—suggests to me that these registrars are ill informed.

Summative assessment has been a component of training in the west of Scotland for three years, and the reliability and validity of the system have been widely reported.^{2,5} The system being adopted throughout the United Kingdom is the one currently used in the west of Scotland with a more detailed trainer's report. All regional advisers are aware of these developments; in addition to training the regional advisers, the west of Scotland's assessors have trained 582 regional assessors on the video and audit components of the package at eight courses arranged throughout the United Kingdom. This number represents an appreciable proportion of the organisers in the training establishment throughout the United Kingdom. This preparation has taken place throughout this year, and an information pack for all trainers and general practitioner registrars is now available. Any trainers or registrars who do not have this should contact their local regional adviser.

The summative assessment package is robust and academically sound and has been adopted in a way that is fair for those taking part. I hope that this reassures all registrars who will take part in this important national test, which will give objective evidence of competence for independent practice.

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Summative assessment will protect patients from incompetent GPs

EDITOR,—There seems to be some misunderstanding by the general practitioner registrars' sub-committee of the General Medical Services Committee in relation to summative assessment.¹

Firstly, the registrars express concerns about the validity of summative assessment. The work that has been done by the United Kingdom conference of postgraduate advisers in general practice has ensured that the assessment has a high validity; indeed, general practice registrars, trainers, and course organisers have been involved in all stages of the design.

Secondly, the position statement mentioned in Linda Beecham's report suggests that the registrars were not aware of summative assessment. There have been two national meetings with regional representatives of general practitioner registrars to discuss the package, and regional advisers in general practice have been kept informed through regular meetings and news sheets.

Thirdly, the statement raises the issue of funding. This remained unresolved until this month. It had been hoped that the vocational training regulations could be altered in time to give one year's notice before implementation, but, despite encouragement from the minister of health that work on assessment should be continued, this has not been possible. There have, however, been positive discussions with the postgraduate deans to secure funding for the first year.

After a meeting with all the leaders of the professional organisations in general practice we

have agreed that all regions should, if funding permits, use all four parts of the summative assessment package. If funding is a problem, however, every region should use the structured trainer's report adopted by the United Kingdom conference of postgraduate advisers in general practice to assess the trainee before signing the vocational training certificate (VTR1). This will be a minimum requirement from September next year and will not entail any cost to the general practitioner registrars.

The profession should be aware that summative assessment of vocational trainees is an important component of a range of activities designed to protect patients from incompetent doctors.

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- 1 Beecham L. Registrars may withdraw from summative assessments. *BMJ* 1995;311:1170. (28 October.)

NRPB will provide advice on radiation

EDITOR,—In her review of a television programme¹ based on John Gofman's book claiming that three quarters of cases of breast cancer in American women are due to radiation from medical radiography done in 1920-60,² Elizabeth White seems to criticise the National Radiological Protection Board for not contributing to the programme. As she says, however, the board distributed a detailed scientific critique of Gofman's work to the media. The fact that the media did not take up the story after transmission of the programme may contain a message in itself.

The board has a duty to provide information and advice on protection from radiation hazards that arise in medicine and elsewhere. In particular, it has established a medical department with two full time physicians who are available to any doctor in Britain concerned about radiation risks who wishes to discuss them further.

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- 1 White E. Midsummer madness: x rays and breast cancer. *BMJ* 1995;311:458-9. (12 August.)
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Bone mineral densitometry in clinical practice

Differences in reference values are important

EDITOR,—J E Compston and colleagues emphasise the merits of assessing bone density in patients relative to that in young adults (the T score) rather than relative to that in controls matched for age (the Z score), on the basis of the recommendations of an expert panel of the World Health Organisation.¹ Consensus on this issue, however, is still lacking,² and the T score has not been widely used clinically in Britain, where comparisons with controls matched for age still dominate.

