of regulatory controversy in USA. We have received an unusual number of queries concerning the study. To answer some of the questions raised by many readers and by these two letters, we provide some further details of the study and a new analysis of data.

We did not measure ethylene oxide concentrations in our study. The data cited in our paper were taken from independent measurements carried out in Finnish hospitals since 1976. By 1981 measurements had been done in 24 hospitals. As the measurements were done at the request of the hospitals, no information is available on how representative the results are for all Finland (in 1979 some 50 hospitals used ethylene oxide). The measurements show that ethylene oxide is usually detected when the sterilising chamber is opened. For about 20 minutes the average concentration varies between 5 and 10 parts per million. At other times the concentration is usually below the detection limit of 1 part per million.

We have no data on the concentration of ethylene oxide before 1976. No major changes in technology or instrumentation have occurred since about 1964, when the present mixture of ethylene oxide and freon gas was introduced. Personnel supervising chemical sterilisation in hospitals believe, however, that the levels of exposure were higher earlier because the harmful effects of ethylene oxide were unknown and less caution was taken when it was used.

The information on exposure in our study was obtained from supervising nurses of the hospitals in 1979. They gave a list of chemical sterilising staff and indicated the agent (one or several) that the persons used. The sterilising staff were contacted individually six months later and asked to fill in a questionnaire on their work history (place of employment and job) in relation to each pregnancy. No questions were asked about sterilising agents. As the exposing agent was assigned by the supervising nurses six months before the actual questionnaire, we cannot think of any mechanism by which the outcome of pregnancy could have influenced the selection of the exposing agents. We believe that the exposure information is unbiased. As the study spanned a relatively long period, however, we were not always able to establish whether exposure took place during pregnancy. This is why we had to use the category "exposure uncertain" (see table I of the original study).

Two sources were used to ascertain the number of spontaneous abortions: questionnaire and hospital discharge data. Questionnaire data on spontaneous abortions may be unreliable because of subjective recognition and reporting.[2] Hospital data, however, should not suffer such weaknesses. The agreement of the results on ethylene oxide based on interview and hospital discharge data add to the findings.

The design of the interview study was complex and asymmetry was introduced which, when uncontrolled, impedes comparison between the groups. The difference in the frequency of reported spontaneous abortions depended on how recent the pregnancy was (see figure in the original study). This caused problems in the analysis, particularly as time of pregnancy also correlated with employment: the most recent pregnancies were likely to be the exposed ones. This has confused some readers. The non-exposed pregnancies usually dated far back in time and took place when the women were housewives. This is why the rates in non-exposed pregnancies were low. It is worth pointing out that in various tabulations exposure to ethylene oxide, rather than to other agents, correlated with the highest rate of spontaneous abortions (table II of the original study).

In the table we provide a new analysis on the interview material, where the controls are nursing auxiliaries from the same hospitals. In each case, including the control group, only those pregnancies that started during hospital employment are included to make a valid comparison between the exposed women and the controls. Age adjustment is done in five year age groups, as a question was raised about the large age groups used in the original study. The spontaneous abortion rate is highest in the pregnancies where exposure to ethylene oxide only took place; the difference between the working controls is significant ($p < 0.05$). The data from the hospital discharge register on the controls working in hospitals during their pregnancy did not differ much from the rate of all controls (9·4% *v* 9·2, see table III of the original study).

Effect of exposure to ethylene oxide, glutaraldehyde, and formaldehyde on the frequency of spontaneous abortions (rates adjusted for age in 5 year age groups by direct standardisation)

Chemical sterilising agent	No of pregnancies	Rate
Ethylene oxide (with and without other agents)	145	18·6*
Glutaraldehyde (with and without other agents)	440	16·5*
Formaldehyde (with and without other agents)	50	11·3
Ethylene oxide or glutaraldehyde, or both	445	17·3**
Ethylene oxide alone	81	20·4*
Glutaraldehyde alone	364	16·6*
Control, working in hospital	721	11·3

*$p < 0.05$, **$p < 0.01$. Normal approximation test based on the SEs of the adjusted rates.

