmacological means have met with variable success. They demonstrated the ability of middle-aged men to stop smoking, lower their lipids, and reduce their blood pressure, with a commensurate reduction in coronary morbidity or mortality, but only at the cost of an inordinate amount of investigational effort [3]. In the light of studies in the US and the United Kingdom showing that coronary risk factors are already present in adolescence, the question arises whether or not interventional efforts might be better expended on preventive measures to start earlier in life [4-6]. Moreover, schools provide the opportunity of using an existing framework for health promotion in a way that does not exist for any other age group.

Most people agree that children should be discouraged from smoking, but there is less enthusiasm for dietary intervention in growing children, and, in view of the technical problems of accurate blood pressure measurement in youngsters, there is little support for the use of drugs to lower blood pressure, even in those in the highest percentiles of its distribution. Encouraging greater physical activity is one intervention, long advocated on general educational grounds, which provokes little dissent—among adults. Physical inactivity in adults increases their risk of coronary disease, yet even a modest increase of activity, for example using stairs rather than a lift, is beneficial, with an even greater benefit from more vigorous exercise [7]. Smoking, obesity, and high blood pressure are less prevalent in those who take regular exercise; regular exercise lowers lipids, benefits non-insulin-dependent diabetes, and many people feel the better for it. Promoting increased activity is a positive intervention entailing no major snags or uncertainties [8]. Young people are often thought to be very active, but this is not so [9]. Therefore many people are becoming concerned that low levels of activity in childhood, together with a further fall-off with age and increasing mechanisation, will produce an increasingly torpid society. Poised to start studies on physical activity as a possible way to promote better health in youngsters, the award by the College of the Medicine-Gilliland Travelling Fellowship offered me the opportunity to visit US centres involved with coronary prevention in youngsters.

Muscatine study

To believe that risk factors emerge in childhood and persist into adult life is a beguiling prospect, but establishing the facts requires long-term studies showing that they track into adult life. Children in Muscatine, under the auspices of the University of Iowa, have been participating in such studies for more than 20 years, with a second generation now entering the study. The data are extensive but their interpretation is provoking a lively debate. Dr Lauer and the Muscatine group fear that the predictive value of individual childhood measurements of cholesterol is less powerful than many had hoped, but others argue that notwithstanding its predictive power in an individual it is still desirable to promote lower lipid levels in all children [10-12]. Coronary prevention, however, means more than just lowering lipids, and the group, working in a technically difficult field, is measuring 24-hour ambulatory blood pressure in adolescents and correlating it with heart growth assessed by echocardiography, in order to examine the early development of hypertension.

Compared with the excitement of collecting information, its processing may seem mundane, but any long-term study of this nature requires first-class methods for handling records; thus discussion about the use of computers in large epidemiological studies was valuable in planning our own studies.

American Health Foundation

Knowledge about risk factors in children is of little value without knowing how to change them. The
American Health Foundation has been active in exploring how schools can be used for health education. By working with teachers to show them how to introduce concepts of healthy living, and providing them with the material and intellectual support they need to effect change, the Foundation has developed a programme—Know Your Body—which starts by inculcating healthy behaviour in primary schoolchildren and develops continuously until, by the teens, it is raising aspects about interpersonal relationships [13]. Although coronary heart disease, as one of the greatest health problems facing industrialised societies, receives due prominence, the Foundation believes it is best dealt with in the wider context of healthy behaviour rather than as a special programme. A prodigious amount of excellent teaching material is now available, coupled with instructional courses for teachers. It has been successfully introduced into differing socio-economic groups and translated into other languages. Its efficacy in coronary prevention has been demonstrated by showing diminished risk factors in participating children, and extensive normative data about North American children have been accumulated.

