extra money spent in the first year. The working life of a concentrator was put at seven years by the manufacturer. So, over the working life of a machine there was no saving in cost. In jargon, the RCCS (revenue consequences of capital schemes) did not justify the capital outlay.

The important finding of the paper by Dr Evans and others is that only two patients (0.3%) used the concentrator for the minimum time necessary for clinical benefit. I remain unconvinced of the clinical value of domiciliary oxygen. To spend two thirds of the day tied to a machine does not enhance the quality of life. The only point on which I wholly agree with the authors is that the installation and supervision must rest securely with the chest physicians and be a charge on their divisional budget. They must be prepared to attend the patient at home at all hours of the day and night.

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Improving the care of asthmatic patients in general practice

SIR,—Although we applaud the aims of the study of Dr Michael Modell and others (25 June, p 2027) it seems to us that the evidence on which they base their discussions is either inadequately presented or insufficient to allow any conclusions to be drawn.

We would like to offer three criticisms. Firstly, the measures of disability and symptoms are not adequately described: (a) the disability index was defined in "units" but the data were presented in "days," and (b) several measures of symptoms were presumably averaged and then placed into one of only two categories. Our experience of asthma morbidity questionnaires suggests that this can be a very difficult, and potentially misleading, manoeuvre.¹ We would have welcomed more information regarding the nature of questions administered and the subsequent analysis of the responses. In addition, little information is given about the agreed plan of patient management. There are no details concerning escalation of drug regimens, nor is there any mention of instructions in inhaler technique or self modification of drug dosage, especially steroids, where applicable. This makes it difficult for the reader to assess the degree of change in doctor management of asthma.

Secondly, single peak flow readings are meaningless as a measure of outcome of a 12 month study in which strong secular trends may occur. It is not surprising that these readings are at variance with disability or symptoms recorded by patients over the preceding four months. No valid comparison can be made between these findings and those of Rubinfeld and Pain,² who assessed their patients during controlled, acute attacks.

The last major criticism concerns the reported assessment of knowledge of asthma. Two controlled trials from the United States have shown a short term decrease in asthma morbidity after educational intervention,^{3,4} but these results have not been reproduced elsewhere. The authors' important statement that there is a clear relation between severity of asthma and lack of knowledge is not supported by their data. There are no objective measurements of patient knowledge; tables V and VI merely report patients' views and behaviour.

In our opinion management of asthma in general practice does need a drastic review. There are two distinct areas in which it might be improved. Firstly, the underdiagnosis and undertreatment recently shown in paediatric asthma might be corrected^{5,6} and, secondly, increased patient education and improved self management might be promoted. Although purporting to approach both of these aspects,

the uncontrolled study of Dr Modell and others does not help us to determine either their relative or combined importance. We share their hope that elucidation will come from other studies.

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¹ Hilton S, Sibbald B, Anderson HR, Freeling P. Evaluating health education in asthma—developing the methodology. *J R Soc Med* 1982;75:625-30.

² Rubinfeld AR, Pain NLF. Perceptions of asthma. *Lancet* 1976;i:882-5.

³ Green LW, WeWelin SH, Schaffner HH, Avery CH. Measuring the decline of medicocentrism. *Health Education Monographs* 1977;5:161-89.

⁴ Maiman LA, Green LW, Gibson G, MacKenzie E. Education for self treatment by asthmatics. *JAMA* 1979;241:1919-22.

⁵ Anderson HR, Bailey PA, Cooper JS, Palmer JC. Influence of morbidity, illness label and social family and health service factors on drug treatment in childhood asthma. *Lancet* 1981;ii:1030-2.

⁶ Speight ANP, Lee DA, Hey EN. Underdiagnosis and undertreatment of asthma in childhood. *Br Med J* 1983;286:1253-6.

* * * We sent a copy of this letter to the authors, who reply below.

SIR,—Dr Sean Hilton and Dr Bonnie Sibbald raise the two important issues of controls and the use of symptoms in measuring severity of asthma.

