Department of Veterans Affairs
Office of Inspector General

Healthcare Inspection

Management of Osteoporosis in Veterans with Fractures

Report No. 09-03138-191 **July 13, 2010**

VA Office of Inspector General
Washington, DC 20420

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Executive Summary

The VA Office of Inspector General Office of Healthcare Inspections assessed the extent to which Veterans Health Administration (VHA) patients who experience a fracture of the hip or vertebra are appropriately evaluated and treated for osteoporosis.

We identified patients 60 years of age and older who were treated at VHA facilities with a primary diagnosis of hip or vertebral fracture during July 1–September 30, 2008. We utilized system-wide clinical encounter data for encounters at VHA facilities and with fee-basis providers, along with prescription data from the VHA Pharmacy Benefits Management database.

We assessed compliance using guidelines from the Healthcare Effectiveness Data and Information Set (HEDIS) measure for post-fracture osteoporosis management. This measure accepts a bone-density scan or prescription for osteoporosis medication as evidence of osteoporosis management. We reviewed the medical records of patients whose management was found to be non-compliant to identify evidence of characteristics that would exempt their care from compliance expectations.

During the study period, 1,413 patients met inclusion criteria. After adjustment for the presence of exemptions, compliance based on HEDIS criteria among patients with two or more VHA primary care visits in the prior year was 45 percent. Compared to women, men were less likely to be appropriately managed for osteoporosis after a fracture (OR 0.33. $p < .001$). Hip fractures were less likely to be associated with osteoporosis management when compared with vertebral fractures (OR 0.39. $p < .001$). One-year mortality after a fracture was 20.5 percent, 25.1 percent for hip fracture and 14.4 percent for vertebral fracture.

We recommended that the Under Secretary for Health implement a plan to ensure that patients with hip or vertebral fracture are appropriately evaluated and treated for osteoporosis.

DEPARTMENT OF VETERANS AFFAIRS
Office of Inspector General
Washington, DC 20420

TO: Under Secretary for Health

SUBJECT: Healthcare Inspection – Management of Osteoporosis in Veterans with Fractures

Purpose

To evaluate Veterans Health Administration (VHA) compliance with established guidelines for osteoporosis management in patients with fractures of the hip or spine.

Background

Most hip and spine fractures are associated with underlying osteoporosis[1] and osteoporotic fractures are often followed by a precipitous decline in functional status and survival.[2] Patients with osteoporosis and a fracture have a twenty-fold increased risk of a future fracture when compared to individuals who have neither of these characteristics, and nearly half of patients living independently before a hip fracture require assistance with daily activities one year later.

Although men are only half as likely as women to experience a hip or vertebral fracture, men who do experience a fracture are more likely to die in the following year.[3] One-year mortality for men after hip fracture may exceed 35 percent, an observation of particular relevance for VHA health care facilities, where most osteoporotic fractures are in men. Further, while the consequences of a fracture are worse for men than for women, men are less likely to be treated for osteoporosis after a fracture has occurred.[4]

Anti-resorptive medication reduces the chances of a subsequent fracture by nearly 50 percent, but studies across various health systems have shown that a minority of patients

[1] Andrade SE, Majumdar SR, Chan KA, Buist DSM, Go AS, Goodman M. Low frequency of treatment of osteoporosis among postmenopausal women following a fracture. Arch Intern Med. 2003;17:2052-57.
[2] Cummings SR, Melton LJ. Epidemiology and outcomes of osteoporotic fractures. Lancet. 2002; 359: 1761–67.
[3] Jiang HX, Majumdar SR, Dick DA, et al. Development and initial validation of a risk score for predicting in-hospital and 1-year mortality in patients with hip fractures. J Bone Miner Res. 2005;20:494-500.
[4] Solomon DH, Finkelstein JS, Katz JN, Mogun H, Avorn J. Underuse of Osteoporosis Medications in Elderly Patients with Fractures. Am J Med. 2003;5:398-400.

receive adequate osteoporosis management following fracture,[5] with rates as low as 25 percent in some settings.[6]

The National Committee for Quality Assurance (NCQA)[7] and The Joint Commission (TJC)[8] have established specific metrics for evaluating and comparing post-fracture osteoporosis management in health systems. The NCQA metric for osteoporosis management is a component of the widely-used Healthcare Effectiveness Data and Information Set (HEDIS).

