Population rates of bone densitometry use in Australia, 2001–2005, by sex and rural versus urban location

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ABSTRACT

Objective: To explore use of bone densitometry in Australia and to identify any sex and geographic differences, as a marker of osteoporosis diagnosis and care.

Design and setting: Analysis of claims data from Medicare Australia in patients aged over 45 years during the period 2001–2005.

Main outcome measures: Age-standardised rates of bone densitometry use, by sex and by metropolitan, rural or remote classification.

Results: Bone densitometry use increased by 26% over the 5 years. Rates were lower for rural and remote populations, with people in capital cities about three times as likely to undergo the investigation as those in remote areas. The sex ratio for the rate of bone densitometry use (women to men) decreased from more than 6 : 1 in 2001 to 4 : 1 in 2005.

Conclusion: Although the sex ratio for osteoporotic fracture is close to 2 : 1 (women to men), the sex ratio for testing is much higher, suggesting underuse of bone densitometry in men. Sex and rural inequities in use of the investigation need to be addressed as part of a national approach to reducing minimal trauma fracture.

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It is widely acknowledged that there is a substantial gap between best and actual practice for the detection and treatment of osteoporosis.[1-4] It is important to identify population subgroups who lack access to the services required for optimal care, such as bone densitometry, as a basis for policy making and targeting of education.

Bone densitometry is the "gold standard" for diagnosing osteoporosis and is used, with few exceptions, for this purpose alone. Consequently, its use reflects patterns of health service activity for osteoporosis as a whole. While preparing national guidelines for the management of osteoporosis in primary health care in 2007, we analysed Medicare claims data for bone densitometry, to explore utilisation patterns. We aimed to examine sex and rural versus urban differences, to guide education efforts and implementation of the guidelines, as well as potentially to influence policy. The guidelines were prepared under the auspices of the Royal Australian College of General Practitioners, supervised by the National Health and Medical Research Council (NHMRC), and supported by Australian Government funding, with no pharmaceutical industry support or input.

METHODS

Medicare claims data for bone densitometry in people aged over 45 years were obtained from the Australian Government Department of Health and Ageing for the period 2001–2005. The Department also provided population denominator data, including age, sex, RRMA (a seven-tiered Rural, Remote and Metropolitan Areas classification), and year of the service.

Rates of bone densitometry use were age-standardised to the 2001 population. The sex-specific reference population was used for sex-specific analysis of rates by RRMA. The combined female and male 2001 population was used as the reference for analysis of female to male ratios. All Medicare item numbers for bone densitometry were combined (primary osteoporosis, secondary osteoporosis, measured by dual x-ray absorption or by computed tomography) for the analysis.

RESULTS

Over the 5 years, 702 675 bone densitometry services were provided through Medicare for people aged over 45 years (Box 1). Age-standardised bone densitometry claims increased by 25%–35% across different RRMA categories between 2001 and 2005, and by 29% nationally. This increase was mainly in the 55-years-and-over age groups. The increase was more marked for men, although this was from a far lower rate at the beginning (Box 2).

There was a clear trend of lower rates of bone densitometry use in rural and remote locations, with men in capital cities 3.6–4.5 times as likely to undergo the investigation as those in remote areas. Women in capital cities were 2.4–2.7 times as likely to undergo bone densitometry as those in remote areas (Box 2).

Overall, the rate of bone densitometry use in women was seven times that in men in 2001, decreasing to four times in 2005, with some variation in the ratio across different RRMA categories (Box 3).

DISCUSSION

This novel analysis of longitudinal national data shows that bone densitometry use in Australia is markedly lower in rural areas compared with urban areas, and in men compared with women. While use of the investigation increased between 2001 and 2005, these differences have persisted. The results suggest that rural communities and men potentially have inequitable access to the gold-standard investigation for the detection of osteoporosis. This in turn has implications for the implementation of best practice care, potential targeting of interventions to improve clinical care, and the setting of future policy affecting access to bone densitometry.

Rates of osteoporosis investigation and care after minimal trauma fractures in older patients in Australian hospitals are poor,[1,2] and the evidence–practice gap is well recognised.[3,4] Our study suggests particular problems with this evidence–practice gap in rural areas and in men.

While some difference in bone densitometry use between the sexes would be expected because of the lower incidence and prevalence of osteoporosis in men compared with women, the difference we observed was far greater than the population-wide ratio for prevalence of osteoporosis. A previous Australian study showed that the true incidence of fractures in men aged over 60 years is 1940 per 100 000 person-years, compared with 3250 for women. This gives a crude sex ratio of about 1.7 : 1. For fracture of femur, the corresponding crude incidence ratio is 2.9.[4] There is an estimated residual lifetime fracture risk of 44% for

1 Raw counts from Medicare for use of bone densitometry in Australia, 2001–2005, by Rural, Remote and Metropolitan Areas (RRMA) category

	Number of services						
	Capital city	Other metropolitan	Large rural	Small rural	Other rural	Remote centre	Other remote
2001	81 084	10 572	6 910	7 985	11 690	348	674
2002	99 134	13 018	8 597	9 901	14 646	424	783
2003	92 131	12 387	7 832	9 176	14 015	412	947
2004	98 902	13 143	8 204	9 518	14 781	444	843
2005	103 771	14 278	9 112	10 145	15 549	435	883
Increase*	28%	35%	32%	27%	33%	25%	31%

* 2005 v 2001.

