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Impact of Medicare Reimbursement Reduction for Imaging Services on Osteoporosis Screening Rates

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Abstract

Background/Objectives—In efforts to control costs, Medicare reduced reimbursement for office-based imaging services in 2007, an act projected to save $2.8B over 5 years. Many were concerned that imaging reimbursement reductions would reduce osteoporosis preventive bone mineral density (BMD) screening, which could lead to undiagnosed and untreated osteoporosis. The purpose of this study was to describe BMD testing rates and the proportion of women diagnosed after BMD screening versus an osteoporosis-related fracture before and after the 2007 Medicare reimbursement reductions.

Design/Setting/Participants—In a retrospective observational analysis of administrative medical claims reimbursement data, BMD screening services between 2005 and 2008 in women age 65+ with employer-sponsored Medicare supplemental coverage were evaluated. BMD testing and the incidence of patients whose first diagnosis for osteoporosis occurred with BMD screening versus as a result of osteoporosis-related fracture were identified by calendar year.

Results—A cohort of 405,093 women (average age 74.1 ±6.7 years) was identified of which 37.9% of study women received ≥1 BMD test during the study period. The proportion of women who received a BMD test was 12.9% in 2005, 11.4% in 2006, 11.8% in 2007, and 11.6% in 2008. Although testing rates varied, results were consistent with testing guidelines and did not decrease at a rate relative to reimbursement reductions as anticipated.

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Conflict of interest

Carrie McAdam-Marx, Sudhir Unni, Xiangyang Ye, Nancy A. Nickman salaries are paid in full or in part by the Pharmacotherapy Outcomes Research Center, which received a research grant from Novartis to conduct this study rather than individual investigators.

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Author Contributions

Carrie McAdam-Marx: Study concept and design, statistical analysis and interpretation, manuscript preparation and final approval.

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Sudhir Unni: Study concept and design, statistical analysis and interpretation, manuscript preparation and final approval.

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Nancy A. Nickman: Study concept and design, data acquisition, statistical analysis and interpretation, and manuscript preparation and final approval.

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Conclusion—In an analysis of data from a medical claims dataset, BMD screening rates did not substantially decline during the 2 years after reimbursements reductions in Medicare-eligible women. Meanwhile, the proportion of women diagnosed after a fracture increased, although the nature of this increase is unclear.

Keywords

osteoporosis; bone mineral density; Medicare reimbursement

INTRODUCTION

Osteoporosis affects as many as 20% of women age 50+in the United States (US) and is responsible for more than 1.5 million fractures annually.[1,2] This age-related condition is responsible for $12.2 to $17.9 billion per year in direct medical treatment costs, much of which are borne by the Centers for Medicare & Medicaid Services (CMS),[1,3,4] Fragility fractures due to osteoporotic or osteopenic bone architecture and reduced bone strength also take a large human toll relative to reduced quality of life and increased risk of early death.[3,5,6]

Because the risk of developing osteoporosis increases significantly with age from approximately 6% at age 50 to more than 50% above age 80, clinical practice guidelines recommend bone mineral density (BMD) screening for all women age 65+.[5,7–10] These guidelines also promote early osteoporosis diagnosis and treatment in order to reduce fracture potential and associated comorbidities. Although, published evaluations of BMD screening have shown that not all women who should receive at least a baseline BMD scan actually do so,[1,9,11–14] significant progress in early screening and treatment has been made in recent years.[11,12]