This review assessed the extent to which VHA patients who experience a fracture of the hip or vertebra are appropriately evaluated and treated for osteoporosis.

Scope and Methodology

This evaluation is based on guidelines specified in the NCQA HEDIS measure on post-fracture osteoporosis management in women, and incorporates elements of TJC's performance measure "Risk Assessment/Treatment after Fracture." HEDIS methodology includes patients age 65 and older, while TJC's measure pertains to patients 50 and older. We included patients age 60 and older. In addition, while HEDIS focuses on female patients, patients for this review were selected regardless of sex. Further, in contrast to HEDIS, for patients with fractures associated with hospitalization we defined the index date for the start of the 6-month post-fracture interval as the admission date rather than the discharge date because of the wide range of observed lengths-of-stay.

Fractures occurring after little or no trauma, referred to as fragility fractures, have been most associated with osteoporosis. Differentiating fragility fractures from other traumatic fractures can be difficult and quality improvement initiatives have not distinguished between these fracture types. In keeping with HEDIS and TJC methodologies, we did not attempt to determine the cause of fractures.

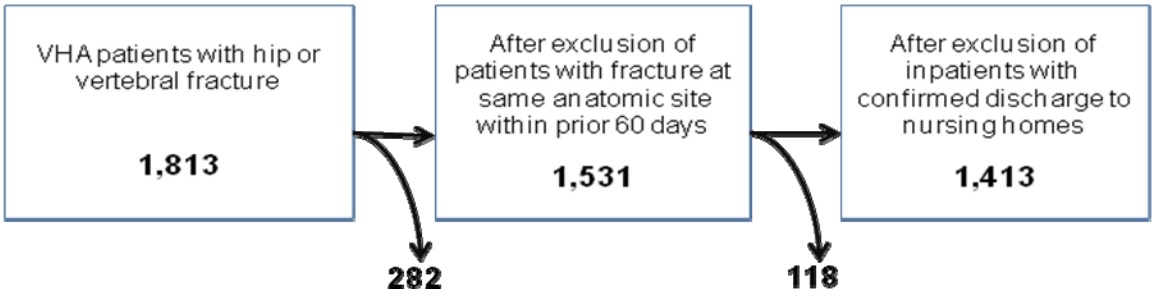
Patient Selection

We identified all patients born before 1947 who had an inpatient or outpatient encounter within the VHA system during July 1 - September 30, 2008, with a primary diagnostic code (ICD9-CM) for hip (820) or vertebral (805 and 806) fracture. For each patient we defined the index date as the earliest fracture encounter during the study period.

[5] Curtis JR, Adachi JD, Saag KG. Bridging the osteoporosis quality chasm. J Bone Miner Res. 2009;24:3–7.
[6] Majumdar SR, Kim N, Colman I, Chahal AM, Raymond G, Jen H. Incidental vertebral fractures discovered with chest radiography in the emergency department: prevalence, recognition, and osteoporosis management in a cohort of elderly patients. Arch Intern Med. 2005;8:905-9.
[7] National Committee for Quality Assurance (NCQA). HEDIS 2008: Healthcare Effectiveness Data & Information Set. Vol. 2, Technical Specifications. Washington (DC): National Committee for Quality Assurance (NCQA); 2007.
[8] The Joint Commission. Improving and Measuring Osteoporosis Management. Oakbrook Terrace, IL: The Joint Commission; 2007.

