described as "not screening" is nothing more than a ploy for circumventing the need to consider the overall potential benefits and costs of widespread testing. By accepting the report's recommendations, the Department of Health is undermining the firm national lead on the evaluation of potential new screening programmes promised by the chief medical officer.⁵

Value of densitometry in risk assessment

What is the evidence that bone density measurement is "essential for clinical decision making" for these groups? There are internationally accepted criteria for evaluating diagnostic health technologies and for reviewing publications on this topic.⁶ Two fundamental conditions must hold: the test must accurately predict patients who could potentially benefit (those who will have a fracture in the future) and there must be a cost effective treatment. Bone densitometry for risk assessment has problems on both counts.

Estimates from a recent systematic review of cohort studies—most of which as yet have only short term follow up—show bone density as rather a poor predictor, with a sensitivity of 38% and specificity of 88% (for 1 standard deviation below the mean cut off) and 9% sensitivity and 99% specificity (for a 2 standard deviation cut off).⁷ Thus even with the cut off for higher specificity (which misses 91% of potential fracture patients) only 56% of people so identified and recommended therapy will in fact be destined to sustain a fracture. In the context of this evidence the advisory group's assertion that bone densitometry is "the best tool available" and that it "provides specific and reasonably sensitive indices of fracture risk" is vague and misleading.

On the second count the report gives little systematic consideration to the nature and quality of the evidence for the effectiveness of interventions. There are, for example, no studies showing that use of bone densitometry in high risk groups results in a reduced incidence of fractures. There are also doubts about the persistence of any protective effect of hormone replacement therapy with age⁸ and after treatment is stopped.⁹

Other fundamental issues—important whether whole population or selective screening is under consideration—are barely considered in the report. These include the requirement for rigorous common standards of analytical performance to ensure that a

test result would be the same independently of where or by whom the test is performed, the reference mean and standard deviations of bone mass to be used in British populations, and the cut off points. In Aberdeen the criteria used resulted in treatment being recommended for 50% of women at the time of the menopause; in other places the equivalent figures are 25% or less.¹⁰ Bone densitometry is also recommended in the report for monitoring therapeutic response. However, because precision of the measurement is low relative to the rate of bone loss, measurements need to be several years apart to be useful in detecting whether treatment was retarding bone loss.

The introduction of a new diagnostic health technology, particularly for prevention, is a complex issue which requires detailed assessment. The advisory group usefully highlights an important research agenda. However, because of the emphasis on bone density testing these aspects were lost on the media. National television news highlighted the fact that other countries invest more in dual x ray absorptiometry machines, and the *General Practitioner* carried the headline, "Officials now favour mass bone screening." Health authorities faced already with funding an alarming list of effective interventions are not likely to find this report particularly constructive. They might be forgiven for wondering whose interest will best be served by recommending the increased purchase of bone densitometry and this back door advocacy of screening—the general public or the equipment and pharmaceutical suppliers?

- 1 Advisory Group on Osteoporosis. *Report*. London: DoH, 1994. (Chairman: D Barlow.)
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- 3 Chalmers I, Altman DG, eds. *Systematic reviews*. London: BMJ Publishing Group, 1995.
- 4 Evans NJB. *Review of the Department of Health's arrangements for obtaining external medical and scientific advice*. London: DoH, 1995.
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- 7 Swedish Council on Technology Assessment in Health Care. *The measurement of bone density*. Stockholm: SBU, 1995.
- 8 Ettinger B, Grady D. The waning effect of postmenopausal estrogen therapy on osteoporosis. *N Engl J Med* 1993;329:1192-3.
- 9 Cauley JA, Seeley DG, Ensrud K, Ettinger B, Black D, Cummings SR, et al. Estrogen replacement therapy and fractures in older women. *Ann Intern Med* 1995;122:9-16.
- 10 Torgerson DJ, Donaldson C, Russell IT, Reid DM. Hormone replacement therapy: compliance and cost after screening for osteoporosis. *Eur J Obstet Gynecol Reprod Biol* 1995;59:57-60.

Department of Health is fair to patients with osteoporosis

David Barlow, Cyrus Cooper, Jonathan Reeve, David Reid

Members of the Advisory Group on Osteoporosis were shown Professor Sheldon and colleagues' commentary on their report, and this is their response

The Advisory Group on Osteoporosis¹ was not established to advise ministers on health technology; machinery for that purpose is in place and a separate group has been set up to review this rapidly advancing topic. The remit given to the advisory group was to summarise current knowledge about osteoporosis, to detail ongoing research into the subject, and to identify research priorities. The final version was submitted to wide ranging consultation, including review by several representatives of purchasers and providers of health care, by the Standing Medical Advisory Committee of the Department of Health, and by the NHS Management Executive.