In response to escalating healthcare costs in the US and Federal budget deficits, payers such as CMS have reduced provider reimbursement rates in a number of areas. One specific provider reimbursement reduction case stemmed from the US Deficit Reduction Act (DRA) of 2005,[15,16] whereby the CMS reduced Medicare reimbursement for office-based imaging services starting in 2007. The reduction was projected to save Medicare $2.8 billion over 5 years,[17] and included reduced reimbursement for office-based dual-energy x-ray absorptiometry (DXA), an evaluation tool used in the diagnoses of osteoporosis. DXA is considered the gold standard for bone mineral density (BMD) testing,[5,9] and as such, plays a major role in the prevention, identification, and treatment of osteoporosis. Specifically, reimbursement for DXA was reduced from approximately $130 to $80 per exam,[15–18] and was estimated to represent 60% of what it cost a physician's office to deliver the exam.[18–20] Professional provider organizations such as the International Society for Clinical Densitometry and the American College of Rheumatology among others argued that cutting reimbursement for preventive services without consideration of long term impact would negatively affect patient access to and quality of osteoporosis preventive screening and care. This decline was speculated to be due to office-based DXA examinations being abandoned by providers.[17,19] With little available evaluative evidence in the literature, a seemingly reasonable consensus formed around the concern that gains in BMD screening rates in recent years[11,12] could be at odds with CMS cost cutting measures intended to save short term dollars.

Therefore, the purpose of this study was to assess whether overall BMD testing rates were impacted in women age 65+ and to describe patterns in the proportion of women who were diagnosed with osteoporosis following BMD screening versus after an osteoporosis-related fracture as a result of Medicare reimbursement reductions that were implemented in 2007.

Administrative medical claims reimbursement data for BMD screening services between 2005 and 2008 (two years pre- and post-reimbursement changes) in women age 65+ with employer-sponsored Medicare supplemental coverage were analyzed in order to: 1) evaluate the frequency of all imaging-based BMD testing in Medicare-eligible women by calendar year; and 2) estimate the incidence per calendar-year of patients whose first diagnosis for osteoporosis occurred with BMD screening versus as a result of fracture. To assess the overall impact on quality of care, BMD testing conducted in non-office settings and testing using other techniques was considered to account for shifting patterns of BMD testing.

METHODS

This study was a retrospective, descriptive analysis of women age 65+ in the MedStat *MarketScan* Commercial Claims and Encounters database from 2004–2008. The *MarketScan* database consists of medical and prescription claims data for individuals with employer-sponsored health insurance, including Medicare-eligible individuals with employer-sponsored Medicare supplemental coverage. This study was based on a subset of all patients in the database which included of 5.6 million women age 50+ years any time between 2004 and 2008, and is a subset of results from a larger study of BMD testing in women aged 50+ years.

A benefit of the *MarketScan* database for evaluating resource utilization in the Medicare-eligible population is that it has information on patient diagnoses and treatments that were reimbursed by the commercial payer and/or Medicare. As such, healthcare services not covered by Medicare Part A or Part B but that were reimbursed by a supplemental plan are identifiable in this database which creates a comprehensive utilization history. The data are not limited to patients covered by a single payer or managed care organization. However, the MarketScan database does not include clinical data such as DXA exam results.

BMD screening and osteoporosis diagnoses were identified in the database from January 1, 2004, thru December 31, 2008. The study observation period was 2005 through 2008, with 2004 used as a baseline year to identify prior osteoporosis-related diagnoses or treatment. Women included in the study were age 65 or older on January 1, 2005 with continuous database enrollment from January 1, 2004, thru December 31, 2008. This extended period of eligibility facilitated efforts to identify repeat BMD testing and single BMD tests which may not be repeated in women not considered to be high risk. Patients with a diagnosis of osteoporosis or a prescription claim for an osteoporosis drug during 2004 were excluded to identify BMD testing that was used for screening versus osteoporosis treatment monitoring. This approach assumed that all women with osteoporosis would have a diagnosis code or prescription for a drug to treat osteoporosis documented in the database during 2004, thereby identifying all prevalent cases of osteoporosis in the database cohort.

All BMD testing claims were identified via Current Procedural Terminology (CPT) codes appropriate for BMD tests. The occurrence of a new osteoporosis diagnosis during the 2005–2008 timeframe was identified based on the first occurrence of an International Classification of Disease-9 Clinical Modification (ICD-9 CM) osteoporosis diagnosis code (733.0, 733.00, 733.01, 733.02, 733.03, 733.09) or a new prescription order for a drug used to treat osteoporosis (bisphosphonate, selective estrogen receptor modulator, vitamin D/ vitamin D analog, or parathyroid hormone).

