Authors' reply

EDITOR,—D M Tappin has three criticisms of our article: that it is impossible to separate the effects of breast feeding and socioeconomic status, that the control babies were inappropriately chosen, and that the sample was an inadequate size.

Tappin states correctly that socioeconomic status is associated with breast feeding, but it is not perfectly correlated. In Britain in 1990, 86% of women categorised as social class I breast fed compared with 48% of women categorised as "unclassified" (registrar general's classification of husband's or partner's occupation).¹ It is therefore possible to analyse the effect of breast feeding on sudden infant death having allowed for socioeconomic status. Whether one should adjust for the socioeconomic status is a matter of judgment. This is why we presented the odds ratios for being bottle fed before and after adjustment for employment status (the proxy we used for socioeconomic status).

Secondly, we are puzzled by Tappin's claim that the selection of control babies was biased as the health visitor's caseload would have included all infants in a geographical area. The use of controls matched by neighbourhood would not have underestimated the effect of being bottle fed as the matching was taken into account in the analysis.

Tappin's final point was discussed in the paper. We stated that our results were consistent with an odds ratio for sudden death as high as the upper limit of the confidence interval and that larger studies might be able to distinguish a small, independent effect of being bottle fed. It would have been irresponsible not to publish such findings solely because they were not significant at the 5% level as this would have led to publication bias.²

In answer to J A Walker-Smith, the type of feed was categorised as breast, bottle, or mixed, according to age. No details were collected on the type of milk. This information, however, will soon be available from the confidential inquiry into sudden death in infancy, which is in progress in three regions.

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Sudden infant death in France

EDITOR,—Claudia Court and Alexander Dorozynski both state that the incidence of sudden infant death is still rising in France.^{1,2} They seem to be unaware of the data we obtain every year at the National Institute of Health and Medical Research.

After being steady from 1987 to 1990 the rate of the sudden infant death syndrome fell from 1.93/1000 in 1991 to 1.74/1000 in 1992. The provisional figure for 1993 is 1.6/1000. For the past 20 years all other causes of infant death have decreased every year, except in 1988 (figure).

Trends in the sudden infant death syndrome and other causes of infant death, France, 1974-93 (data for 1993 are provisional)

Secondly, in France no studies are done about ethnic groups since civil registration data do not include ethnic origin. So nobody could say that "the incidence of cot death is about the same among all... ethnic groups,"² or the reverse.

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Cot mattresses and the sudden infant death syndrome

EDITOR,—P J Fleming and colleagues' editorial on the possibility of a relation between the fire retardants, biocides, and plasticisers in cot mattresses and sudden infant death should help medical professionals understand how the sudden infant death syndrome may be caused by gases generated from mattresses by micro-organisms;¹ arsine from wallpaper similarly caused deaths of infants a century ago.²

Scopulariopsis brevicaulis develops through warmth and perspiration on cot mattresses and can convert phosphorus, arsenic, and antimony compounds into toxic trihydride gases, but activity is low for several months; the risk is lowest for firstborn infants, who are most likely to have new mattresses, and with reused mattresses the risk becomes important only after several weeks of fungal reactivation.^{2,3} Poisoning first causes headache and irritation, with dislodgement of bedding by stronger infants, so that risk decreases with age; hyperthermia from fever or overwrapping increases the generation of gas, and analgesics suppress warning headaches.

Emphasis on antimony in the editorial and in the television programmes to which the editorial refers is unfortunate as arsenic and phosphorus are also hazardous; arsenic is rarely found, but phosphorus is common. The normal low antimony concentration in tissue permits chemical detection of stibine poisoning, but phosphine poisoning is not detectable. The editorial criticises the analysis of antimony in hair for the television programmes, but many infants had high antimony concentrations while their mothers had low concentrations, confirming exposure in the infants' environment alone. Antimony is usually found in homes only as a fire retardant in polyvinyl chloride and can transfer to infants only as a gas.

Statistics published by the Office of Population

Censuses and Surveys for England and Wales show a reduction in the rate of the sudden infant death syndrome of about 40% after the "back to sleep" campaign in November 1991—the same decrease that occurred after similar interventions in other countries—but the rate had already decreased by about 30% over several years before the campaign started.⁴ The decrease followed recommendations for changes in the manufacture and care of cot mattresses.

