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# Bones beyond 70

## Insights into osteoporosis management in the elderly

### Background

Bone mineral density is presently the only reliable diagnostic test for osteoporosis.

### Methods

Using quantitative questionnaires, general practitioners prospectively evaluated their own investigation and treatment of osteoporosis in patients aged more than 70 years.

### Results

Data are available for 114 GPs; 2850 patients (cycle 1) and 1710 patients (cycle 2). Of the 25.4% with a prior fracture, bone mineral density had been assessed in 55.5% (cycle 1) and 67.0% (cycle 2;  $p < 0.05$ ). Among patients with no documented prior fracture, bone mineral density had been assessed in 39.4% (cycle 1) and 56.9% (cycle 2;  $p < 0.05$ ).

### Discussion

Bone mineral density is subsidised for all patients aged more than 70 years, yet GPs are more likely to request bone mineral density tests only among those who already have a fracture. General practitioner education on the role of bone mineral density testing among all patients aged 70 years or more is important as it influences initiation of appropriate osteoporosis treatment.

**Keywords:** osteoporosis; clinical audit; general practice; aged care



Osteoporosis (OP) and its associated problems are major health concerns in Australia, especially with an aging population.<sup>1</sup> Currently 2.2 million Australians have OP and this is expected to increase to 3 million by 2021.<sup>2</sup> The loss of bone occurs progressively over many years and without apparent symptoms, and often the first sign of OP is a fracture. However, prevention is preferable as the risk of further fractures significantly increases once a minimal trauma fracture has occurred.<sup>3</sup>

Measuring bone mineral density (BMD) by dual energy X-ray absorptiometry (DXA) is currently the only reliable diagnostic test for OP.<sup>4</sup> In 2007, several systems changes were made to allow for improved management of OP, both in ensuring timely diagnosis and in providing appropriate treatment. These were:

- access to Medicare subsidised BMD tests were expanded, with all people aged 70 years and more entitled to a Medicare subsidy. The Pharmaceutical Benefits Schedule (PBS) listings for alendronate and risedronate were extended to enable their use in a preventive capacity (before the first fracture in patients aged 70 years or more with a T-score of  $-3.0$  or less)<sup>5</sup>
- A change in the prescribing criteria for strontium ranelate was made, enabling its use for primary prevention in postmenopausal women aged 70 years or more with a T-score less than or equal to  $-3.0$ .<sup>6</sup>

'Bones Beyond 70' is a clinical audit designed to investigate current practice with regard to the assessment and management of OP in patients aged 70 years or more.

### Methods

The audit followed The Royal Australian College of General Practitioners (RACGP)

clinical audit criteria and involved five steps: needs assessment, audit cycle 1, review and reflection, audit cycle 2, review and reflection. It was a prospective, fixed time clinical audit, whereby GPs evaluated their own assessment of OP in a total of 40 patients aged 70 years or more (25 patients over a 6 week period in audit cycle 1 and 15 patients over a 6 week period in audit cycle 2). Six criteria were identified as performance outcome measures for this audit (Table 1). These evaluation criteria, and the ideal and acceptable standards, were determined by a panel of GPs as part of the audit development process. Following completion of cycle 1, the GPs received an individual performance report and a report discussing some of the interim findings from the first audit cycle and advice on best practice management.

### Data collection

General practitioners were recruited through advertising in medical publications, on the RACGP website, by invitation or by direct mail. General practitioners were provided with quantitative questionnaires and asked to evaluate their assessment and management of OP in 40 patients aged 70 years or more. Any patient aged 70 years or more that presented to the GP was eligible for recruitment, regardless of whether or not they had OP. The flow of the audit was such that patients fell into one of two streams, those that had already sustained a minimal trauma fracture and those that had not. Minimal trauma fracture was defined as fracture resulting from a minor bump or accident.