For patients with a new osteoporosis diagnosis in 2005–2008, the potential driver of the diagnosis was identified. When osteoporosis was documented within 60 days of a BMD scan in the absence of a fracture, it was assumed that the diagnosis was made based on BMD screening results. A new diagnosis occurring at the time of or after a fracture was deemed to

be the result of the fracture. Fractures were identified based on ICD-9 CM codes for non-traumatic fracture of the limbs, ribs, clavicle, or spine, excluding hands, feet and skull. Approximately 20% of new osteoporosis diagnoses were made without a fracture diagnosis or a claim for BMD screening. These patients were designated as having an unspecified diagnosis driver; no assumptions were made regarding information or events that led to the osteoporosis diagnosis.

The number and proportion of patients with a BMD test were identified by calendar year and overall. Results were described by patient characteristics including 5-year age bands, geographic region, and insurance type defined by prospective or fee-for-service reimbursement. For patients with ≥2 BMD screening tests in the follow-up period, the mean number of months between tests was also identified as an exploratory analysis. Finally, the proportion of patients diagnosed by means of BMD screening, fracture, or by unspecified means were identified by year and overall. Data analyses were performed using SAS v. 9 (SAS Institute, Cary, NC). Due to the large sample size, statistical tests were not performed to determine whether changes in testing rates or diagnoses reason differed by year. This study was approved by the University of Utah Institutional Review Board.

RESULTS

Of the 5.6 million women in the MarketScan database age 50+ anytime between 2004 and 2005, 405,093 women were age 65+ with continuous employer-sponsored supplemental Medicare plan enrollment and no claims history of osteoporosis diagnoses or treatment in 2004. The mean (SD) age on the study index date of January 1, 2005, was 74.1 (±6.7) years (Table 1), 89.7% of whom were covered by a fee-for-service Medicare supplemental plan.

BMD Testing

During the January 1, 2005 – December 31, 2008 study period, 37.9% of study women received at least one BMD test (Table 2). The proportion of women who received a BMD test in a given calendar year decreased from 12.7% in 2005 to 11.4% in 2008 (−10.2% reduction in testing overall). Year over year, the single largest drop in BMD testing was in 2006 with a 12.5% reduction over the previous year; in 2007, an increase in testing (+4.5%) was followed by a marginal decrease (−1.7%) in 2008. The BMD testing rate was slightly higher in 2005 (12.9%), with rates in subsequent years ranging from 11.4% (2006) to 11.8% (2007).

When considering age at time of the exam, BMD testing rates were highest in the youngest women, what one would expect when considering treatment guidelines that suggest routine testing at or after the time a women reaches age 65.[1,5,7–10,21–23] A total of 35.7% of women age 65–69 (30.4% of the study cohort at baseline) received a BMD test. However, only 14.3% of women age 80+ (21.8% of the study cohort at baseline) received a BMD test, perhaps because a BMD test prior to 2005 had already been conducted and these women were considered “low risk.” Overall, 36,656 patients (9.0%) received 2 BMD tests between 2005 and 2008 (Table 2) that were on average 26.0 (±7.8) months apart. The majority (over 95%) of BMD tests consisted of traditional DXA axial and peripheral skeleton bone density studies (Table 2, CPT codes 77080, 77081). Although a slight decline in traditional DXA scans was seen between 2006 and 2007 when the reimbursement decrease took effect (97.4% to 95.7%), DXA scans rebounded to 98.7% of all reimbursed scanning services in 2008.

Osteoporosis Diagnosis

A total of 18.3% (n=74,179) of women received a new diagnosis of osteoporosis during the study period (Table 3). While the proportions diagnosed by BMD screening versus fracture or unspecified reasons changed over the 4 study years, the proportion of women diagnosed after a BMD test relative to all diagnosed women declined from 76.6% in 2005 to 65.0% in 2008. The proportion of women diagnosed by fracture increased from 5.4% in 2005 to 8.3% in 2008, and the proportion of women with an unspecified diagnosis driver also increased from 17.9% in 2005 to 26.7% in 2008.

