Reviewer's report

Title: Bone densitometry after a fragility fracture in older adults: spatial variation and determinants of use in Quebec

Version: 1 Date: 17 February 2005

Reviewer: Suzanne Cadarette

Reviewer's report:

General
Authors provide descriptive data stratified by region for fragility fracture incidence in Quebec, and then among those with a fragility fracture: mean and median distance to nearest BMD testing site, death rates and BMD testing rates. The title and abstract do not reflect the breadth of information presented. Rather, the title and abstract focus on predictors for BMD testing post fragility fracture. To clarify the paper’s content, it is suggested that authors either broaden the title/abstract or restrict the paper to predictors for BMD testing post fragility fracture (i.e., omit fracture incidence rates and death rates by region).

Authors use administrative claims data to examine predictors for BMD testing. It is unclear what methods of bone densitometry were included (DXA, DPA, QCT, QUS?).

There are several other possible confounding factors that could be examined using claims data to strengthen the results and interpretation.

Given the focus of OP management post fragility fracture, a more compelling question would be predictors for i) treatment and/or ii) BMD testing / OP treatment. I am not familiar with the nuances of Quebec pharmacare. Ontario pharmacare requires special criteria to cover several OP treatments. Therefore Ontario governmental claims data miss treatment paid out-of-pocket or through private coverage and would not be suitable to examine treatment. Authors need to clarify OP drug availability vs. OP drugs covered by Quebec pharmacare. To my knowledge, all drugs mentioned on page 7 were available in Canada in 1999 and 2000: etidronate (since 1983), alendronate (since 1996), risedronate (since 2000), raloxifene (since 1999) and miacalcin (since 1999). If all drugs were freely available and captured with data under investigation, it is suggested that OP treatment be (or included with) the outcome of interest.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. Clarify OP drug availability vs. OP drugs covered by Quebec pharmacare (see general comment)

2. Include recent publications to strengthen background, methods and discussion:

3. Missing important potential confounders / predictors available from claims data, e.g.,:
   a. comorbidity (could create comorbidity score based on claims data of health conditions, and/or based on drug use).
   b. long-term steroid use
   c. prior BMD test (having had BMD test prior to fracture may impact whether or not another test is
done post fracture).
d.health services use and physician characteristics, e.g., sex of primary care giver, specialist visits (rheumatologist in particular)
e.see suggested references (Morris, Solomon, Elliot-Gibson) for others

4. Including treatment pre fracture (within 2 years) and post fracture (within 30 days) has potential problems:
a.mixes BMD for screening/OP diagnosis with BMD testing to monitor response to therapy
b.includes some but not all (only within 30 days post fracture) treatment prior to BMD testing

5. When comparing rates between regions: use small area variation statistics and comment on the stability of the reported rates.

6. From what is presented in the paper, the benefit of regression tree analysis is not clear to me. Please clarify, are all variables in the multiple variable regression model controlled for in the regression tree analysis? Why are new categories (e.g., ages <89 vs. 89+ in women and <86 vs. 86+ in men; <71km vs 71+km) created? How are the new categories created (arbitrary or underlying statistical techniques such as spline used to determine where to cut?). I also question the stability of the results using this method. There are several very small sample sizes thus how reliable/valid are the results? Unless authors can better explain how regression tree analysis controls for all confounding factors significant in multiple variable logistic regression, produces stable estimates and uses sound statistical (not arbitrary) methods to determining categories, it is suggested that these methods/results be excluded.

7. sensitivity analysis:
a.comment on adjusted results (predictors) if exclude patients who die within 2 years. Presumably these patients have poorer health. Very sick patients may be less likely to have BMD/be treated since other conditions take priority and if life expectancy low, utility of OP treatment is questionable. Is it really a care gap if quality of life (or length) is unlikely to improve by OP screening/treatment?
b.Prior BMD test, treatment: how do predictors change if exclude prior BMD testing and/or any treatment prior to BMD test (or only compliant treatment pre BMD etc). This sensitivity analysis will help disentangle some of the predictors for screening to make treatment decisions vs. testing to monitor response to therapy.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
1. Broaden title/abstract or limit study to post fragility fracture BMD testing (see general comment)
2. Clarify outcome of interest (BDM testing). What methods of BDM testing were considered? List all of the methods included, e.g., dual-energy x-ray absorptiometry, dual photon absorptiometry (etc., so could replicate the study). If only dual-energy x-ray absorptiometry (DXA) then state this specifically and use this acronym (DXA--consistent with ISCD guidelines) instead of BDM.
3. p5: Osteoporosis Society of Canada (not Canadian Osteoporosis Society).
4. Excluding prior fragility fracture within 2 years is reasonable when examining post-fracture BMD testing. However, authors should acknowledge that this will not exclude all cases with prior fragility fracture. For example, wrist fracture is a good predictors for future spine/hip fractures that may occur a decade later. It is suggested that authors acknowledge this in the discussion.
5. Table 1: modify so specific to population under investigation, i.e., 65+ with fragility fracture
6. Table 4 & 5: combine, omit p-values, present adjusted OR estimates as OR (95% CI), i.e., x.xx
7. Tables 2 & 3/figures 2 & 3: link mapped regions with names in tables using table footers

8. Add limitation of using BMD testing as the end point to examine care gap to discussion. Hard to know if care gap vs. different management strategies in regions if don’t also examine treatment.

Discretionary Revisions (which the author can choose to ignore)

1. p8. define acronyms ESRI, DMTI, GCS

2. including treatment rates by region

3. if all OP drugs open listed, consider OP treatment (or combination BMD testing/OP treatment) as the outcome

4. given hierarchical nature of the data (patients clustered within physicians who are clustered within regions of BMD accessibility), consider multilevel analysis

5. omit figures: 1 (in text description sufficient), 4 and 5

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: Yes

Declaration of competing interests:

I declare that I have no competing interests