

"threshold" level for the whole population. As Fox points out, this is easily overlooked, as, for example, in Tampa, USA, in 1968. There a measles vaccination programme reached 80% of the target population, but in some areas there were groups with 70% of the target population still not immune. It was in such an area that a measles epidemic occurred later that year.¹

It is therefore misleading to think in terms of overall vaccination rates, which may hide potential epidemic areas. Let us break free from considering herd immunity in large populations in terms of a model that is really only applicable to very small groups.

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1 Fox JP. Herd immunity and measles. *Rev Infect Dis* 1983;5(3):463-5.

Mixed appointment systems

SIR,—I was interested in Dr Bruce Taylor's article as we have just changed from a mixed to a full appointment system (10 November, p 1277). We found that the mixed system worked very well when all doctors were present and when there were enough appointments available. At other times, however (about six months a year in our eight doctor practice), there was enormous pressure on available appointments with sometimes a two week wait. This resulted in patients not waiting or becoming conditioned to believe that it was not worth phoning for an appointment and just coming to the open surgery.

There were always long queues, often making patients aggressive. Moreover, equalising each doctor's consultations meant that many patients could not see their own GPs and went to see them at other times. This resulted in considerable duplication of work. Finally, we always felt under pressure to consult quickly to clear the waiting room. I agree that there is a small nucleus of patients who cannot cope with our new system (and they are not invariably socially deprived or old), but we found that far more were disadvantaged by the mixed system. These included people who could not arrive during the 0830-1000 open surgery (mothers with young children, nursing mums, those who had to travel on public transport, commuters) and people who were too unwell to wait for over an hour.

The mixed appointment system may well work better in certain areas, in small practices, and if there is a prolonged open surgery with a further large number of appointments available at other times. Our initial overall impression of a full appointments system, however, is one of patient and doctor preference, which we soon hope to confirm by a survey.

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C Reactive protein concentrations during long distance running

SIR,—The assumption by Dr A F Strachan and others (10 November, p 1249) that a raised serum C reactive protein concentration

during long distance running provides evidence for significant tissue necrosis is an unjustified extrapolation. Tissue necrosis certainly provokes an acute phase protein response roughly proportional to the size of the damage, as does trauma; peak concentrations for serum C reactive protein usually occur at 48 hours when the trauma is surgical.^{1,2} "Inflammation" provokes the response with far greater sensitivity. In acute gout, for instance, serum C reactive protein concentrations often rise to 100-200 mg/l—that is, to values far greater than those observed in the runners. The observation that indomethacin did not affect the increase in serum C reactive protein concentration is interesting but unsurprising; the same is true when indomethacin is given to patients with rheumatoid arthritis.³

The only conclusion this study seems to permit is that long distance runners experience a small rise in serum C reactive protein concentration, the reason for which is unknown; it could be either an inflammatory response or necrosis. Of course, the conclusion that high values for serum C reactive protein signify some other disorder is valid. It is, however, unsafe to assume that such values necessarily signify myocardial infarction.

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- 1 Crookson RA, Payne CJ, Ratcliff AP, Soothill JF. Time sequence of acute phase reactive proteins following surgical trauma. *Clin Chim Acta* 1966;14: 435-41.
- 2 Fischer CL, Gill C, Forrester MG, Nakamura R. Quantitation of "acute-phase proteins" post-operatively. *Am J Clin Pathol* 1976;66:840-6.
- 3 McConkey B, Crookson RA, Crookson AP, Wilkinson AR. The effects of some anti-inflammatory drugs on the acute-phase proteins in rheumatoid arthritis. *Q J Med* 1973;168:785-91.

Anaphylactic reaction to aprotinin

SIR,—While we agree that adverse reactions to drugs should be published, we feel that the report by Mr G A LaFerla and W R Murray of an anaphylactic reaction to aprotinin (3 November, p 1176) should not pass without comment.

Aprotinin (Trasylol) is a protein of bovine origin and, not surprisingly, gives rise to anaphylactic reactions in a small proportion of the patients who receive it. In their data sheet the manufacturers issue the caution, "Care should be exercised in treating patients intermittently or those who have previously received Trasylol (aprotinin), since an anaphylactic reaction can occur."¹ Moreover, other information published by the manufacturers suggests that "no test is known that will definitely show whether a patient is at risk or not (of an anaphylactic reaction)."² In view of these warnings it is not clear why aprotinin was used to "cover" endoscopic retrograde cholangiopancreatography, in a patient who had twice received it as treatment of pancreatitis, and why faith was placed in an ocular sensitivity test. The waters are further muddied because there appears to be no evidence that aprotinin can influence the clinical complications of endoscopic retrograde cholangiopancreatography.

A 21% incidence of acute pancreatitis after attempts to cannulate the pancreatic duct at endoscopic retrograde cholangiopancreatography appears somewhat high. A recent analysis of 1118 endoscopic retrograde chol-

angiopancreatography examinations carried out at the General Infirmary, Leeds, showed that an overall incidence of acute pancreatitis of less than 1% can be achieved. Factors which appeared to be responsible for pancreatitis after endoscopic retrograde cholangiopancreatography were parenchymal opacification, inexperience of the endoscopist, and repeated unsuccessful attempts to cannulate the common bile duct.³

We suggest that with careful attention to the technical details of endoscopic retrograde cholangiopancreatography the incidence of acute pancreatitis can be reduced to a level which obviates the use of agents such as aprotinin even if they can be shown to have a protective role.

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- 1 Bailey AGM, Taylor W, eds. *ABPI data sheet compendium*. London: Dataform Publications Ltd, 1984:143-5.
- 2 Anonymous. *Trasylol, inhibitor of proteinases*. Haywards Heath, West Sussex: Bayer UK.
- 3 Hamilton I, Lintott DJ, Rothwell J, Axon ATR. Acute pancreatitis following endoscopic retrograde cholangiopancreatography. *Clin Radiol* 1983;34: 543-6.

SIR,—Mr G A LaFerla and W R Murray routinely administer aprotinin immediately before performing endoscopic retrograde cholangiopancreatography—a procedure associated with hyperamylasaemia in 70% of cases and acute pancreatitis in 21% (though how this latter figure is arrived at must be open to question). Aprotinin is presumably given just in case it has any effect on acute pancreatitis: hyperamylasaemia results from raised pressure in the pancreatic duct system from whatever cause. Aprotinin has been shown to be equally ineffective in clinical acute pancreatitis¹ and in animal studies² in this condition, and there are sound arguments why its administration is unlikely to be helpful. Aprotinin in acute pancreatitis has now been shown to be dangerous as well as useless.

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- 1 Imrie CW. Acute pancreatitis. In: Bouchier IAD, Allan RN, Hodgson HJF, Keighley MRB, eds. *Textbook of gastroenterology*. London: Baillière Tindall, 1984.
- 2 Keynes WMA. Non-pancreatic source of the proteolytic-enzyme amidase and bacteriology in experimental acute pancreatitis. *Ann Surg* 1980;191: 187-99.

Low protein diets in chronic renal disease

SIR,—The observation by Dr A M El Nahas and colleagues (17 November, p 1337) that a protein restricted diet in chronic renal failure is beneficial in slowing the rate of progression of the renal failure concurs with our published observations¹ and those of others.² Our further observations on the effect of protein restriction on different nephropathies³ conflict, however, with the conclusions drawn in this study.

In a retrospective analysis of 47 patients with chronic renal failure (mean serum creatinine 780.3 (SD 37.8) $\mu\text{mol/l}$ (8.8 (0.42) mg/100 ml), range 399-1570 $\mu\text{mol/l}$ (4.5-17.8 mg/100 ml))