DISCUSSION

This study's aim was to assess whether the 2007 reduction in Medicare reimbursement for office-based imaging services impacted overall osteoporosis-related BMD testing in Medicareeligible women, and whether changes in screening rates could have led to women not being diagnosed until the occurrence of a fracture. Our study showed that 37.9% of Medicare-eligible women with employer-sponsored Medicare supplemental insurance received a BMD test between 2005 and 2008, consistent with other published national quality reports relative to employer-sponsored insurance.[11] A reduction in testing was seen from 2005 to 2006 (12.9% to 11.4%) prior to reimbursement reductions, but BMD testing rates were relatively constant in the three following years (11.4% in 2006, 11.8% in 2007 and 11.6% in 2008) that encompassed the implementation of DRA 2005-related imaging reimbursement reductions.

These findings are similar to recent findings in a study by O'Malley, et al., which was also based on the MarketScan database.[20] In both studies, the screening rates in 2005 were approximately 13%. The O'Malley study similarly concluded that BMD testing rates remained relatively constant from 2006 to 2008. However, the O'Malley study observed a steady year to year increase in BMD screening rates prior to 2007, suggesting a tapering of BMD testing gains seen in previous years.

This increasing testing trend prior to 2007 was not identified in the current study due in large part to the use of a shorter observation period. It is also a likely artifact of using a fixed cohort rather than a dynamic cohort as used in the O'Malley study. Baseline BMD screening is recommended at age 65,[9] and Medicare covers BMD testing every 2 years for women who meet testing criteria. Thus, women in the current study who were screened in 2005 would not have been candidates for screening in 2006. Meanwhile women newly eligible for BMD screening were not entering the study.

This study went on to evaluate whether the proportion of women diagnosed with osteoporosis by BMD screening rather than fracture changed with reimbursement reductions. Our analyses revealed a shifting in the proportion of women diagnosed with osteoporosis away from women diagnosed subsequent to BMD screening which declined over time and towards diagnosis following a fracture or toward an unspecified reason diagnosis. However, overall screening rates generally remained constant over the reimbursement reduction period; therefore the increase in osteoporosis diagnoses made after a fracture was not necessarily due to women who were not screened.

There are other possible explanations for this trend that do not suggest quality of care was negatively impacted. For instance, women previously screened who were not candidates for repeat screening[24] but later fractured, could account for some of this shift. BMD screening strength lies in its ability to identify who is at greatest risk for fracture due to low bone density. However, many women who fracture have a BMD level above the osteoporosis diagnosis cutoff. [25,26]

This fact that BMD testing leveled off but did not decline may reflect the impact of this reimbursement reduction on provider income. Authors of a recent survey of radiologists regarding the impact of the DRA (not specific to BMD testing) concluded that the DRA would only reduce radiologists' income by 1% on average.[18] While this survey also noted that there was considerable variability around this income reduction, the DRA may not have had a negative impact on physician income as anticipated. Another recent survey comprised mostly of physicians who performed in-office DXA exams found that 63% of physicians performed the same number or more exams after the reimbursement reductions.[27] Furthermore, not all physicians conduct BMD tests in their office practice, thus, DXA reimbursement amount may not be a consideration for many practitioners who prescribe BMD tests.