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Sampling for analysing blood gas pressures

Arterial samples are the best

EDITOR,—I cannot agree with Khavar Dar and colleagues' conclusion that capillary sampling should be used for analysing blood gas pressures in routine clinical practice.¹ Tissue stabs yield a mixture of true capillary, arteriolar, and venular blood: the similarity of the sample to arterial blood depends almost entirely on the degree of "arterialisation" achieved by warming or rubbing the sample site. At worst the sample is similar to venous blood, and this is particularly so with vasoconstriction.²

Although the authors found that for the partial pressure of oxygen the mean capillary value was within 0.09 kPa of the arterial value, they do not report what the actual arterial values and differences were for each subject or whether their subjects were breathing added oxygen. These are important omissions since in the presence of arterial hypoxaemia the difference between arterial and venous values of partial pressure of oxygen is less (thus making capillary or venous sampling inherently more accurate) than it is when the arterial partial pressure of oxygen is high. The reason for this is the sigmoid shape of the haemoglobin dissociation curve. Fifty four of the 55 patients described in Dar and colleagues' study were admitted urgently to hospital with conditions associated with severe hypoxaemia; it might be predicted that as these patients' conditions improved and they became less hypoxic the difference between capillary and arterial values of partial pressure of oxygen increased.

I am also uncertain whether the authors' method lends itself readily to the repeated sampling essential in managing asthma and controlled oxygen treatment in chronic airways disease. The study provides no evidence that repeated stabs to the ear lobe are less painful than repeated arterial puncture. Repeated stabs would almost certainly be more painful than insertion of an arterial cannula under local anaesthesia on a single occasion, from which repeated samples may painlessly be taken. Interestingly, as many patients expressed no preference between arterial puncture under local anaesthesia and ear lobe sampling as expressed a preference for ear lobe sampling.¹ Repeated "arterialised" venous samples may be obtained from a cannula in a dorsal hand vein: for partial pressure of carbon dioxide the agreement with arterial values is generally within 0.13-0.26 kPa.³ I have found, however, that even in the presence of a

modest alkalosis causing vasoconstriction (pH about 7.4-7.5) this difference increased to 0.53 kPa (unpublished observations). Forster *et al* have found unsatisfactory correlation between arterial and arteriased venous samples for partial pressure of oxygen.⁴

Capillary or venous sampling to estimate arterial blood gas pressure has been used for many years,^{2,4} and several other indirect methods have also been used.¹ While some results have been encouraging, the conclusion that such methods should become routine is probably still premature. If knowledge of the arterial blood gas pressures is important in determining management in potentially life threatening conditions then the arterial blood gas pressures should be measured.

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- 5 Campbell EJM, Howell JBL. Simple rapid methods of estimating arterial and mixed venous PCO_2 . *BMJ* 1960;i:458-62.

Capillary sampling is routine in Germany

EDITOR,—Capillary blood sampling for measurement of blood gas pressures and pH, described by Khavar Dar and colleagues, has been normal practice in Germany for many years.¹ Arterial puncture is performed only when an indwelling line is needed. Use of a scalpel blade is unnecessary and dangerous. A blood lancet (Monojector lancet device, Sherwood Medical) provides enough blood for the capillary tube and can be used on the finger as well as the ear lobe.

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Mount Everest study supports use of capillary samples

EDITOR,—Like Khavar Dar and colleagues, we have investigated the differences between arterial and capillary estimations of blood gas pressures, although under different circumstances.¹ We used a blood gas analyser (Ciba Corning 248) to measure blood gas pressures in 52 members of the 1994 British Mount Everest medical expedition at Mount Everest base camp (altitude 5300 m) in Nepal. Capillary samples were preferred because of our concern about the hazards of arterial puncture. To compare arterial and capillary values, four researchers also underwent arterial puncture. Arterial samples were taken without local anaesthesia from the radial artery with a 25 gauge needle; capillary samples were taken by puncture of the medial aspect of the thumb, which had been warmed in a glove or by holding it in the axilla. Blood gas pressures and acid-base values were compared with a paired *t* test.

Differences (arterial minus capillary) were non-significant for partial pressures of carbon dioxide (-0.59 kPa (95% confidence interval -1.63 to 0.16 kPa); $P=0.09$) and oxygen (0.215 kPa (-0.8 to 1.35 kPa); $P=0.54$) as well as pH (-0.0065 (-0.08 to 0.0055); $P=0.66$). Capillary standard bicarbonate concentration was significantly higher than the arterial concentration (-2.5 mmol/l

(-4.31 to -0.84 mmol/l; $P=0.018$). There were no complications from the blood sampling, and, in contrast to Dar and colleagues' finding, little discomfort was reported with arterial puncture, perhaps because of the smaller diameter needle used. Although the numbers are small, our data support the use of capillary blood sampling in patients and research subjects, both in wards and on mountains.

