**Symposium report**

**Prevention of coronary heart disease starts in childhood**

A two-day symposium on the theme that 'Prevention of coronary heart disease starts in childhood', was held at the Central Middlesex Hospital on Thursday, 30 June and Friday, 1 July 1977. The speakers considered the pathogenesis of atherosclerosis, the major risk factors for coronary heart disease, and ways that might be used in childhood to reduce the incidence in the future.

The symposium was opened by Dr. R. W. D. Turner (University of Edinburgh) who drew attention to the rapid increase in the incidence of coronary heart disease (CHD) in many developed countries of the world, especially in younger men. He identified the major risk factors as smoking, hypertension, and dietary-induced hyperlipidaemia, with obesity and lack of exercise as secondary contributors. The seeds of many of these factors were sown in childhood, emphasizing the need for an early start for prevention. It was time to stop arguing about causation because proof would not be forthcoming in the foreseeable future. The reduction of saturated fats with partial substitution by polyunsaturated fats was urgently needed for the population as a whole, starting with infants and children.

**Biochemistry and pathology of the arterial wall**

Dr. M. Crawford (Nuffield Institute of Comparative Medicine) spoke of the roles of polyunsaturated fatty acids in the cell membranes and developing brains of infants, and as prostaglandin precursors. He said that humans cannot synthesize the double-bonds of the longer fatty acids and require disproportionate amounts of linoleic acid, for example, to provide the small proportions of very long-chain unsaturated fatty acids found in cell membranes; as many as 30 molecules of linoleate may be required to provide one molecule of the long-chain polyunsaturates.

Professor N. Woolf (Middlesex Hospital Medical School) reviewed the development of the normal arterial wall and the early pathological changes of atherosclerosis. The presence of atherosclerotic lesions in young adults suggests that the early stages occur during childhood.

Professor H. N. Neufeld (University of Tel-Aviv) continued this theme and demonstrated the effects of presumed environmental influences on the coronary arteries of genetically similar groups of infants. Changes were already present in infancy, and from his comparative study of heart disease in different ethnic groups the changes were so consistently pronounced by the age of 2 that the ethnic group of a child could be identified simply from pictures of his coronary arteries. Most importantly the changes in infants were found only in males; possibly testosterone is a facilitating factor for atherogenesis rather than oestrogen being protective.

**Childhood nutrition**

In the second session of the symposium attention began to focus on the various risk factors for coronary heart disease. Dr. C. G. D. Brook (Central Middlesex Hospital) examined the complexity of the nutritional influence in childhood in relation to the aetiology of CHD. The quantity but also the quality of the diet is of great importance; the inter-relationship of obesity, hyperinsulinism, and hypertension, all of which may have a dietary origin, as well as the fatty acid composition of the diet poses a complex nutritional problem for the prevention of CHD. Because body fatness is a strongly genetically determined characteristic and because it evolves over the whole period of childhood, a vigorous and sustained programme of health education is required to effect a small shift in the fatness of the whole population. Such a shift would disproportionately reduce the incidence of obesity, and actuarial data indicate that it might reduce the incidence of atherosclerotic cardiovascular disease.

Dr. E. M. Widdowson (University of Cambridge) reviewed the history of infant feeding and traced the evolution of present-day artificial preparations. The fatty acid composition of preparations used in different countries may well provide valuable information in the future about the relevance of constituents of infant feeds to later atherosclerosis.

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Hyperlipidaemia

Professor B. Lewis (St. Thomas’s Hospital Medical School) reviewed present concepts of lipid metabolism. He favoured a simple functional classification of hyperlipidaemic states which included both the primary and secondary hyperlipidaemias. The implications of the different types of hyperlipidaemia may be crucial in the consideration of population intervention. This point was elaborated by Professor June Lloyd (St. George’s Hospital Medical School), who stressed the need to examine each individual factor critically before making recommendations for nationwide screening. She considered that screening for hyperlipidaemia was unlikely to be profitable but that identification of children with familial hyperlipidaemia was important in view of their high risk of CHD.

Professor J. H. de Haas (The Netherlands) demonstrated that screening for cholesterol, hypertension, and smoking in a population of schoolchildren was practicable, but that the problems raised in defining normality and what to do about potentially abnormal subjects were considerable.

Smoking

Dr. Beulah Bewley (St. Thomas’s Hospital Medical School) described her study of smoking among children in Derbyshire and Kent. 7% of boys and 2.5% of girls smoked more than one cigarette per week by the age of 11; 40% had puffed their first cigarette by the age of 9. When the factors which influence children to start smoking are discovered, determined intervention methods must be developed.

The critical part which smoking plays in the aetiology of CHD was highlighted by Dr. Inger Asmussen (University of Copenhagen) whose scanning electron micrographs of the umbilical arteries of babies of smoking mothers showed a cobble-stone appearance quite different from infants of nonsmoking mothers. The implication for the remainder of the infant’s arterial tree was obvious. Dr. E. M. Ross (Central Middlesex Hospital) recalled the evidence of the long-term effect of smoking in pregnancy on the physical development and educational attainments of children up to 7 years old.

Hypertension

Professor R. M. Lauer (University of Iowa) discussed the problems of detection of hypertension in children in view of the lack of consistency of repeated blood pressure readings. He considered the appetite for salt to be a learned phenomenon and questioned whether salt restriction should not be started in infancy to decrease the incidence of later hypertension. While being cautious in recommending screening for the whole population, he made a plea for the more frequent taking of blood pressure in children in order to identify those at greater risk. The identification of this accelerator of atherosclerosis, which follows indices of body weight as well as familial trends, is crucial to the prevention of CHD. Both he and Dr. E. A. Shinebourne (Brompton Hospital) highlighted the irreversible arterial changes which follow late correction of coarctation of the aorta.