### Statistical analyses

All data were captured in an excel database. Only data from GPs who completed both audit cycles (ie. provided data for all 40 patients) were included in the final analysis. Analysis included basic descriptive statistics and

**Table 1. Bones Beyond 70: clinical audit evaluation criteria**

Clinical audit criteria	Ideal standard	Acceptable standard
Osteoporosis should be discussed with all patients aged $\geq 70$ years attending the general practice surgery	100%	80%
Patients aged $\geq 70$ years should be undertaking appropriate lifestyle modifications aimed at reducing their modifiable risk factors for osteoporosis	100%	80%
Patients aged $\geq 70$ years who have had a minimal trauma fracture should be prescribed specific antiresorptive therapy for osteoporosis	100%	60%
Patients aged $\geq 70$ years who have had a minimal trauma fracture should be taking calcium and active vitamin D supplements	100%	75%
Patients aged $\geq 70$ years who have a reasonable life expectancy and are willing and able to be treated should have their BMD tested	100%	80%
Patients aged $\geq 70$ years who have a low BMD (T-score $< -3.0$ ) should be prescribed specific antiresorptive therapy for the prevention of osteoporosis even if they have not had a minimal trauma fracture	100%	75%

Note: The evaluation criteria and the ideal and acceptable standards were determined by a panel of GPs as part of the audit development process

comparisons between cycle 1 and cycle 2 using Chi-squared (categorical data) or analysis of variance (continuous data). Missing data have been omitted in the calculation of the percentage responses for each category.

### Ethics and informed consent

The audit was accredited by the RACGP and the Australian College of Rural and Remote Medicine. General practitioners obtained written patient consent for each patient who was entered into the clinical audit. Ethics approval was provided by the BellBerry Human Research Ethics Committee, Ashford, South Australia.

### Results

A total of 180 GPs enrolled in the audit and entered patient data ( $n=5948$ ). Of these, 114 GPs completed the entire audit; data for 2850 patients (cycle 1) and 1710 patients (cycle 2) and were included in the analysis.

### Patients with a prior minimal trauma fracture

Across both audit cycles 1142 (25.4%) patients

had had a previous minimal trauma fracture (Table 2). In both cycles of the audit, GPs reported that they had a detailed discussion about OP with almost all of these patients (cycle 1: 617, 89.2% and cycle 2: 439, 96.3%). Where such a discussion had not taken place, the primary reason stated was 'other more urgent medical conditions'. Bone mineral density had been tested in 55.5% (381/687) of patients in cycle 1 and 67.0% (305/455) of patients in cycle 2. In each cycle, the lower of the two T-scores was  $< -2.5$  in 70% of patients.

Most patients with a prior minimal trauma fracture were being actively managed (Table 3). The three most frequent interventions in both audit cycles were bisphosphonates, calcium supplements and vitamin D supplements. Compared to cycle 1, significantly more patients were being treated with specific antiresorptive pharmacological therapy in cycle 2 (bisphosphonate, raloxifene or strontium ranelate, 75.8% [521/687] vs. 85.7% [390/455];  $p<0.05$ ).

A range of reasons were given as to why patients were not currently being treated with specific antiresorptive pharmacological therapy. In cycle 1 the main reasons were side effects/

poor tolerance (25/139; 18.0%) and unknown BMD (22/139; 15.8%). Conversely, in cycle 2 the main reason given was no indication (10/54; 18.5%); presumably reflecting the fact that more patients in cycle 2 had undergone BMD testing.

### Patients with no documented prior minimal trauma fracture

Of the 4560 patient records audited, most had either not previously sustained a minimal trauma fracture (3203, 70.2%) or this information was not available in their records (215, 4.7%). In cycle 1, GPs reported that they had had a detailed discussion about OP with 55.2% of these patients (1194/2163), this increased significantly in cycle 2 (1015/1255, 80.9%;  $p<0.05$ ).

Compared to those patients with a prior minimal trauma fracture, fewer patients were being actively managed (Table 3, 'B'). Among those patients with no documented prior minimal trauma fracture, BMD had been conducted in only 39.4% (854/2163) of patients in cycle 1, despite all patients being aged 70 years or more and therefore being eligible for the Medicare rebate for BMD testing. This increased significantly to 56.9% (715/1255) in cycle 2 (Figure 1). Results revealed that the T-score was  $\leq -3.0$  in 212/854 (24.8%) of patients in cycle 1 and 151/715 (21.1%) of patients in cycle 2. Among those who had undergone BMD testing, 68.9% (588/854; cycle 1) and 74.7% (534/715; cycle 2) of those with a T-score  $\leq -3.0$  were receiving specific antiresorptive therapy.