In conclusion, we are unaware of any such bias that could explain why exposure to ethylene oxide rather than to glutaraldehyde or formaldehyde would correlate with an increased rate of spontaneous abortions in the present material. The difference between the ethylene oxide and the control groups is two fold or less, depending on the group of comparison. A limited number of ethylene oxide exposed pregnancies are recorded in the latter part of the 1970s, when measurements have been carried out in Finnish hospitals. Thus our series is not large enough to compare abortion rates and known ethylene oxide concentrations.

K HEMMINKI
P MUTANEN
M-L NIEMI

Institute of Occupational Health,
Haartmaninkatu 1,
SF-00290 Helsinki 29,
Finland

1 Hemminki K, Axelson O, Niemi M-L, Ahlborg G. Assessment of methods and results of reproductive occupational epidemiology: spontaneous abortions and malformations in the offspring of working women. *Am J Ind Med* 1983;4:293-307.

Recurrent oesophageal stricture due to tuberculosis

SIR,—Dr R W Fowler and Dr M R Hetzel (14 May, p 1562) describe a rare complication of tuberculous mediastinal lymphadenopathy. We have recently treated a patient with a recurrent oesophageal stricture due to this disorder and believe that the case and its implications are worthy of brief description.

A 29 year old Pakistani lady, resident in the United Kingdom for four years, presented with an eight month history of dysphagia and weight loss. Physical examination was normal. No abnormality was seen on a chest radiograph, but a barium swallow showed mid-oesophageal stricture. This was assessed endoscopically and several biopsy samples were taken. Histological findings were non-specific. Full dilatation was performed, and five further dilatations were necessary over the next five months. At this point mediastinal tomography was organised and enlarged mediastinal glands were now shown. Bacteriological studies were negative for mycobacterium tuberculosis. Interestingly, the most recent biopsy material had shown granulomas in the submucosa of the oesophagus. Antituberculous treatment was given for nine months. No further dilatations were required, the appearances on barium swallow improved dramatically, and the patient remains symptom free 18 months after discontinuation of drug treatment.

This case illustrates that the diagnosis of oesophageal tuberculosis may not be straightforward, biopsy sample appearances are often non-specific, bacteriological assessment may be negative, and the chest radiograph can be normal. A strongly positive Mantoux test may be helpful.

We would fully endorse the opinion of Dow[1] that the diagnosis of oesophageal tuberculosis demands a high index of suspicion and regard this as another important lesson of the week.

J P MILNES

Southmead Hospital,
Bristol BS10 5NB

G K T HOLMES

Derbyshire Royal Infirmary,
Derby DE1 2QY

1 Dow CJ. Oesophageal tuberculosis: four cases. *Gut* 1981;22:234-6.

Should children with Down's syndrome be advised not to use trampolines?

SIR,—In a recent reply to an Any Question (5 March, p 785) I suggested that children with Down's syndrome should not necessarily be discouraged from trampolining, I was unaware, however, of a study just published emphasising the frequency of symptoms after neck injury in patients with Down's syndrome.[1]

Pueschel studied 236 patients and found that 17% had radiological evidence of atlantoaxial instability, of whom 15% had neurological symptoms and signs. The author continued: "Since we have observed several such patients who have acquired symptoms after an injury to the neck area, we recommend parents and teachers not to let these children engage in contact sports, somersaults, trampoline exercises, or other activity which may lead to cervical spine injury." Unfortunately, the frequency with which neurological problems followed clear cut history of injury is not quoted, but in view of these observations it would seem prudent to discourage trampolining and somersaults. For those children with Down's syndrome who develop neurological problems an urgent referral to an appropriate centre is desirable.

JOHN WILSON

Hospitals for Sick Children,
London WC1N 3JH

1 Pueschel SM. Atlanto-axial subluxation in Down syndrome. *Lancet* 1983;i:980.

Studies comparing methods of measuring blood pressure

SIR,—It is interesting to learn from Dr W G O'Callaghan and others (14 May, p 1545) that direct and indirect methods of measuring blood pressure in the elderly relate well to each other, as they do in younger people. The authors have, however, made the common error of using the correlation coefficient as an indicator of the closeness of the association. This statistic and the probability value derived from it test the null hypothesis that the two sets of readings are completely unrelated. Given that they are paired readings of the same parameter in the same people, this hypothesis is quite inappropriate. As the numerical value of the correlation coefficient is increased by a greater range of the observations as well as by greater closeness to a straight line, it can be misleading if it is misused in this way.