

These clinics could worsen the situation if staff members do not take the time to prepare patients psychologically for their angiography. On the other hand, shorter waiting times before invasive investigation may allow less time for psychosocial problems to develop. It seems reasonable that we develop better, non-invasive algorithms for use by general practitioners to avoid unnecessary referrals to hospital. Cardiologists need to use coronary angiography with care, prepare patients for the possibility of normal findings, and identify patients at high risk (with normal

anatomy or coronary disease). Otherwise, the advantages of an early diagnosis of angina will be offset by an increasing number of chronically disabled patients with non-cardiac pain.

Gurjinder Nijher *medical student*
 John Weinman *professor of health psychology*
 Christopher Bass *consultant in liaison psychiatry*
 John Chambers *reader in cardiology*

Cardiothoracic Centre, St Thomas's Hospital, London SE1 7EH
 (johnchambers@dial.pipex.com)

- 1 Chambers J, Bass C. Chest pain with normal coronary anatomy: a review of natural history and possible etiologic factors. *Prog Cardiovasc Dis* 1990;33:161-84.
- 2 Black N, Langham S, Coshall C, Parker J. Impact of the 1991 NHS reforms on the availability and use of coronary revascularisation in the UK (1987-1995). *Heart* 1996;76(suppl 4):1-30.
- 3 Cox AL, Petrie JF, Pollak PT, Johnstone DE. Managed delay for coronary artery bypass graft surgery: the experience at one Canadian center. *J Am Coll Cardiol* 1996;27:1365-73.
- 4 Underwood MJ, Firmin RK, Jehu D. Aspects of psychological and social morbidity in patients awaiting coronary artery bypass grafting. *Br Heart J* 1993;69:382-4.
- 5 Sanders D, Bass C, Mayou RA, Goodwin S, Bryant BM, Forfar C. Non-cardiac chest pain: why was a brief intervention apparently ineffective? *Psychol Med* 1997;27:1033-40.
- 6 McDonald IG, Daly J, Jelinek VM, Panetta F, Gutman JM. Opening Pandora's box: the unpredictability of reassurance by a normal test result. *BMJ* 1996;313:329-32.
- 7 Sullivan AK, Holdright DR, Wright CA, Sparrow JL, Cunningham D, Fox KM. Chest pain in women: clinical, investigative, and prognostic features. *BMJ* 1994;308:883-6.
- 8 Mayou RA, Bass C, Hart G, Tyndel S, Bryant B. Can clinical assessment of chest pain be made more therapeutic? *Q J Med* 2000;93:805-11.
- 9 Kouyayanou K, Pither C, Wessely S. Iatrogenic factors and chronic pain. *Psychosom Med* 1997;59:597-604.
- 10 Henbest R, Stewart M. Patient-centredness in the consultation. II. Does it really make a difference? *Fam Pract* 1990;7:28-33.
- 11 Petrie KJ, Weinman J, Sharpe N, Buckley J. Role of patients' view of their illness in predicting return to work and functioning after myocardial infarction: longitudinal study. *BMJ* 1996;312:1191-4.
- 12 Petrie KJ, Cameron LD, Ellis CJ, Buick D, Weinman J. Changing illness perceptions following myocardial infarction: an early intervention randomised controlled trial. *Psychosom Med* (in press).
- 13 Lucock MP, Morley S, White C, Peake MD. Responses of consecutive patients to reassurance after gastroscopy: results of self-administered questionnaire survey. *BMJ* 1997;315:572-5.
- 14 Weinman J, Petrie KJ, Moss Morris R, Horne R. The illness perception questionnaire: a new method for assessing the cognitive representation of illness. *Psychol Health* 1996;11:431-46.
- 15 Chambers J, Bass C. Atypical chest pain: looking beyond the heart. *Q J Med* 1998;91:239-44.