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- 1 Dar K, Williams T, Aitken R, Woods KL, Fletcher S. Arterial versus capillary sampling for analysing blood gas pressures. *BMJ* 1995;310:24-5. (7 January.)

Geographical relations between patients and general practitioners

EDITOR,—Scott A Murray and colleagues draw attention to the geographical relations between patients and general practitioners in an urban area.¹ In rural areas lists are low, travel is a major factor for patients and doctors, and there is the additional, and potentially perverse, factor of rural practice units. Remuneration heavily based on capitation penalises rural practitioners, and rural practice units are intended to offset this partially. Unfortunately, no worthwhile limits are placed on the distribution of these payments, with the result that urban practices may be tempted to extend their range of operations to attract or retain rural practice units. Likewise rural practices may be tempted to extend their ranges to maintain numbers of patients in the face of urban encroachment. This is plainly self defeating, jeopardises standards of care, and precipitates ever more frenetic work rates for the practitioners.

A balance must be struck between safeguarding standards of care, the freedom of patients and doctors to choose each other, and the continued viability of rural practices. I propose the following amendments to the regulations. They do not prevent doctors and patients from choosing each other but do encourage reevaluation of the relationship and the motives in maintaining it.

Firstly, no practice whose main premises are in a town with a population of over 8000 should be eligible for rural practice units.

Secondly, rural practice units should be payable from the existing 3 mile range, in 1 mile increments, up to but not beyond a point 3 miles from the next practice. Patients beyond this limit should neither attract payments nor count toward the 20% threshold for payment.

Thirdly, patients living in areas that are beyond the limits of a neighbouring practice's area should be offered an interview with the independent medical adviser or community health council in order to determine that their preferences and needs are being adequately met and that they are fully acquainted with the options open to them.

The independent medical advisers of family health services authorities may care to speculate on practitioners' ability to fulfil their contractual obligations to particularly far flung patients. It is flattering to have one's ego stroked by patients

asking to remain registered when they move much closer to another practice. It is treading a path paved with good intentions and obscured by a fog of folly to accede.

Murray and colleagues reflect my view: "The enthusiastic recommendation of a neighbouring practice may allow some patients to feel that they will have continuity of care despite changing surgeries." I have every confidence in my neighbouring practices and do not hesitate to direct patients to them when they move. Having patients and doctors crossing on the road as they travel to see each other in adjacent manors makes no sense at all, especially in a rural area.

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- 1 Murray S, Graham L, Dlugolecka M. How many general practitioners for 1433 patients? *BMJ* 1995;310:100. (14 January.)

Paracetamol and self poisoning

EDITOR,—Keith Hawton and colleagues' unsubstantiated comment that "prevention of fatal self poisoning with paracetamol is now an urgent issue" is not supported by information on fatal self poisoning.¹ In England and Wales in 1992 the number of deaths due to overdoses of medicines was 1951, of which 144 were due to paracetamol poisoning. The number of deaths due to poisoning with analgesics obtained over the counter, including paracetamol, has been declining steadily, from 322 in 1975 to 191 in 1992 (the latest year for which full data are available). Furthermore, the number of deaths due to paracetamol poisoning fell in 1991 and 1992 (Office of Population Censuses and Surveys, personal communication).² Altogether 116 of the 144 deaths due to paracetamol poisoning were probably suicides; while paracetamol is by far the most widely used medicine for therapeutic purposes in Britain, it is responsible for fewer than 3% of all suicides (Office of Population Censuses and Surveys, personal communication).²

Any preventable death is cause for concern, but it is important not to exaggerate the importance of paracetamol poisoning in the overall context of fatal overdoses of medicines and suicide. It is especially important that perceived urgency should not lead to hasty attempts to do something—particularly something as speculative as the measures offered by Hawton and colleagues—at the expense of an analgesic that contributes much to the safe day to day management of pain by many millions of people.

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- 1 Hawton K, Ware C, Mistry H, Hewitt J, Kingsbury S, Roberts D, *et al*. Why patients choose paracetamol for self poisoning and their knowledge of its dangers. *BMJ* 1995;310:164. (21 January.)
- 2 Office of Population Censuses and Surveys. *Mortality statistics: injury and poisoning 1992*. London: HMSO, 1994: table 10. (Series DH4 No 18.)

Preventing suicide

EDITOR,—We agree with Greg Wilkinson that additional resources are required for the identification and treatment of people with mental illness.¹ Australian statistics show a high incidence of suicide among people with mental illness. These same statistics, though, refute the contention that there is "no good evidence of benefit from such commonly cited measures as seeking to influence the means available." Even a cursory examination