2 Direct age-adjusted rates for use of bone densitometry in Australia, 2001–2005, by sex and Rural, Remote and Metropolitan Areas (RRMA) category

	Age-adjusted rate per 1000*							Ratio, capital city : remote
	Capital city	Other metropolitan	Large rural	Small rural	Other rural	Remote centre	Other remote	
Women								
2001	32.1	30.5	26.6	26.1	20.4	12.1	15.1	2.7
2002	38.5	36.6	32	31.3	24.7	14.2	16.5	2.7
2003	34.0	33.3	27.6	27.2	22.5	13.4	19.6	2.5
2004	35.1	33.8	27.5	26.9	22.6	14.7	16.6	2.4
2005	35.6	35.3	29.2	27.6	22.7	13.3	17.4	2.7
Increase†	9.8%	13.6%	8.9%	5.4%	10.1%	9.0%	13.2%	
Men								
2001	4.6	4.6	4.0	3.9	2.7	1.0	1.6	4.5
2002	5.5	5.4	5.2	4.9	3.5	1.4	1.9	4.0
2003	6.0	5.5	5.3	5.3	3.7	1.7	2.6	3.6
2004	7.0	6.3	6.0	5.8	4.2	1.7	2.5	4.0
2005	7.6	7.0	6.9	6.1	4.6	1.8	2.3	4.3
Increase†	39.5%	34.9%	42.2%	35.2%	41.1%	41.9%	30.7%	

* The reference population for standardisation was the sex-specific population aged over 45 years in 2001.
† 2005 v 2001.

women and 27% for men aged over 50 years,[5] again a sex ratio of about 2 : 1. Men may sustain higher levels of high trauma fractures, but the vast majority of symptomatic fractures in men and women aged over 60 years are osteoporotic fractures,[4] and a small sex difference in causes of fracture would not greatly change this estimated expected ratio. These data suggest the "correct" ratio of bone densitometry use would be about 2 : 1 (women to men) (Box 3). Therefore, other factors must be contributing to the differences we observed. These might include a relative underactivity of health services for detecting and managing osteoporosis in men, which would be consistent with other Australian reports that osteoporosis is likely to be underdiagnosed and undertreated in men.[6]

A likely contributor to the gradient across RRMA categories is limited access, both to primary health care[7] and to bone densitometry. Competition between health care priorities may also be more severe in rural areas. It is no surprise that there are lower rates of a "specialised" radiological investigation in rural and remote settings. Currently only 14% of radiologists are based outside metropolitan locations,[8] but serve 30% of the population aged over 45 years.

Osteoporosis and related fractures are so common that they should be managed by decentralised services that include rural and remote Australia. Ways of improving access to appropriate osteoporosis care in rural areas require further exploration and review of policy and education.

Although lower rates of osteoporotic fracture in rural areas might also contribute to the lower utilisation, the reported 15%–65% increase in relative risk of fracture in urban compared with rural areas[9,10] cannot fully account for the 240% to 450% higher bone densitometry usage rates in urban areas seen in our analysis.

This study has several limitations. There may be a significant number of ad-hoc non-Medicare "screening" measurements outside the population considered to yield the highest health benefit. Accordingly, this analysis most closely relates to public expenditure rather than total activity for bone densitometry. We do not have data to enable more detailed assessment of other markers of osteoporosis care, and further research should similarly examine prescribing data for the use of osteoporosis medications, such as bisphosphonates and strontium, to describe the evidence–practice gaps further. Nonetheless, we consider that these results demonstrate reason to be concerned about potential access and equity issues for osteoporosis care in Australia.

These results show relative underuse of bone densitometry in rural areas and in men, likely to reflect poorer access to these services in rural areas and consistent with known undertreatment of osteoporosis in men. These problems should be highlighted in osteoporosis treatment guidelines and emphasised in interventions to improve the detection and management of osteoporosis. This information could also be used to inform policy development addressing urban–rural health inequalities. Further research is needed to explore barriers to bone densitometry use and to confirm whether other components of osteoporosis management show similar inequities.

COMPETING INTERESTS

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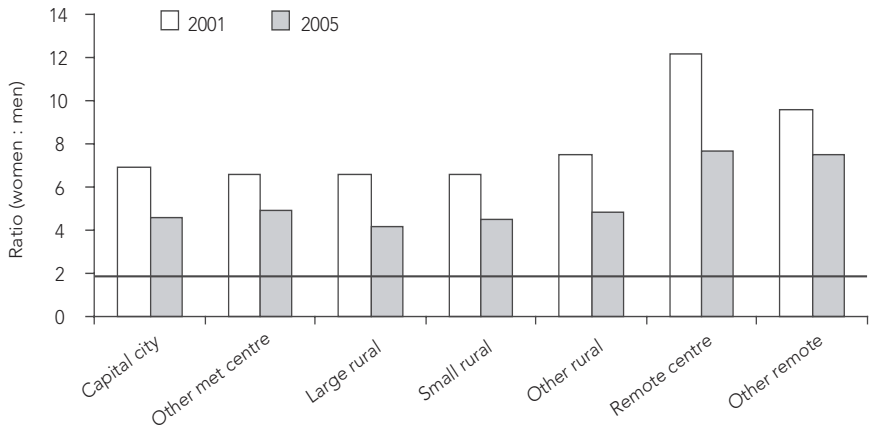
3 Ratio of female to male age-adjusted rates of bone densitometry in Australia, 2001–2005, by Rural, Remote and Metropolitan Areas (RRMA) category*



The bold line represents the ratio of 2 : 1, considered optimal on the basis of the sex ratio for minimal trauma fractures and prevalence of osteoporosis.

Met = metropolitan. * The reference population for direct age-standardisation for sex ratios was the total population aged over 45 years in 2001. ◆

part of the preparation of the guidelines. The RACGP had no role in design, data collection, analysis, interpretation or the decision to publish this work.

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