That BMD screening in women age 65+ with employer sponsored retiree health benefits did not significantly decline after DRA 2005 reimbursement reductions is an important finding. It suggests that while quality of osteoporosis care as measured by rates of screening has not been negatively impacted, efforts to improve osteoporosis screening may face more barriers to success than in the past. Further research is warranted to determine whether DRA and Medicare Physician Fee Schedule reimbursement changes since this time, such as those proposed in the 2010 Medicare Physician Fee schedule planned reduction, reduce BMD screening rates as well as long term efforts to improve osteoporosis screening, treatment, and fracture outcomes.[28]

A strength of this study is that it is based on a large administrative claims database, which is particularly useful for evaluating issues related to healthcare resource utilization. The MarketScan data used in this and the O'Malley[20] study represented a geographically diverse group of women who were not limited to a single carrier or managed care organization for supplemental coverage. The use of this data, however, introduces several limitations. First, the MarketScan database is limited to patients with employer-sponsored supplemental coverage, who may differ from those without employer-sponsored supplemental coverage in terms of osteoporosis risk and diagnosis and thus, the likelihood of receiving BMD screening. Supplemental insurance reimbursement rates, as well as those for women enrolled in a Medicare Advantage (MA) plan may not be affected by or reflective of Medicare reimbursement rates and changes, and thus not directly impacted by Medicaid DXA reimbursement reductions. However, many women in this study were enrolled in a fee-for-service plan and many likely qualified for Medicare reimbursement of BMD tests. The true impact of any Medicare reimbursement reductions on BMD testing in Medicare-aged women may not be fully reflected in this study.

Because our larger study also included women who were not Medicare eligible, a commercial claims database was utilized. However, it would be beneficial to repeat this study in Medicare claims data or the Medicare Current Beneficiaries Survey (MCBS). Like MarketScan, data on services paid for by either Medicare or a supplemental carrier are included in Medicare-specific databases. However, using Medicare claims or the MCBS would allow for the inclusion of women without employer-sponsored supplemental coverage.

Next, the study included data on a fixed cohort of patients for a 5-year period, which is a relatively short period of time for assessing overall BMD screening and osteoporosis diagnoses. Only women who were healthy enough to survive 5 years were included. These "healthy survivors" may also be at low risk for osteoporosis and thus less likely to be screened and/or diagnosed with osteoporosis during the observation period. In addition, to maximize the study observation period based on the data available analyses, the pre-index period was limited to one year. This year may not have been sufficient to identify all

previous osteoporosis diagnoses and treatments, thus some study participants may have had osteoporosis at the start of the study.

Finally, data available from claims databases lack clinical information on numerous osteoporosis or fracture risk factors including actual BMD test results, alcohol use/abuse, smoking, and maternal fracture history. Medical claims data may not indicate whether patients have been screened for osteoporosis based on non-BMD risk factors. This limitation is most obvious when considering osteoporosis drivers, and the relatively large number of women diagnosed with osteoporosis based on factors other than a recently reimbursed BMD test or fracture.

CONCLUSION

The impetus for this study was based on concern that BMD screening rates would decline in Medicare-eligible women after a Medicare reimbursement reduction for office-based imaging services. However, this phenomenon was not observed. Furthermore, changes in reimbursement did not obviously lead to an excess of patients fracturing prior to being diagnosed. Further research is warranted to assess whether Medicare reimbursement changes impact preventive care use and outcomes in the long term as reimbursement levels continue to flux.

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Table 1

Demographic Characteristics of Women Age 65+ with Employer Sponsored Supplemental Medicare Insurance in a Commercial Medical & Pharmacy Claims Database, 2005–2008 (n=405,093)

Variable		
Mean Age (SD)	74.1 (6.6)	
Median Age	73	
Age Category	**N**	**%**
65 – <70 years	123,350	30.4
70 – <75 years	107,454	26.5
75 – <80 years	85,987	21.2
≥ 80 years	88,302	21.8
Geographic Distribution		
Northeast	41,761	10.3
North Central	161,869	40.0
West	117,745	29.1
South	80,283	19.8
Unknown	3,435	0.8
Payment Type		
Fee-for-service*	363,734	89.7
Capitated†	35,467	8.8
Unknown/Missing	5,892	1.5

* Includes Comprehensive, Preferred Provider Organization, non-capitated Point of Service, and consumer driven health plans

† Includes Health Maintenance Organization and Capitated/Partially Capitated health plans