Intervention at the individual level

Dr. Christine Williams (American Health Foundation) described in some detail the schools health education programme of which she is the director. The Know your body (KYB) program consists of screening schoolchildren and then helping them to take an active part in reducing their own risk factors for various conditions, but especially for CHD. In discussion there was concern about possible untoward effects of such knowledge on children but the results of this programme will be eagerly awaited. This new approach may be more successful than didactic health education which has so far failed to change the behaviour of children or their parents.

National policy

Professor A. S. Truswell (Queen Elizabeth College) surveyed the recommendations which various governments have made for dietary measures to reduce CHD, though he regretted that our own had lagged behind others in this field. He considered that the order of priority should be (i) reduction of obesity, (ii) reduction of saturated and total fat, (iii) partial replacement by polyunsaturated fat, and (iv) a reduced dietary cholesterol. Such changes must be made voluntarily but could be helped by measures such as modification of agricultural policy and the labelling of foods. His call for a voluntary nutritional policy rather than for a compulsory food policy was welcomed.

Dr. J. Green (H. J. Heinz Company Ltd.) reviewed the role of the food industry. He complained that advice coming from the medical profession was rarely unanimous. Much scientific thought was given to provision of mixed diets for children and it was better that progress should be cautious. Nevertheless it was the purpose of the food industry to follow rather than to create national policy.

Mr. A. E. Fynn (Saatchi, Saatchi, Garland-Compton Ltd.) discussed the ethics and capabilities of the advertising industry. He contrasted the 80-fold investment which the tobacco industry makes...
in advertising compared with that of the Health Education Council on antismoking propaganda, and highlighted the fiscal dilemma in which the Government finds itself, a dilemma for which the audience had little sympathy.

Dr. H. Jolly (Charing Cross Hospital) reviewed the increasing involvement of doctors with the media, and applauded the more open style with which the medical profession conducted its debates. He felt that much could be done to bring about a gradual awareness that losing weight, stopping smoking, keeping fit, and reducing the consumption of animal fats were good things to do, and he urged the audience not to be reticent in coming forward to be counted.

The paediatrician's responsibility

It fell to Professor O. H. Wolff (Institute of Child Health) to sum up and to suggest the direction which we could now take. He highlighted the distinction between influencing populations and treating special groups known to be at increased risk from CHD. For intervention in the latter group there was little argument, but in recommending national policies we must consider the evidence that a particular measure will have the desired effect, how difficult it will be to implement, and whether it would have effects other than preventing CHD. Under these headings he examined the various risk factors.

Smoking he unequivocally condemned. There was a causal link with CHD and abolition would also prevent carcinoma of the bronchus, chronic bronchitis, and peripheral vascular disease. Preventive action starting with parental and teacher education was desirable.

The evidence for a causal link with hypertension is also convincing and strokes and renal disease would be benefited by controlling it. On the other hand, the cost effectiveness of population screening was unproven and the time for mass action had probably not arrived. Nevertheless paediatricians should take blood pressures more often, especially when there was a family history of hypertension or premature CHD, to identify the population at risk.

Obesity is probably only indirectly linked to CHD, but diabetes and osteoarthritis are major causes of disability; advice is not hazardous and of considerable potential benefit. We should take particular care when there are obese first-degree relatives or predisposing factors. Hyperlipidaemia is an important risk factor, especially for a small section of the population. Paediatricians should attempt to identify and treat the population at special risk, but the evidence in favour of population measures is lacking. The evidence for a causal link between the level of physical inactivity and CHD is lacking but other conditions, and particularly obesity, would benefit from increased fitness and there is some justification, therefore, for encouraging children to become more active.

Finally, Professor Wolff turned to the educative role of the paediatrician towards colleagues in the health and teaching professions who are in the best position to influence children and their families in making changes in eating and other habits. Until doctors are unanimous in accepting a preventive and curative role, most influence will come from non-medical personnel, and paediatricians should seek to show these groups the importance of starting good habits in childhood. A further reason for this effort is to broaden the reception of such advice. Socio-economic factors make a great difference in this respect, the social class differences in the incidence of smoking at the present time being a case in point.

In concluding, Professor Wolff warned against the blunderbuss in the sphere of health education; preventive health advice must be given with great sensitivity. Dogmatic advice receives criticism of parents and, at best, will not be taken; at worst, it will harm family relationships and the relationship between the family and health workers. One major new role of the paediatrician must be to teach others to deal with these delicate issues which are part of his everyday life and which he has been trained to deal with over many years.

Summary

At a 2-day symposium on the theme that prevention of coronary heart disease starts in childhood there was a broad measure of agreement that children should be encouraged not to smoke, to be reasonably physically active, and to eat in moderation. A case was made for recommending the population as a whole to reduce caloric intake moderately, to reduce the amount of saturated fat in the diet, and partially to substitute polyunsaturated fats. Such measures introduced in childhood are likely to be most effective in reducing the incidence of coronary heart disease later, though careful research by paediatricians and others will be necessary to show this.

Paediatricians have a role in identifying children at special risk from premature atherosclerosis due to hypertension, smoking, and hyperlipidaemia, all of which they should be actively seeking, especially in the presence of a family history of coronary heart disease or hypertension. They are also in a very good position to influence other workers in the fields of child health and life to inculcate the principles of coronary prevention early in life.