For those patients who had not had a BMD test conducted, the two leading reasons given were: the patient was considered to be at low risk of OP, and that the patient had other more urgent medical conditions. The main reasons given were very similar in both cycles, however, patient reluctance/resistance was reported to be substantially higher in cycle 2 (25.4% [137/540] vs. 16.1% [211/1309];  $p<0.05$ ).

### GP performance versus standards

The mean GP performance for each of the six audit criteria improved significantly ( $p<0.05$ ) between audit cycles. However, mean performance matched the acceptable standards in only two domains (Figure 2); criterion #3

**Table 2. Characteristics of all analysed patients**

	Cycle 1		Cycle 2	
	N	%	N	%
<b>Gender</b>				
Male	983	34.5	591	34.6
Female	1866	65.5	1119	65.4
<b>Ethnic background</b>				
Caucasian	2550	89.5	1527	89.3
Chinese	160	5.6	95	5.6
Indian	26	0.9	20	1.2
Middle Eastern	33	1.2	22	1.3
Aboriginal or Torres Strait Islander	3	0.1	7	0.4
Black	1	0.03	1	0.06
Other	77	2.7	38	2.2
<b>Is the patient's weight average for their height?</b>				
Below average (low BMI/slim build)	410	14.4	276	16.1
Average	1496	52.5	882	51.6
Above average (high BMI/heavy build)	944	33.1	552	32.3
<b>Has the patient ever smoked?</b>				
Yes: current smoker	192	6.8	141	8.3
Yes: exsmoker (not smoked in the previous 6 months)	959	33.6	579	33.9
No	1699	59.6	988	57.8
<b>Does the patient currently consume alcohol?</b>				
Yes: 1 or more standard drinks daily	457	16.0	275	16.1
Yes: occasionally	1064	37.3	707	41.3
No	1193	41.9	679	39.7
Don't know	136	4.8	49	2.9
<b>Does the patient have a sedentary lifestyle?</b>				
Yes	1335	46.9	792	46.4
No	1513	53.1	916	53.6
<b>Does the patient have a first degree relative with a history of osteoporosis or minimal trauma fracture?</b>				
Yes	251	8.8	176	10.3
No	1463	51.4	847	49.6
Don't know	1135	39.8	687	40.1
<b>Has the patient been taking glucocorticosteroids for 3 months or more?</b>				
Yes: oral	156	5.5	112	6.5
Yes: inhaled	222	7.8	145	8.5
No	2470	86.6	1453	85.0
<b>Is the patient at risk of falls?</b>				
Yes	1101	38.6	664	38.8
No	1749	61.4	1046	61.2
<b>Has the patient ever had a minimal trauma fracture?</b>				
Yes	687	24.1	455	26.6
No	2024	71.0	1179	68.9
Don't know	139	4.9	76	4.4

(patients aged  $\geq 70$  years who have had a minimal trauma fracture should be prescribed specific antiresorptive therapy for OP) in cycle 1 and criterion #1 (OP should be discussed with all patients aged  $\geq 70$  years attending the general practice) and criterion #3 in cycle 2. In either cycles, mean performance fell short of the acceptable standard for all other criteria, with performance being worst in criterion #4 (patients aged  $\geq 70$  years who have had a minimal trauma fracture should be taking calcium and active vitamin D supplements) and criterion #5 (patients aged  $\geq 70$  years who have a reasonable life expectancy and are willing and able to be treated should have their BMD tested).

## Discussion

Guidelines for preventive activities in general practice advocate OP risk factor assessment and provision of advice regarding risk factor modification from age 45 years for women and 50 years for men.<sup>7</sup> While GPs are discussing OP with their patients (63.5% in cycle 1 and 85.0% in cycle 2), lifestyle modification is not routinely suggested to patients aged 70 years or more (45.9% in cycle 1 and 62.7% in cycle 2). This audit was not designed to identify the reasons behind the GPs' actions; we speculate that this may be due to the time constraints of general practice. General practitioners may be providing some lifestyle advice during their general discussion about OP with the patient.