We do not accept that our project was uncontrolled. The study group was assessed before and after the plan of management was introduced, so that each patient acted as his or her own control for the effects of the management plan. The study does show the difficulty of finding a suitable control population for this kind of general practice research. We had planned to include a group of patients who were interviewed by the research worker but had no new plan of management. We were unable to do so. Firstly, it was impossible to construct a control group from within the study practice. Once the doctors had agreed a systematic approach to asthma they would be bound to apply it to all their patients. We could not use half the doctors plus their patients as controls because the partners often see each other's patients, especially at night or during a weekend. We therefore sought a control practice, but the most suitable control practice did not yield sufficient identified asthmatics, and the patients approached in this practice were not keen on being interviewed—perhaps because they did not perceive the project as originating from "their" doctors.

Overemphasis on the scientific importance of the randomised controlled trial has probably inhibited much clinical research in general practice. It is particularly difficult to identify a valid control group when dealing with patients' knowledge and attitudes (important ingredients of primary care). There are too many sources of knowledge around for patients to remain uncontaminated during the study period. In many drug trials in patients studied sequentially the test drug is withdrawn in a third final phase to demonstrate to what extent the original problems return. Planning and education, however, cannot be withdrawn. Our study was partly retrospective, which is not ideal, but is often unavoidable.

It is difficult to assess the frequency and severity of asthmatic symptoms. In the pilot study of Hilton *et al*¹ patient knowledge and asthma morbidity were assessed by means of a questionnaire only, but we conducted personal interviews and asked detailed questions with follow ups when necessary. The interviewer was able to help patients in the admittedly imprecise process of trying to assess how symptoms were distributed during the previous four months. Two distinct groups soon emerged, those patients reporting symptoms once or more a week (often daily) and those less affected.

We think that the remaining points are much less important. In a short article we could not include a

more detailed description of our research worker's interviews with patients or of the doctors' agreed plan of management. This plan of management included, for example, a description of how to escalate the patients' drug regimen and laid particular emphasis on showing them how to use their inhalers. We would be happy to send copies of the interview schedule and management plan to anyone who asks. As far as disability days are concerned, one "disability day" equals one unit as explained in the methods section.

We do not agree that the best of three peak flow readings are "meaningless as an outcome measure" any more than three readings of blood pressure are a meaningless measure of control of blood pressure. Both have their uses and limitations and are obviously more reliable when done sequentially. We aimed to manage patients in a way that could be easily copied by other general practitioners and we therefore did not expect patients to record their peak flow readings daily. One of the lessons we learnt was that the management of severely affected asthmatics might be improved if they were lent a peak flow meter and kept an asthma diary. Rubinfeld and Pain discovered that 10% of their patients were not aware that they had severe airways obstruction at rest even though their forced expiratory volume in one second was less than half the predicted value.² Another 5% were still asymptomatic at the height of a controlled acute asthma attack. These results are directly comparable with our own.

Although we investigated the extent of patients' knowledge in the interviews, we felt that their perceptions of asthma and their attitudes to it were in fact more important in influencing behaviour and self management. Our findings suggest that the more severely affected patients feel less satisfied with their understanding of the disease than those with mild symptoms.

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¹ Hilton S, Sibbald B, Anderson HR, Freeling P. Evaluating health education in asthma—developing the methodology: preliminary communication. *J R Soc Med* 1982;75:625-30.

² Rubinfeld AR, Pain MCF. Perception of asthma. *Lancet* 1976;i:882-5.

Occupational medicine

SIR,—Professor Lee (23 July, p 241) does his colleagues a disservice in suggesting that many regard occupational medicine as largely esoteric. Any doctor practising, particularly in an industrial area, is rapidly aware of the appreciable problems that industry can cause. It is also somewhat misleading to suggest that the National Health Service, as the largest employer, should view the legal side of occupational medical services in the same way as an industrial concern. This misconception has resulted in the development of the sort of occupational health service which I suspect Professor Lee does not feel is appropriate. In my experience there has never been any problem in providing adequate health advice for the employees within the National Health Service; this is not the case in the wider industrial sector. The need to set up separate occupational health organisations is therefore much less a priority for the Health Service, and in particular the hospital service, than it is for industry, particularly when we are informed that people are denied vital treatment such as renal dialysis.

My experience with such an occupational health service is that it does become merely a