

Decision rules for bone mineral density testing

Cadarette SM, Jaglal SB, Murray TM, McIsaac WJ, Joseph L, Brown JP. Evaluation of decision rules for referring women for bone densitometry by dual-energy x-ray absorptiometry. *JAMA* 2001;286:57-63.

Background: A policy that recommends screening all postmenopausal women for low bone mineral density (BMD) would send many women unnecessarily for testing. Multiple clinical decision rules have been developed to assist clinicians in deciding when to refer the average woman at risk for primary osteoporosis for bone densitometry. These rules range from simple to too complex to apply in day-to-day practice. In addition, the National Osteoporosis Foundation (NOF) practice guidelines¹ recommend BMD testing for all women considering treatment who are 65 years or older and for younger postmenopausal women considering treatment who have 1 or more risk factors for osteoporotic fracture other than menopause.

Question: What are the diagnostic properties of 4 decision rules — Simple Calculated Osteoporosis Risk Estimation (SCORE);² Osteoporosis Risk Assessment Instrument (ORAI);³ Age, Body Size, No Estrogen (ABONE);⁴ and body weight less than 70 kg (weight criterion)⁵ — for selecting women for dual-energy x-ray absorptiometry (DEXA)? How do they compare with the NOF practice guidelines?

Design: MEDLINE was searched for English-language decision aids (those listed above) that used simple criteria to select women living in the community for BMD testing. The decision aids were applied to data from the Canadian Multicentre Osteoporosis Study (CaMos, a population-based 5-year cohort study that collected data on risk factors for osteoporosis, measures of BMD and osteoporotic fracture) to determine the diagnostic accuracy in picking women

with low BMD values for testing. Data from Ontario CaMos centres were excluded because they were used in developing the ORAI instrument.

Menopausal women 45 years or older with DEXA data at the femoral neck were eligible. Excluded were those with physician-diagnosed bone disease, those already taking hormone replacement therapy for < 5 years (or taking other bone-sparing medication) and those with missing data for any of the variables required by the decision rules or NOF guidelines. Women considered at high risk for secondary osteoporosis were also excluded (except those with rheumatoid arthritis, which is used in the SCORE decision aid as a selection criterion).

Results: The study sample comprised 2365 women. The mean age was 66.4 years and the mean weight 69.0 kg; 96.6% were white. The SCORE and ORAI instruments had the best discriminatory performance at all BMD thresholds evaluated. For a BMD T score of less than -2.0 (pharmacological treatment threshold), the sensitivity was 93.7% for the NOF guidelines, 97.5% for SCORE, 94.2% for ORAI, 79.1% for ABONE and 79.6% for the weight criterion. The proportion of women with normal BMD values who would have been tested was 74.4% using the NOF guidelines, as compared with 69.2% with SCORE, 56.3% with ORAI, 35.8% with ABONE and 38.1% with the weight criterion.

Commentary: Because most of the subjects were white, the data cannot be extrapolated with confidence to other races. Also, the CaMos cohort preferentially selected an older group, and the decision rules might not perform as well with younger postmenopausal women or those not volunteering for a study. Because the SCORE included a cause of secondary osteoporosis (rheumatoid arthritis) the study may have inflated its sensitivity while decreasing that of the other decision rules that targeted primary osteo-

porosis. Unfortunately, use of these instruments may still miss a small but significant proportion below the treatment threshold who are at risk of fracture. Future studies should address the cost-benefit ratio of restricted screening.

Practice implications: In general, screening all postmenopausal women under 65 for primary osteoporosis is not recommended. However, the use of decision rules may help in selecting those who should be tested by DEXA. The rules are designed to predict low BMD values but should not be used alone to decide treatment, because therapy would be prescribed unnecessarily in many cases. The ORAI and SCORE instruments performed better than the NOF guidelines and are relatively simple to use. Other women who merit DEXA testing include those with risk factors for secondary osteoporosis, a history of minimal-trauma fracture or radiologically diagnosed vertebral compression fractures, early or premature menopause, or hypogonadism at any age.

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