Among the limitations of bone densitometry the authors briefly note the differences in the reference data provided by the manufacturers.³ Such reference data are critical to allow accurate assessment of bone density and thus determine whether inter-

Number of patients attending for bone densitometry who were defined as having osteoporosis by T scores of <-2.5 for different ranges used in Britain* (number of centres using each reference range was identified in survey)

Reference range*	No of centres using range	Spine	Femoral neck
Hologic			
A	1	183	231
B	22	216	231
C	2	396	444
D	1	270	231
E	1	216	293
F	3	140	47
G	2	274	293
Lunar			
H	3	292	44
I	22	212	40
J	1	216	44
K	2	216	36
Norland			
L	4	268	0
M	1	239	47
N	2	328	47
O	1	268	47

*Reference ranges are arbitrarily labelled—for example, the reference range B is the current reference range derived from Hologic's data.

vention is recommended. We believe that the relevance and magnitude of these differences in reference data have not been fully and widely appreciated.

We recently surveyed the number of normal reference ranges being used for two of the most clinically relevant sites (the femoral neck and lumbar spine) for white women in Britain.⁴ We found that 15 pairs of reference ranges, comprising not only different versions of the manufacturers' reference ranges but also locally derived ones, were in use. To investigate the effects on the classification of patients we compared the effect of the different reference ranges on a representative sample of over 1000 patients scanned in our unit.⁵ The table summarises the findings, which show the wide variation in classification for the three main makes of equipment used in Britain: Hologic, Lunar, and Norland.

Our findings suggest that patients may be diagnosed as having osteoporosis if one reference range is used but not if another is used, even when the same manufacturer's dual energy x ray absorptiometry system is used. This is likely to affect decisions regarding intervention and to be an increasing problem now that NHS purchasers can switch contracts between providers. We advocate the construction of a British national reference dataset appropriate to all dual energy x ray absorptiometry systems to harmonise patients' management.

Finally, although we agree with the authors that the availability of equipment for dual energy x ray absorptiometry is poor in Britain, we have shown that 106 systems capable of measuring the bone density of the hip and spine were in use in March 1994.⁴ About 120 systems are currently in use, making 2.1 systems per million population rather than the 1.6 reported by the authors.

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Different guidelines will yield different estimates of prevalence

EDITOR,—J E Compston and colleagues suggest that in clinical practice patients should be selected for bone densitometry on the basis of clinical or historical risk factors.¹ Having recently assessed the guidelines on the detection of osteoporosis that operated during the first year of operation of the bone densitometry service in the Wirral, we would point out that care is needed in selecting criteria for bone densitometry as different criteria lead to different rates of detection of disease.

We have the only densitometer in Wirral, which has a catchment population of 365 000. Our guidelines stated that the following categories of patients would be eligible for scanning: women who had taken hormone replacement therapy for 18 months, to determine whether the treatment should be continued; women who were unable to take hormone replacement therapy; women who had sustained a trivial fracture (including vertebral fractures); women taking corticosteroids; and private referrals.

Altogether 435 scans were obtained in the first year, of which 307 fell within the guidelines. The table shows the number of scans obtained for various indications and the incidence of osteoporosis detected (on the basis of the World Health Organisation's guidelines.² The highest proportions of women with osteoporosis were found in the groups with osteopenia evident in x ray films (58%) and with trivial fractures (50%) ($P=0.002$, χ^2 test). When patients who were already taking antiosteoporotic treatment (those who had had 18 months of hormone replacement therapy or were taking etidronate) were excluded we found no difference in the proportion with osteoporosis between the group referred according to our guidelines and the other referrals ($P=0.74$ for the lumbar spine, $P=0.44$ for the femoral neck, χ^2 test). When, however, we reanalysed our data using the guidelines suggested by Compston and colleagues (trivial fractures, use of corticosteroids, premature menopause, and osteopenia evident in x ray films) we found a significant difference in the proportion of patients with osteoporosis between the group referred according to their guidelines (75/178 (42%) had osteoporosis of the lumbar spine and 99/178 (56%) of the femoral neck) and the others (77/257 (30%) had osteoporosis of the lumbar spine and 109/257 (43%) of the femoral neck; $P=0.02$ for the lumbar spine, $P=0.02$ for the femoral neck, χ^2 test).