The characteristics of our patient sample are similar to those in a review of factors influencing the management of individuals at risk for OP in primary care settings in Australia.<sup>8</sup> The most notable differences are the proportion and management of patients with a history of prior minimal trauma fracture. The review reported that 12.6% of patients in their sample had a prior minimal trauma fracture and that only 29.7% of these were currently using specific medication for OP. In contrast, 25.4% of the patients in our audit had a history of prior fracture and the use of specific antiresorptive therapy was reported in 75.8% and 85.7% of these patients, in cycle 1 and 2, respectively. The review data was collected in 2006 and included patients aged 40–104 years. While the specific age restriction of our sample (70

**Table 3. Patient management – cycle 1 versus cycle 2**

<b>Patients with a prior minimal trauma fracture</b>				
	<b>Cycle 1 (N=687)</b>		<b>Cycle 2 (N=455)</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Lifestyle modification	372	54.1	307	67.5*
Calcium supplements (total)	447	65.1	342	75.2*
Vitamin D supplements (total)	396	57.6	311	68.4*
Calcium + vitamin D	348	50.7	274	60.2
Bisphosphonate	462	67.2	334	73.4*
Raloxifene	27	3.9	14	3.1
Strontium ranelate	32	4.7	42	9.2*
<b>Patients with no documented prior minimal trauma fracture</b>				
	<b>Cycle 1 (N=2163)</b>		<b>Cycle 2 (N=1255)</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Lifestyle modification	935	43.1	765	60.9*
Calcium supplements (total)	805	37.1	706	56.2*
Vitamin D supplements (total)	612	28.2	566	45.1*
Calcium + vitamin D	535	18.8	524	30.7*
Bisphosphonate	228	10.5	209	16.6*
Raloxifene	15	0.7	1	0.08
Strontium ranelate	19	0.9	13	1.0

\*  $p < 0.05$  versus cycle 1 results

years or over) is likely a key contributor to this difference, changes in GPs' knowledge and the influence of changes to the prescribing criteria for specific antiresorptive therapies in 2007 cannot be discounted.

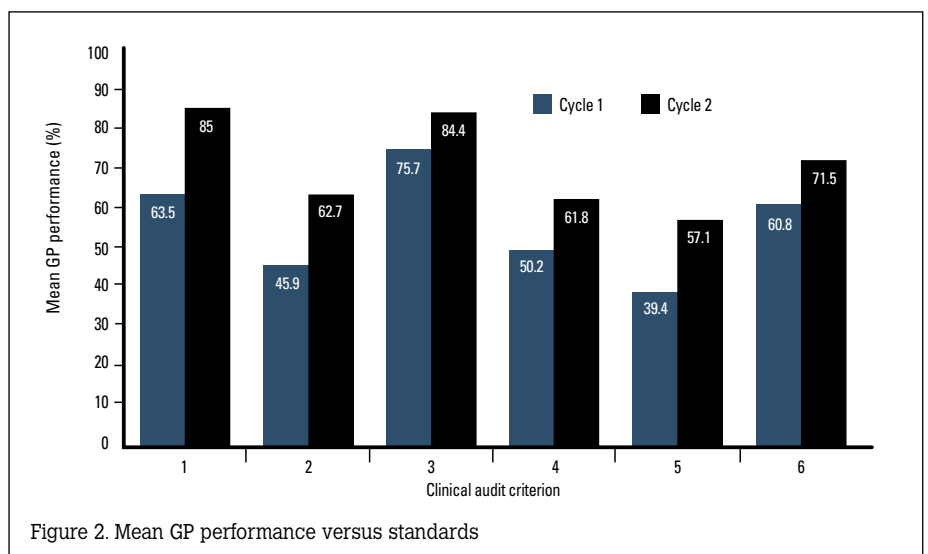
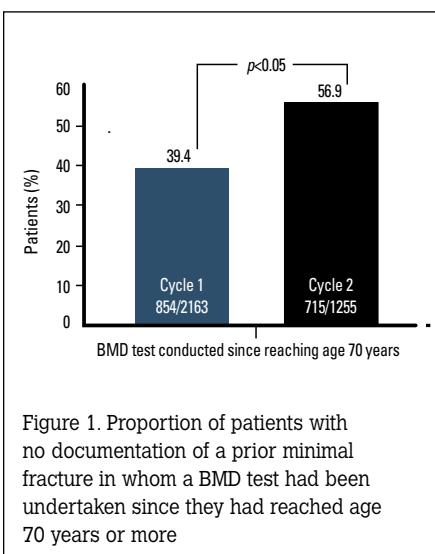
Although the use of specific antiresorptive therapy was reported to be high among this group of patients, use of calcium and vitamin D was much lower (50.7% in cycle 1 and 60.2% in cycle 2). Adequate calcium and