Table 2

Frequency of BMD Tests and Test Type in Women Age 65+ (n=405,093)

BMD Test Frequency	2005	2006	2007	2008	Overall†
Total patients receiving BMD tests	52,312	46,049	47,988	47,070	153,423
% of patients with 1 or more BMD tests*	12.9	11.4	11.8	11.6	37.9
% with 1 BMD test	12.7	11.1	11.6	11.4	28.0
% change from prior year	---	−12.5%	+4.5%	−1.7%	---
% with 2 BMD tests*					9.0
% of patients with BMD test by age at time of test†					
65 – <70 years					35.7
70 – <75 years					29.3
75 – <80 years					20.7
≥ 80 years					14.3

BMD Test Type by CPT^ Code			2005		2006		2007		2008	
Pre-2007	**Post-2007**	**CPT Code Description**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
		Total BMD scans	52,312	100	46,049	100	47,988	100	47,070	100
76075	77080	Dual-energy X-ray absorptiometry (DXA), bone density study, 1 or more sites; axial skeleton (eg, hips, pelvis, spine)	50,605	94.8	44,830	95.3	45,939	93.5	46,458	97.1
76076	77081	Dual-energy X-ray absorptiometry (DXA), bone density study, 1 or more sites; appendicular skeleton (peripheral) (eg, radius, wrist, heel)	1,377	2.6	1,174	2.5	1,164	2.4	822	1.7
76070	77078	Computed tomography, bone mineral density study, 1 or more sites; axial skeleton (eg, hips, pelvis, spine)	778	1.5	612	1.3	533	1.1	362	0.8
76977	76977	Ultrasound bone density measurement and interpretation, peripheral site(s), any method	452	0.8	290	0.6	247	0.5	176	0.4
76071	77079	Computed tomography, bone mineral density study, 1 or more sites; appendicular skeleton (peripheral) (eg, radius, wrist, heel)	18	0.0	16	0.0	101	0.2	40	0.1
76078		Radiographic absorptiometry (e.g., photodensitometry, radiogrammetry) one or more sites	109	0.2	104	0.2	0	0.0	0	0.0
78350, 78351	78350, 78351	Bone density (bone mineral content) study, single photon absorptiometry >/=1 sites; dual photon absorptiometry >/=1 sites	44	0.1	27	0.1	2	0.0	3	0.0

*Frequency of multiple tests assessed overall but not by year 2005–2008

†Overall age as of 2005

^Current Procedural Terminology (CPT) codes were reassigned in 2007; therefore, corresponding CPT codes prior to 2007 were also included

Table 3

Ratio of Osteoporosis Diagnosis after Fracture versus Osteoporosis Diagnosis after BMD Test in Women with Employer Sponsored Supplemental Medicare Insurance in a Commercial Medical & Pharmacy Claims Database, 2005–2008

Variable	2005	2006	2007	2008	Overall
Total study patients without a prior osteoporosis diagnosis	405,093	381,904	363,639	346,522	405,093
% of patients with BMD test in study year*	12.9	11.6	11.7	12.4	100
% of patients with a new osteoporosis diagnosis during study year*,†	5.7	4.8	4.9	4.5	18.3
% of patients with a new osteoporosis diagnosis during the study year triggered by a BMD test ‡	76.6	73.0	67.9	65.0	71.5
% of patients with a new osteoporosis diagnosis in the study year triggered by a fracture ‡,§	5.4	6.2	7.4	8.3	6.7
% of patients with a new diagnosis in study year but without BMD test or fracture ‡,//	17.9	19.9	24.7	26.7	21.8

*Proportion of those without a prior osteoporosis diagnosis

†Diagnosis based on diagnosis code or medication order for an osteoporosis drug

‡The percentage based on proportion of patients with a new osteoporosis diagnosis

§Osteoporosis diagnoses documented within 60 days of a BMD scan in the absence of a fragility fracture

//Osteoporosis diagnoses documented at the time or after a fragility fracture