In conclusion, 71% of our referrals adhered to our guidelines, which suggests that the guidelines are reasonably well followed. A balance has to be achieved, however, between setting guidelines to detect disease and setting guidelines that take

into account patients' preferences (for example, scanning of women who were already taking hormone replacement therapy made up 15% of our workload) but have a lower rate of detection.

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2 World Health Organisation. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis. *WHO Tech Rep Series* 1994;No 843.

Authors' reply

EDITOR,—We agree with Andrew Simmons and colleagues about the need to standardise reference values for bone densitometry; differences between manufacturers' reference data have been reported previously,¹ as have differences in reference data from different centres in Britain.² The number and selection of subjects on whom these data are based and geographic differences in bone density will affect the absolute values measured, the pattern of changes related to age, and the variance. These factors in turn contribute to variations in the classification of patients, whether this is based on T scores, Z scores, or absolute values. The use of Z scores to diagnose osteoporosis is illogical since the prevalence of osteoporosis, thus defined, would not increase with age, while the use of an absolute value as a diagnostic criterion is problematic because differences between measurement systems in calibration, detection of the edge of the bone, and methodological approach produce different absolute values for a given bone density.³ Until there is better standardisation of reference data, inconsistencies in classification will persist, regardless of which diagnostic criteria are used; however, T scores provide the most appropriate means of defining osteoporosis, and problems associated with reference data, while requiring attention, should not be allowed to detract from the clinical value of bone densitometry as currently practised.

In response to S S Yeap and colleagues' letter, it is self evident that different guidelines for bone densitometry will result in varying rates of detection of osteoporosis. Assessment of guidelines should not, however, be based solely on the percentage of patients found to have osteoporosis since high rates of detection may reflect inappropriate use of bone densitometry in patients in whom a diagnosis has already been made; conversely, the exclusion of osteoporosis in patients with risk factors is a valuable component

of bone densitometry services since it provides reassurance and avoids unnecessary treatment. Finally, guidelines that take into account patients' preferences are unlikely to be viewed favourably by health authorities or commissions that are approached to provide funding for bone densitometry.

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Comparing hospital and chiropractic treatment for back pain

Trial did not compare like with like

EDITOR,—In the move towards evidence based medicine, randomised trials should be welcomed. The study by T W Meade and colleagues, however, is flawed in both its methodology and its analysis.^{1,2}

Essentially, the study does not compare like with like. There is no information on outcomes of treatment for different grades of physiotherapists, for the physiotherapists' differing levels of training in manipulation, or for Cyriax versus Maitland manipulation when compared with the outcomes of chiropractic. Each treatment group had a different number of treatments and probably received treatment for different lengths of time. When the number of treatments was similar (at six weeks) there was no significant difference in the mean changes in the Oswestry scores between the two therapies. While significance was reached at six months, when the number of extra chiropractic treatments "was not yet extensive," there was no significant difference at one year.

We suggest that the key messages from this study should advocate more extensive investment in postgraduate training in physiotherapy and in physiotherapists to achieve treatment that is more equitable with that in the private sector. Furthermore, randomised controlled trials in physiotherapy, chiropractic, and other complementary therapies are needed so that NHS purchasers can choose the most beneficial and cost effective treatments for their patients.

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1 Meade TW, Dyer S, Browne W, Frank AO. Randomised comparison of chiropractic and hospital outpatient management for low back pain: results from extended follow up. *BMJ* 1995;311:349-51. (8 August.)

Incidence of osteoporosis detected for each indication for bone densitometry

	No of women	No (%) with osteoporosis of:	
		Lumbar spine	Femoral neck
Taken hormone replacement therapy for 18 months	67	18 (27)	21 (31)
Unable to take hormone replacement therapy	61	18 (30)	27 (44)
Trivial fracture (including vertebral fracture)	91	45 (50)	55 (60)
Use of steroids	50	17 (34)	27 (54)
Private referral	38	8 (21)	13 (34)
Premature menopause	18	2 (11)	5 (28)
Taking etidronate	16	7 (44)	13 (81)
Osteopenia evident in x ray film	19	11 (58)	12 (63)
Family history of osteoporosis	27	8 (30)	13 (48)
Other	48	18 (38)	22 (46)
Total	435	152 (35)	208 (48)