Because the index date is intended to approximate the first VHA encounter for a particular fracture episode, all encounters occurring during the 60 days prior to the index date were evaluated to determine whether the patient had been previously seen for a fracture at the same anatomic site. See Figure 1. All VA-funded visits were considered for this exclusion, including visits both at VHA facilities and those provided through fee-basis arrangements. Patients were excluded from analysis if a previous encounter was found during this 60-day period. In order to select patients more likely to be candidates for osteoporosis management, patients identified through inpatient encounters and recorded as being discharged to a nursing facility or another hospital were also excluded (Appendix A).

Figure 1. Patient Selection Process



Patient Characteristics

To characterize the overall health status of the population, patient records were evaluated for a history of heart failure, diabetes, cancer (excluding non-melanoma skin cancer), paraplegia, and quadriplegia.[9] The presence of these diseases was determined by the presence of associated diagnostic codes for all VHA visits during the 1-year period prior to the index fracture date.

Patients on prednisone were identified using the VHA Pharmacy Benefits Management database. To be identified as a patient receiving prednisone required evidence of a prescription for prednisone during the one-year leading up to the fracture, and this prescription must have contained a supply for at least 90 days.

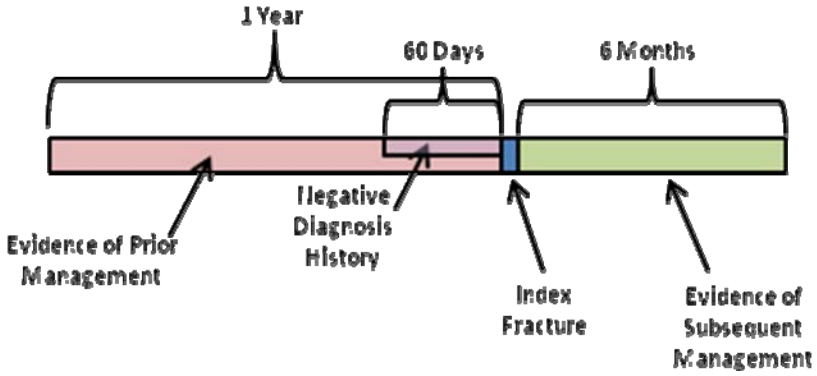
Evidence of Osteoporosis Management

Acceptable osteoporosis management required evidence that a prescription for osteoporosis medication was filled or that a bone density test had been performed. Exploration for evidence of these actions was restricted to the period starting one year before and ending six months after the index date. See Figure 2.

[9] The following ICD-9 codes were used: 428, 250, 140-239 (excluding 173, 210-229 and 238), 344.0, and 344.1.

All VA-funded inpatient and outpatient encounters, both at VHA facilities and through fee-basis arrangements, were investigated for evidence of bone mineral density testing by identifying visits with specific CPT and ICD9-CM procedure codes (Appendix B).

Figure 2. Observation Period for Each Patient



Medical Record Review

The NCQA metric approximates the percentage of patients with fragility fracture with care in compliance with expected post-fracture assessment and treatment. However, we recognized that certain patient characteristics may indicate that osteoporosis management is not warranted. Osteoporosis management guidelines from The Joint Commission informed the selection of patient exemption characteristics.

From the sub-population of patients whose care was initially classified as non-compliant, we selected a ten percent random sample for medical record review. Registered nurses experienced in the use of VHA's electronic medical record followed a standardized protocol, including keyword text searches, to search for evidence of the following exemption criteria:

1) Discharge to hospice or explicit mention that the patient was terminally ill.
2) Non-VHA provider explicitly described as managing osteoporosis or non-VHA primary care provider.
3) Contraindication or patient refusal.

Data Analysis

After determining compliance with HEDIS guidelines, we calculated adjusted compliance based on results of medical record review to account for patients likely to be exempted from expected osteoporosis management. Adjusted compliance was calculated using the percentage of exempted patients identified from the medical record review

sample. That percentage was applied to the entire population, to obtain a more accurate estimate of the proportion compliant.