Adult obesity and growth in childhood

Children who grow rapidly during childhood are more likely to be obese as adults

Over half of all adults in the United States and the United Kingdom are overweight, and developing countries are increasingly facing the public health problems of overnutrition as well as undernutrition.¹ In the past 20 years or so, the prevalence of obesity and overweight in both adults and children has increased dramatically.² These time and geographical trends argue against a primarily genetic cause of obesity, and both behavioural and pharmaceutical interventions in obesity have limited effectiveness.³ Prevention through environmental, social, or behavioural interventions is a logical focus for tackling this epidemic.

The possibility of preventing adult obesity by taking action in infancy and childhood is attractive. Several studies have shown a weak relation between being heavy at birth and becoming overweight in later life. Others have found that faster growth in childhood predicts obesity in adulthood.⁴ In this week's issue (p 1331) Parsons et al replicate these findings in a large British birth cohort study followed to age 33.⁵ Unlike earlier studies, this study has data to take account of confounding factors that may be associated with both birth weight and with later fatness and to examine whether the relation between birth weight and obesity is modified by childhood growth. These potentially complex interrelationships may hold the key to effective preventive strategies.

Parsons et al find that the positive relation between birth weight and later body mass index is largely

accounted for by maternal weight—heavier mothers have heavier babies who tend to become heavier adults. A father's weight, however, does not influence the risk of adult obesity in his children. Though the poorer quality of measurements of fathers' variables may explain this discrepancy, the greater influence of maternal nutrition seems more likely. Whether this acts biologically or behaviourally, prenatally or postnatally, cannot be determined by this study. It suggests that interventions to prevent obesity in women of childbearing age give long term benefit to their children, and the women themselves; such interventions merit evaluation.

Because rapid linear growth is often accompanied by accelerated weight gain, it may not be surprising that children who grow rapidly during childhood are more likely to be obese as adults. Many of these children would also have been heavy at birth. Parsons et al found, however, that those who were most vulnerable to developing obesity in association with rapid childhood growth were men who had been light at birth or who had thin or light mothers. This is an important finding as this pattern of growth is becoming common in developing countries that are experiencing a nutritional transition to Western lifestyles. In such countries, women tend to be small, following an impoverished childhood, and inter-generational effects lead to the persistence of high prevalences of low birth weight.⁶ Changing economic circumstances and population lifestyles, however, make rapid postnatal weight gain likely, perhaps particularly

Papers p 1331

in boys, who may receive preferential treatment in the sharing of food.⁷ In developed countries, individuals who may be at increased risk because of their pattern of growth are those born prematurely or after intrauterine growth restriction. They have low birth weight and then grow up in a society with low levels of activity and high levels of dietary fat and sugar.⁸

During critical periods of their lives individuals are particularly vulnerable to external influences. Programming occurs when an adverse influence acting during a critical period permanently alters the structure or function of a developing or plastic organism.⁹ The role of intrauterine life as a critical period for the aetiology of adult disease, particularly in the development of cardiovascular disease and its risk factors, has been debated vigorously.^{10, 11} The observations of Parsons et al suggest that early childhood is one critical period for the development of obesity. Intrauterine life is a further critical period in defining a group of individuals (boys who are light at birth) who are more vulnerable to the effects of rapid growth in childhood.

The critical period for intervention and the potential of programming to prevent disease has received less attention in research and debate. Experience in clinical intrauterine growth restriction and in the management of high risk pregnancies has shown that fetal growth is difficult to influence. Childhood growth may be more amenable to environmental interventions, but there is limited information on the prevention of obesity in children.¹² Instead of concentrating research efforts on developing drug treatments for established adult obesity, perhaps we should use what we know

already to design and evaluate social, behavioural, or policy interventions aimed at children.¹³ Association does not equal causation, but systematic reviews of observational studies such as Parsons et al's may guide us to the groups of individuals who are most at risk of adult obesity and the critical periods for intervention.

Catherine Law *senior lecturer*

MRC Environmental Epidemiology Unit, Southampton SO51 0QJ
(claw@mrc.soton.ac.uk)

CL gave an invited talk at the European Obesity Congress 2001, for which she was paid expenses.

