logically detectable but clinically impalpable would save more lives than waiting for the tumours to reach clinically detectable proportions. However, as I have previously pointed out in the pages of this journal,¹ the period during which a breast cancer is radiologically detectable but impalpable is likely to be a relatively short one in the overall natural history of the disease. Mass screening therefore may benefit only a minority of all cases. None the less, it is a reasonable hypothesis to be tested. The only concrete evidence available that screening can save lives comes from one controlled trial referred to as the Health Insurance Plan (HIP) study.² It would surely be foolhardy to base a worldwide change of strategy on this one experiment. It is true that the Department of Health has decided to institute a programme to compare the mortality rates from carcinoma of the breast in geographically defined areas, comparing a screened population with a population offered routine service only. To my mind this is a very second-rate approach and I would have much preferred to see a repetition of an HIP-type study in Britain.

In the absence of mortality data from screened and unscreened control populations the value of the technique could be indirectly inferred by comparing the proportion of cancers of the more favourable stages that are detected. Looked upon in this way the early results from the Edinburgh Breast Screening Clinic published in the same issue (p 175) as the British Breast Group statement make interesting reading. Of the 18 cancers detected, three were non-invasive and it is by no means certain that the natural history of these pathological entities is to progress into frankly invasive cancer. However, accepting that this would be the inevitable course if left untreated, we are left with 12 cases that were histologically node-negative. Somewhat surprisingly six, or precisely one-third of the cancers detected, had involvement of the lymph nodes. These cases might indeed be chronologically early, but biologically they are late, leaving the woman with every likelihood of residual micrometastases.³ It is therefore strictly relevant to compare the nodal status of breast cancers presenting in the conventional manner to the same clinic as reported in the *Lancet* in 1975.⁴ Here 18 out of 38 patients described in a study of axillary node sampling at the time of mastectomy had positive lymph nodes—that is, approximately one in two.

In order to assess the cost-effectiveness of screening for breast cancer it is not sufficient to quote the cost for each cancer detected. The only meaningful figure is that calculated for each life saved as a result of the screening programme. Assuming therefore that each additional node-negative case detected in a screening programme is equivalent to a life saved, it can be calculated from the preceding figures that for every six cancers detected at a screening programme one additional node-negative case is found. If it costs £6000 to detect each cancer, then it costs £36 000 to detect each additional node-negative case. Far be it from me to place a value on a woman's life, as even the Book of Proverbs (xxxi, 10) prices the ideal wife far above rubies, but in these days of swingeing cutbacks in the national health care budget it is not too difficult to imagine how the expenditure of £36 000 could benefit more than one woman suffering with carcinoma of the breast. The total budget for the Cancer Research Campaign trial, the largest ever undertaken to

investigate the management of breast cancer, was of this order.⁵ There are so many burning questions yet to be answered concerning the management of this commonest of all female malignancies—for example, the role of adjuvant chemotherapy or adjuvant endocrine therapy, the place of breast conservation, the interaction between local and systemic therapies, etc—that only prospective clinical trials are likely to answer that I for one feel that a national trials programme would improve the survival rates and the quality of life of infinitely more women than a national screening programme. However, I am prepared to change my stance, but only on the basis of hard data coming out of the mortality statistics from the proposed Department of Health studies. Until that time anyone who takes a position either for or against screening for carcinoma of the breast is being ruled by his heart rather than his head.

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¹ Baum, M, *British Medical Journal*, 1976, 1, 439.

² Strax, P, et al, *Cancer*, 1967, 20, 2184.

³ Fisher, E R, et al, *Cancer*, 1975, 36, 1.

⁴ Cant, E L M, Shivas, A A, and Forrest, A P M, *Lancet*, 1975, 1, 995.

⁵ C R C Working Party, *British Medical Journal*, 1976, 1, 1035.

SIR,—The latest statement by the British Breast Group (15 July, p 178) provides a most useful note on screening for breast cancer. There are a number of points that require further probing before a desirable strategy for work in Britain can be spelled out.

On the question of the effectiveness of screening the statement appears to place emphasis on the need for further randomised controlled trials, though acknowledging that other controlled studies such as are proposed in Britain can yield useful information. It would be helpful to have more detailed discussion of the various approaches to setting up trials, the specific constraints from alternative study designs, and the qualifications in data collection that would be required in order to achieve interpretable results.

In identifying "women likely to benefit from screening" it might be useful to distinguish (1) those who are at high risk of developing breast cancer, and within this group those at risk of developing lesions in which early diagnosis will influence prognosis; and also (2) those who need and would benefit from the reassurance given by a negative screening result. Research on risk categorisation could be aimed at identifying different stages in the development of breast cancer such as (a) markers of risk that are independent of carcinogenic mechanisms (for example, social class), (b) aetiological factors (for example, age at first pregnancy), (c) possible precursors of malignant change (for example, duct pattern, hormonal factors), and (d) preinvasive disease or possible functional changes indicating incipient disease (for example, tumour markers).