vitamin D are prerequisites for treatment with bisphosphonates.<sup>9</sup> Most older men and women are unlikely to meet the recommended daily intake of calcium (1300 mg) from normal dietary sources alone. Similarly, despite the sunny climate in Australia, a significant number of Australians are vitamin D deficient.<sup>10</sup>

Osteoporosis is asymptomatic until a fracture occurs. Bone mineral density is, arguably the best, readily available tool to identify OP before fracture occurs. It is for this reason that BMD screening is subsidised for high risk groups including all patients over 70 years of age. Without a BMD it is likely that a significant proportion of people at increased risk would be overlooked.

Despite the revision to Medicare subsidisation, only 39.4% of cycle 1 patients with no documented prior minimal trauma fracture had had their BMD tested since age 70 years. Though this increased to 56.9% in cycle 2, it still did not meet the agreed acceptable standard (80%). Patient resistance was cited as the reason for not conducting the test more frequently in cycle 2 than in cycle 1, suggesting that the GPs were trying to conduct more BMD tests in eligible patients. Changing patient perception and expectation regarding OP as a chronic disease and its risks may be an important adjunctive strategy to improve screening and preventive treatment.

In cycle 1, 68.9% of patients with no documented prior minimal trauma fracture who had had their BMD tested and it was



found to be  $<-3.0$  had been prescribed specific antiresorptive therapy. All such patients would be eligible for such therapy under the revised PBS prescribing criteria. In cycle 2 of the audit, this was significantly increased with 74.7% of these patients being prescribed specific antiresorptive therapy. It appears that in cycle 2 of the audit the increased uptake of BMD testing has aided in identifying those patients that would benefit from specific antiresorptive therapy and thus aided in improving their overall management.

### Limitations of this study

Clinical audits, while valuable educational tools, are not without their limitations. In our study, the sample size was large but selection of the sample was not randomised and the GPs themselves conducted the audits of their patient records. Data collection errors were kept to a minimum through the use of inbuilt field validation limits in the data collection tool.

### Conclusion

It is encouraging that GPs do consider BMD testing of patients over 70 years of age regardless of whether they have had a prior fracture. It is also encouraging that patients with a prior fracture and those without documentation of prior fracture but with demonstrated OP are considered for treatment. However, the rates of screening and treatment remain suboptimal. Our results demonstrate the utility of educational audits in improving GP performance in at least the short term in this clinical area.

### Implications for general practice

- BMD testing is an important basis from which to make informed management decisions regarding OP in patients over 70 years of age.
- It cannot be assumed that calcium and vitamin D levels are adequate in the elderly. Ensuring all elderly patients have adequate calcium and vitamin D is vital and is a prerequisite for treatment with bisphosphonates.
- Lifestyle advice should be offered to patients as part of routine preventive measures for OP.

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Conflict of interest: Anabela Smeath is an employee of Sanofi-Aventis Australia Pty Ltd. Sanofi-Aventis Australia Pty Ltd and Warner-Chilcott Australia Pty Ltd were sponsors for the clinical audit. Analysis of data and writing of the manuscript was conducted independently of the sponsor. The sponsor has reviewed the manuscript. The authors were fully responsible for the content, editorial decisions and opinions expressed in this manuscript. Scius Solutions Pty Ltd served as a contractor to develop and implement the clinical audit, and prepare and draft the manuscript.

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