mg four times a day, and then to 160 mg four times a day. His ECG initially showed widespread T-wave inversion, but this abnormality was most marked two days later, with gross T-wave inversion in most leads (figure). Serial enzyme studies failed to confirm myocardial damage.

ECG of patient with subarachnoid haemorrhage showing T-wave inversion.

Thus this patient was already taking a beta-blocker, in a dose comparable to 240 mg propranolol, but despite a further increase in dosage and apparently clinically adequate beta-blockade (resting pulse rate about 60 beats/min) he proceeded to develop grossly abnormal ECG appearances, of a severity which we have not previously observed in association with subarachnoid haemorrhage.

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Pertussis and the risk of non-accidental injury

SIR,—Pertussis is described in your leading article (22 April, p 1007) as "often a frightening and sometimes terrifying illness," but its social implications have not been amplified. The troublesome paroxysms of coughing can impose such a strain on parents that child abuse becomes a real danger, as highlighted recently by the following case.

A mother of a 15-month-old boy had lost much sleep over her son's whooping cough, which he had been suffering from for four weeks. She had become increasingly agitated by the paroxysms of coughing and was witnessed to have shaken the boy violently during one of these paroxysms. The incident took place in the family doctor's surgery and it was felt that the boy was at risk. A Place of Safety Order was necessary, so that the child could be admitted to hospital. After admission of the child his mother seemed relieved and later divulged that she had become so irritated by her son's coughing that she probably would have harmed him. At a subsequent court hearing, the child was returned home with the provision of a supervision order for three years. The child had by then recovered from whooping cough.

This child may be one of many children with pertussis whose symptoms are sufficiently distressing for their parents to subject them to the real danger of physical harm. Medical complications of pertussis are well recognised,¹

but social complications are much less apparent. As we are in the midst of an epidemic of pertussis² (the worst since 1960), which will probably last until mid-1979, it is pertinent to bear in mind the distressing nature of the disease for parents and consider hospitalisation, even for mild cases, where a risk of non-accidental injury exists.

We would like to thank Dr W C Marshall, who drew our attention to this aspect of pertussis.

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¹ Lloyd, C Olson, *Medicine*, 1975, **54**, 427.
² *British Medical Journal*, 1978, **1**, 1007.

Borderline substances

SIR,—The bureaucratic treatment of the question whether Optimax drinking chocolate is a food or a drug is rivalled only by the situation in which the Department of Health, whose inspectors stamp on the slightest degree of cross-contamination in pharmaceutical production, insists that only food containing traces of gluten may be prescribed under the National Health Service for the treatment of coeliacs. The present policy of the Department's Borderline Substances Committee is to permit only non-luxury food items to be prescribed, and with hidebound logic they maintain that to allow naturally gluten-free flours on prescription would mean that any other essential food that contained no gluten—for example, meat and vegetables—would have to be allowed too. Such an argument is so ridiculous as to be almost beyond belief.

Practically all the "gluten-free" products that are allowable for the 100 000 coeliacs in the United Kingdom are based on gluten-containing flours such as wheat. It is impossible to remove all traces of gluten from such flours and a draft FAO standard states that "gluten-free" food may contain "wheat, rye, barley or oat flour from which all gluten has, so far as is practicable, been extracted." Australian recommendations allow a maximum of about 0.3% gluten.¹ Treatment of coeliac disease is by complete exclusion of gluten from the diet² and lack of response or suboptimal response is commonly due to failure to eliminate gluten completely.³ As an example, the case has been reported of a patient with confirmed coeliac disease who failed to improve until it was discovered that she was receiving Communion wafers containing wheat flour daily.¹ Baker *et al*³ estimated that 65% of coeliacs continue to ingest gluten even when on a supposedly gluten-free diet. Some of this inadvertently ingested gluten is undoubtedly derived from so-called "gluten-free" foods which contain enough residual protein to provoke symptomatic exacerbations in at least some coeliacs and dermatitis herpetiformis patients.⁴

Alternative foods that naturally contain no gluten, such as rice, maize, and potato flours, are available and are generally cheaper than the prescribable "gluten-free" foods. All are just as capable as the gluten-reduced flours of producing palatable and nutritious bread, cakes, and biscuits. The cheapest of the

naturally gluten-free flours (maize) costs 72p per kg less than the dearer of the two most commonly prescribed proprietary brands based on wheat flour, while the most expensive natural flour (rice) costs 11.6p per kg less than the cheaper proprietary brand.

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¹ McCausland, J, and Wrigley, C W, *Journal of the Science of Food and Agriculture*, 1976, **27**, 1203.

² Davidson, S, *et al* (editors), in *Human Nutrition and Dietetics*, p 483. Edinburgh, Churchill Livingstone, 1975.

³ Townley, R R W, and Anderson, C M, *Ergebnisse der Inneren Medizin*, 1967, **26**, 1.

⁴ Price, H, Zownir, J, and Prokipchuk, E, *Lancet*, 1975, **2**, 920.

⁵ Baker, P G, Barry, R E, and Read, A E, *British Medical Journal*, 1975, **1**, 486.

⁶ Monro, J, *Lancet*, 1975, **2**, 920.

Immunisation of adults against diphtheria

SIR,—In his letter (30 September, p 962) Dr S E Ellison details the schedule used for adults at the Central Middlesex Hospital: two doses of 0.2 ml (10 Lf) of adsorbed diphtheria vaccine for those with no history of previous immunisation, and one dose of 0.5 ml (25 Lf) for those previously immunised. We are surprised to learn that no severe reactions have been reported over a period of 10 years, particularly as Schick testing was not done before immunisation.

Severe local and general reactions have been reported¹ in adults following the use of as little as 5 Lf of purified diphtheria toxoid, mainly in those with an allergic reaction (pseudo-reaction) to the Schick control. During an outbreak of diphtheria in Manchester in 1971 severe reactions resulting in time off work were common in adult health workers given 10 Lf of diphtheria vaccine.² For this reason in adults we have been using a preparation containing 1.5 Lf of adsorbed diphtheria toxoid (similar to that described by Edsall *et al*³).

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¹ Pappenheimer, A M, jun, *et al*, *American Journal of Hygiene*, 1950, **52**, 353.

² Butterworth, A, *et al*, *Lancet*, 1974, **2**, 1558.

³ Edsall, G, *et al*, *American Journal of Public Health*, 1954, **44**, 1537.

SIR,—Dr F W Sheffield and others (22 July, p 249, and 30 September, p 962) outline methods for the immunisation of selected adults against diphtheria. Protective antitoxin levels were found in 41 out of 60 adults before immunisation and 56 out of 60 after immunisation. We have been examining, similarly, antitoxin levels in random blood donors by a modified immunoelectro-osmophoresis and passive haemagglutination method,¹ using commercial, British Standard, and fourth British reference preparation for diphtheria antitoxin. Only 3% of adult donors