- 1 World Health Organization. *Obesity: preventing and managing the global epidemic*. Geneva: World Health Organization, 1998.
- 2 James WPT. The epidemiology of obesity. In: Chadwick DJ, Cardew G, eds. *The origins and consequences of obesity*. Chichester: Wiley, 1996:1-16.
- 3 NHS Centre for Reviews and Dissemination. *Systematic review of interventions in the treatment and prevention of obesity*. York: NHS Centre for Reviews and Dissemination 1997:1-147. (Report No 10.)
- 4 Parsons TJ, Power C, Logan S, Summerbell CD. Childhood predictors of adult obesity: a systematic review. *Int J Obesity* 1999;23:S1-107.
- 5 Parsons TJ, Power C, Manor O. Fetal and early life growth and body mass index from birth to early adulthood in 1958 British cohort: longitudinal study. *BMJ* 2001;323:1331-5.
- 6 United Nations Children's Fund. *The state of the world's children 2001*. New York and Geneva: Unicef, 2001.
- 7 Ramalingaswami V, Jonsson U, Rohde J. The Asian enigma. In: *The progress of nations*. New York: Unicef, 1996:11-7. www.unicef.org/pon96/nuenigma.htm (accessed 5 Oct 2001).
- 8 Childhood obesity: an emerging public-health problem. *Lancet* 2001;357:1989.
- 9 Barker DJP. *Mothers, babies and health in later life*. Edinburgh: Churchill Livingstone, 1998.
- 10 Robinson R. The fetal origins of adult disease. *BMJ* 2001;322:375-6.
- 11 Dietz WH. Critical periods in childhood for the development of obesity. *Am J Clin Nutr* 1994;59:955-9.
- 12 Campbell K, Waters E, O'Meara S, Summerbell C. Interventions for preventing obesity in children. *Cochrane Library* 2001;(3):CD001871.
- 13 Després JP. Drug treatment for obesity. *BMJ* 2001;322:1379-80.

Managing major public health crises

Lessons from recent events in the United States and the United Kingdom

The recent terrorist attacks in New York have shown how all societies need rescue, health, and public health services to respond immediately to major disasters. Subsequent covert releases of anthrax (and scares and hoaxes) have been straining public health and reference laboratory services.¹ The epidemic of foot and mouth disease in the United Kingdom has not directly threatened human health, but its control has required huge efforts and resources. Control measures have affected health services: primary care has had to deal with the stress experienced by affected communities; public health services have responded to disposing of over four million animals with concomitant zoonoses like bovine spongiform encephalopathy, *Escherichia coli* O157, and the specialist microbiological reference laboratories were needed to exclude cases of human infection.²

What lessons can be learnt from these events? This question is timely in Britain, because the arrangements for health protection in the new NHS are yet to be finalised, though we know that regional directors of public health will oversee this function (see box 1).^{3, 4}

Events in the United States emphasise the need to be able to deliver surge capacity for health protection. It must be possible to rapidly deliver support when local services look like being overwhelmed.^{1, 3} An

immediate lesson from the foot and mouth epidemic is that the potential impact on human health of any major activity outside the health sector must be speedily considered. Those responsible for controlling the epidemic found public veterinary services had been slimmed down; they had to recruit veterinarians from the private sector, abroad, and out of retirement. The capacity of veterinary laboratories was sorely taxed. Despite the recommendations of the Phillips report, which derived lessons from the epidemic of bovine spongiform encephalopathy, local public health and veterinary networks did not assume executive roles or provide emergency liaison.⁵ These events in the United States and the United Kingdom indicate the need for clear direction at the executive level to establish rapidly effective collaboration between national bodies and between appropriate local and national agencies.

Box 1: Components of health protection³

- Monitoring of and protection against communicable disease
- Protection against non-communicable environmental hazards
- Planning for and response to emergencies