The recommendations of the report were: (a) better coordination of services in osteoporosis management, (b) greater availability of bone densitometry facilities for defined clinical indications, (c) provision of these facilities at the discretion of purchasers at a local level,

and (d) the development of guidelines for osteoporosis management through the royal colleges. Of the 86 pages covering this diverse and often complex agenda, Professor Sheldon and colleagues have taken exception to the conclusions articulated in the seven which refer to a clinical bone density service. We infer that they are in broad agreement with most of the report, which covers the definition and epidemiology of osteoporosis, pathophysiology, clinical subtypes, and approaches to prevention and treatment.

Message misrepresented

As the four hospital based physicians who belonged to the advisory group, we are not qualified to comment on the internal mechanisms of the department for establishing research input into decision making about new technologies. However, the report succeeds in

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balancing the best interests of today's patients with those of competing health care priorities. Concerns that the Department of Health is abandoning scientific principles are unfounded. We entirely agree that the headline "Officials now favour mass bone screening" misrepresents our message and prefer our own statement: "Current information does not support the widespread application of population screening by means of densitometry."

Role of bone densitometry

Professor Sheldon and colleagues were concerned that we did not provide estimates of the predictive capacity of bone density measurements for future fracture. We were surprised, as the report refers to eight studies examining this issue, six of which are summarised in a table. The sensitivity, specificity, and predictive value of the measurements so used have been assessed in detail elsewhere,² but we believe that these measures become conceptually difficult when applied to continuously distributed variables being used for predictions. The estimates provided by Professor Sheldon are conservative in this regard.

If we assume a relative risk increase of 2.5 per standard deviation drop in bone density and a 30th centile cut off with a lifetime fracture risk of 30%, then estimates of sensitivity and specificity are 74% and 80% respectively. We stand by our view that this methodology is the best currently available predictive tool. A recent study has suggested that fall related risk factors may enhance the predictive capacity of bone densitometry for hip fracture³; this approach clearly needs to be evaluated further before it can be recommended on a large scale.⁴ These considerations, as well as those pertaining to the efficacy of long term hormone replacement, led us to the clear conclusion that bone densitometry screening to target women who might need hormone replacement therapy at the menopause could not be justified. We felt unable to discount the possibility that such an approach might be effective, both medically and economically, if applied at a different stage in life and for other interventions.⁵ Research into this issue is in progress.

The issue then arises about the usefulness of bone densitometry for individual clinical decision making. We and others^{6,7} have attempted to define the clinical settings in which knowledge of the test result influences management. The published series of clinical indications are, if anything, more remarkable for their similarities than their differences. In no way is it claimed that each indication invariably warrants measurement. Rather, they list the context in which bone physicians perceive that the test results might influence clinical activity. Furthermore, data are now available which suggest that treating patients with low bone mass significantly reduces their risk of spine and non-spine fractures.⁸

The cost effectiveness of this more focused use of the technology has been assessed, and in one health authority a clinical bone densitometry service has been estimated to cost £1391 per fracture averted and £22558 per life year saved.⁹ To claim that this somehow represents the "back door advocacy of screening" seems to us preposterous. We agree with the deficiencies in our knowledge base which Professor Sheldon and his colleagues highlight. We could list several more, such as the adequacy of normal range data, the definition of decision thresholds, and the frequency of measurement required to monitor change over time. These are research priorities which will be

Histological appearances of normal and osteoporotic trabecular bone

addressed through the NHS research and development strategy. However, bone densitometry remains the only validated and practically useful marker of future fracture risk, and we cannot accept that these deficiencies in knowledge invalidate its use in defined clinical settings. That the technology should be set against other competing priorities is important, and the report makes this clear by leaving service development at the local level.

Patients come first

Finally, we wonder whether our difference of opinion is a reflection more of strategy than of science. The costs of new technology are rising and health planners are compelled to make difficult choices within ever tighter financial constraints. This climate facilitates a uniformly negative attitude to medical advances. However, it is incumbent on those of us who manage patients to balance against this fiscal concern the welfare of today's patients. That is the spirit in which the department assembled the Advisory Group on Osteoporosis, and that is the spirit in which its report should be read.

1 Advisory Group on Osteoporosis. *Report*. London: DoH, 1994. (Chairman: D Barlow.)

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Correction

ABC of Atrial Fibrillation

An editorial error occurred in the seventh chapter of the ABC of Atrial Fibrillation by Gregory Y H Lip and others (13 January, pp 112-5). In the key to the graph on p 114 blue and pink were reversed: blue shows duration of atrial fibrillation of <3 months (not >12 months) and pink shows duration of >12 months (not <3 months).