University of Minnesota, Minneapolis

Using simple fieldwork methods of assessing fitness, it appears that two-thirds of American children could be called ‘unfit’. Whether or not this is an entirely fair picture is debatable, but it does raise concerns similar to our own in Britain. Our studies have shown no evidence of deterioration in fitness (ie the ability to exercise) over the past 25 years in spite of the present surprising lack of physical activity (ie what children actually do) [14]. The National Heart Lung and Blood Institute has embarked on a multicentre study of physical activity and fitness in children, coordinated from the University of Minneapolis. Oxygen consumption has come to be the gold standard for assessing fitness but measuring physical activity is more difficult. Self-administered questionnaires, movement sensors, observation (sometimes with video-recording) all have their advocates. In Exeter we have not been convinced about the objectivity of these methods, so we have developed ambulatory heart-rate recording as an indirect but highly relevant method of assessing the effect of activity on the cardiovascular system. It was mutually valuable to discuss the relative merits of these methods with other experts seeking solutions to a similar problem.

Medical College of Georgia, Augusta

The reasons why some people exercise but many more give it up are just as likely to be psychological as physiological. Starting from a firm foundation in exercise testing in children with congenital heart disease, the group in Augusta have developed an exciting study of both the physiology and the psychology of exercise in normal children, tackling some of the fundamental psychological aspects about attitudes to exercise and children’s own perception of what they are actually accomplishing. Few studies have looked at circulatory reflexes in children; neither the investigators nor the subjects, I suspect, will still be able to refer to the cold pressor test as the Cold Willy Test now that they know the ribaldry this would provoke in British schools!

Bogalusa Heart Study

The Bogalusa Heart Study, based at Louisiana State University, is probably the most extensively documented study ever undertaken of cardiovascular health in youngsters [15]. It started in the same era as the Muscatile study, so both groups are now seeing a second generation of children. Bogalusa, like Muscatile, is a self-contained township on the Mississippi, but it differs by having a higher proportion of blacks and in being poorer; its biracial structure and the stability of its population are, however, a paradigm of the US. They have developed an ingenious system of obtaining the names of a child’s close friends which has proved more effective than any government agency (social security, tax, driver licensing, etc) in tracing participants once they have left school. They too have used schools for health promotion but they differ from the American Health Foundation’s approach in specifically targeting coronary prevention in their Heart Smart programme [16]. They have highlighted the importance of involving the whole family by enrolling service families living in a large military base—Fort Polk Study—with initially encouraging results from this novel approach.

Conclusions

The work I encountered in these centres was immensely stimulating, especially in discussing with colleagues how they had overcome problems similar to those we have encountered, and in comparing interpretations of our results. The people I met and the overwhelming welcome I received everywhere were the true delight of my visit. There was a ready desire to share the results of their research, including the blind alleys as well as the fruitful progress. I was especially grateful to my friends Dr and Mrs J. Will, for allowing me to make my base with them, and for arranging a visiting professorship for me at the University of Wisconsin, Madison. My travels essentially took me the length of the Mississippi, through localities of considerable affluence to places of relative poverty, thereby offering a perspective on the United States not often granted to the casual tourist. Some days were heavy, starting at 7.15 am and, with a working lunch, going on to early evening, but other days were less strenuous, being spent in art galleries, the theatre, concerts and the outdoors; but above all meeting the American people pro-
vided an exciting counterpoint to the primary purpose of my visit. Where else could I have encountered a champion chicken-caller, an assertiveness training officer from the National Guard, a general back from the Kuwaiti conflict, and the most entrepreneurial beggar I have ever met? Where else could one see such appalling name puns as Soups On for a restaurant, or I Wear for an optician, or—an official street sign—No Parking, No Standing, No Stopping, No Kidding? Only in the US!

For anyone seeking intellectual stimulation in research, or an opportunity to step back and look at other ways of providing health care, the Medicine-Gilliland Fellowship offers a unique opportunity. As a result of holding this Fellowship I am amply convinced of the importance of providing clinicians with a period of intellectual refreshment during a busy professional life.

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