As mentioned in the statement, health education in breast self-examination requires a full evaluation, but the role of education in screening programmes also deserves further study in order to identify appropriate ways of boosting response.

In addition to the possible adverse effects listed, others to be considered include (1) the anxiety and morbidity engendered by "unnecessary" biopsies, (2) the possibility that subsequent symptoms may be ignored in

women negative at screening, (3) long-term psychological effects of repeated cycles of tension and relief which may occur before and after regular self-examination or screening, and (4) the danger that in some women screening may merely prolong the time for which a woman knows she has malignant disease without influencing ultimate survival.

These are just some of the areas which may merit further research, and current studies of early detection programmes offer an opportunity for exploring these issues.

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Domiciliary oxygen

SIR,—We were interested in the paper by Dr M M Jones and others (27 May, p 1397) covering the domiciliary use of oxygen. In 1977 we carried out a similar survey of oxygen use in Sheffield and discovered very similar patterns of consumption. We interviewed 34 patients in their homes drawn from a random list of NHS patients across the city; they were mainly bronchitics. Three had stopped using oxygen before the visit; one was an MRC trialist using oxygen for 15 h a day, while one achieved 6-7 h daily and one 3-4 h daily. Three patients used oxygen on a regular basis for short periods only and the remaining 25 patients used oxygen only for short periods and only when they felt that their breathlessness demanded it. The average six-monthly cylinder consumption rate varied between 168 and 0.3, with a mean of 16.6 for the whole group, and 6.5 for the 25 using oxygen for short periods only. We also found that current supply arrangements were adequate for the limited quantities used, that in general patients were satisfied with the service, and that most patients reported subjective benefit.

We took the opportunity to measure oxygen flow rates delivered by the drug-tariff reducing valves and found them to be remarkably pressure-sensitive. Thirty-one valves were tested. On the higher setting cylinders either three-quarters or entirely full had a mean flow rate of 3.48 (SD 0.68) l/min and those either half or a quarter full a mean flow rate of 2.75 (SD 0.69) l/min. On the lower setting the means were respectively 2.22 (SD 0.32) and 1.56 (SD 0.46) l/min. These differences are statistically significant. As the cylinder empties the patient receives less oxygen and clearly a better product is essential.

Domiciliary oxygen is expensive; oxygen for brief periods of the day has little physiological benefit and has a largely placebo effect. If the 25 patients found to be using oxygen for brief periods when breathless are considered, the mean cylinder consumption is 13 per patient per year. It will cost £97.50 per annum per patient to provide a placebo effect of this sort and we would argue this to be unacceptably high.

A number of studies^{1,2} have shown that long-term oxygen for sufficient periods of daily time can achieve a physiological response, but demonstration of clinical improvement awaits the results of the MRC controlled trial. Long-term oxygen therapy patients in Sheffield take their oxygen more or less as prescribed but will need in future to be carefully selected

and will be fewer in number than those at present receiving limited-period oxygen.

We would take issue with the conclusions of Dr Jones and his colleagues. Current domiciliary oxygen supply is costly, inefficient, and uses outdated equipment. Changes will have to be made, but only on the basis of a clearer knowledge of the type of patient likely to benefit, the duration and quantity of daily therapy required for clinical benefit, and a thorough evaluation of new techniques of delivery, "G" size cylinders, oxygen concentrators, or portable liquid oxygen systems.

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of reulceration and of non-ulcer dyspepsia as well as other gastrointestinal disturbances and, very rarely, mortality. Further experience of the long-term treatment of duodenal ulcer disease with cimetidine and of contemporary surgery are required before any firm conclusions can be made for the relative merits of these alternatives.

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- ¹ Burland, W L, et al, in *Proceedings of Westminster Hospital Symposium on Cimetidine*. Edinburgh, Churchill Livingstone. In press.
² Bodemar, G, and Walan, A, *Lancet*, 1978, 1, 403.
³ Wormsley, K G, Symposium on Management of Peptic Ulceration, Royal College of Surgeons of Edinburgh, April 1978.

* * * The authors sent a copy of this letter to Professors Clark and Wyllie, whose reply is printed below.—ED, *BMJ*.

Maintenance treatment of duodenal ulcer with cimetidine

SIR,—In making their case for surgical treatment of chronic duodenal ulcer disease in preference to cimetidine Professors C G Clark and J H Wyllie (8 July, p 123) appear to have made an error in reference to our review of data for recurrence of duodenal ulcer during longer-term treatment with cimetidine.¹ These data are given in the table below and are not dissimilar from those also referred to by Professors Clark and Wyllie which were reported by Bodemar and Walan² and Dr E Gudmand-Hoyer and others (29 April, p 1095). Professors Clark and Wyllie are also concerned about the frequency of symptomless recurrence associated with cimetidine treatment as reported by Wormsley.³ Data for this association from our review are also presented in the table and suggest that longer-term treatment with cimetidine will protect against symptomless reulceration and that short-term courses of treatment with cimetidine are not more likely to be associated with subsequent symptomless reulceration.

Professors Clark and Wyllie do not discuss the merits of additional courses of treatment with cimetidine. Should duodenal ulcers recur during longer-term treatment or when that treatment is discontinued, then a second course of treatment and indeed a third may be as successful as the first.²

They also refer to some of the best results available from proximal gastric vagotomy. While this is becoming the operation of choice, it is fair to say that its long-term efficacy and safety are no more well defined than for cimetidine. Results are likely to improve with increased operator experience, but at present it is an irreversible procedure (unlike medication) associated with a small but real incidence

SIR,—If we made an error of interpretation of the data of Dr Burland and his colleagues others may do the same. From the table, if 2.1 patients on 400 mg cimetidine at bedtime relapsed per 100 patient months, then recurrence would appear to be at a rate of 25.2% per annum (not 13.4%) and we conclude that the average length of follow-up of the 179 patients was 6.4 months. In 184 patients treated with cimetidine 400 mg twice daily the follow-up was 7.2 months with a symptomatic relapse rate of 21.6%. In addition there are a further 7% of patients with asymptomatic reulceration. Their data are therefore not comparable with those of Bodemar and Walan or Dr Gudmand-Hoyer and his colleagues, who followed patients for a whole year.

Our reference to a relapse rate of 40% we regarded as understating what was found in Dr Burland's data at one year—namely, 23 of 47 patients (49% with 95% confidence limits 35-63%). If this is not correct then clarification is necessary.

Symptomless recurrence was seen this week in one of our patients, a man aged 39 treated on maintenance therapy for just over one year. He presented with severe haemorrhage necessitating emergency surgery, a situation which carries an appreciable mortality in elderly patients. We do not dispute that second or third therapeutic courses of cimetidine may be given to those who relapse on maintenance therapy. Nor do we dispute that recurrent ulceration is seen after proximal gastric vagotomy. Indeed, comparing silent recurrence with cimetidine and recurrence after surgery, the incidence is about the same, and it may well be that the risks involved are no different though for different reasons. However, we do think the long-term efficacy

of operation is considerably better defined than that of cimetidine and our original letter was intended to give a temporal assessment on current evidence while the clinical use of cimetidine is being extended.

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Efficacy of rubella vaccination

SIR,—In the staff health unit of this hospital from 31 May 1977 to 1 June 1978 we examined the serum of 112 women and 22 men aged 18-50+ for the presence of rubella antibodies. This test is routine. Personnel when asked direct questions concerning vaccinations cannot give complete answers; we have therefore not asked about rubella immunisation to date. Fourteen women and two men were found by this test to be susceptible.

It is our policy to offer rubella vaccine to all women of childbearing age. Of the 14 susceptible women, 12 accepted the vaccine, of whom nine were aged 18-25. The follow-up rubella haemagglutination inhibition (HAI) test in four of the 12 vaccinated showed evidence of susceptibility at periods ranging from 3 to 6 weeks. In one of these four the test became positive after three months, but in three it remained negative 3-8 months later.

The hospital pharmacist has written to the makers, who have no explanation. The vaccine was stored in the recommended manner and was in date. Three different batch numbers were used as well as different makes at differing times. There is no historical or clinical evidence that any of the women who responded negatively to immunisation have abnormal immunological functions. Blood was sent through the normal hospital channels to a public laboratory for testing.

These results clearly raise a number of issues concerning: (1) the efficacy of the vaccines; (2) the immunological integrity of the individuals; and (3) the integrity of the HAI test. There are also wider implications. If the findings were to be confirmed, then there are certain mandatory steps the profession should take before women of childbearing age can be assured of immunity as offered by immunisation. These must include follow-up studies of allegedly immunised women and a policy of revaccination should this be considered necessary.

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Children who cannot read

SIR,—I was disappointed by your leading article on this subject (1 July, p 3). Ten years as school medical officer have given me a special interest in this problem and I thought your strong psychological bias left a very important group of children too much out of account. These children are far from being negligible in numbers and often have high intellectual ability. As a rule they are psychologically stable, although considerable mental stress may be caused by their disability. They suffer—I use the word literally and purposefully—from an inherited neurological defect which makes interpretation of written symbols

Recurrence of ulceration during longer-term cimetidine treatment

Treatment (No) (Patients entered studies with endoscopically proved healed ulcers)	Symptomatic reulceration confirmed at endoscopy		Asymptomatic reulceration seen at routine endoscopy	
	No (%)	No per 100 patient-months treatment	No examined	No (%) with reulceration
Cimetidine 400 mg at bedtime (179)	24 (13.4)	2.1	75	4 (5.3)
Cimetidine 400 mg twice daily (184)	24 (13.0)	1.8	75	7 (9.3)
Placebo (333)	158 (47.4)	9.9	75*	22 (30.0)

*13 previously treated with placebo and 5 (38%) ulcerated; 60 previously treated with cimetidine and 17 (28%) ulcerated; 2 previously treated with drugs other than cimetidine or placebo and none ulcerated.