Confidence intervals were calculated and logistic regression modeling performed using Stata 10 software (StataCorp. 2007. *Stata Statistical Software: Release 10*. College Station, TX).

We conducted the inspection in accordance with *Quality Standards for Inspections* published by the President's Council on Integrity and Efficiency.

Results

The 1,413 patients analyzed for this report had a median age of 77; 96.3 percent were male. Hip fractures constituted 56.8 percent of all fractures in this study. Patients had the following co-morbidities: heart failure (14.2 percent), diabetes mellitus (31.8 percent), and cancer (25.1 percent). Prednisone use for 90 or more days in the year prior to fracture was found in only 1.8 percent of patients. Paraplegia and quadriplegia were also infrequent, each characterizing less than one percent of patients. Eighty-two percent had visited a VHA primary care clinic two or more times during the prior year.

Table 1: Characteristics of 1,413 patients with hip or vertebral fractures during July 1 - September 30, 2008.

Age, median [range]	77 [60,103]
(%)	Number
Male	1,361 (96.3)
Hip Fracture	802 (56.8)
Vertebral Fracture	611 (43.2)
Heart Failure	200 (14.2)
Diabetes	450 (31.8)
Cancer	355 (25.1)
Prednisone Use	26 (1.8)
Paraplegia	12 (0.8)
Quadriplegia	3 (0.2)
≥2 VHA Primary Care Visit During Prior Year	1,159 (82.0)

*prescription for ≥90 day supply during prior year

Review of medical records for 117 randomly selected patients whose care was non-compliant revealed that 20.5 percent (95 percent CI, 14.2-28.7) of patients had characteristics that would exempt them from osteoporosis management. In the sample, 17 (14.5 percent) had evidence of terminal illness, 6 (5.1 percent) had evidence of a

provider outside the VHA responsible for osteoporosis management, and 2 (1.7 percent) had a contraindication or refused osteoporosis management.

Compliance with HEDIS guidelines for osteoporosis management following hip or vertebral fracture incorporates any of four accepted activities: bone density testing in the year before the index encounter, bone density testing in the subsequent six months, a prescription for osteoporosis medication in the year before the index encounter, or a prescription for osteoporosis medication in the subsequent six months. Adjusted Compliance is based on results of medical record review, and accounts for patients not likely to benefit from osteoporosis management. This metric is expected to most accurately assess compliance. See Table 2.

Vertebral fractures were more likely than hip fractures to be associated with osteoporosis testing or treatment (51 versus 36 percent), and women with fractures were more likely than men to have recommended management (60 versus 42 percent). Among patients with two or more primary care visits in the year prior to the index encounter, adjusted compliance was 45 percent.

Table 2: Osteoporosis Management.

Fracture Category	Prior Bone Density Scan	Follow-Up Bone Density Scan	Prior Prescription Activity	Follow-Up Prescription Activity	HEDIS Compliance	Adjusted Compliance (estimated range)
	Percent					
Hip (N=802)	6.9	3.0	10.9	4.7	19.6	**36.1** (31.0-42.7)
Vertebral (N=611)	8.0	10.8	17.7	12.8	38.5	**51.1** (47.2-56.1)
Male (N=1,361)	7.0	6.3	13.2	8.0	26.9	**41.9** (37.3-47.9)
Female (N=52)	17.3	9.6	28.9	13.5	50.0	**60.3** (57.1-64.4)
Patients with ≥2 Primary Care Visits (N=1,159)	8.8	7.3	15.2	9.0	30.9	**45.1** (40.7-50.7)
All Patients (N=1,413)	7.4	6.4	13.8	8.2	27.7	**42.6** (38.0-48.5)

Seven patient characteristics were evaluated as predictors of osteoporosis management in a logistic regression model. Heart failure, diabetes and cancer were included in the model because of the possibility that osteoporosis management might be deferred in patients dealing with these conditions. In addition to age, sex and fracture location,

evidence of VHA primary care was included because VHA care—and the intensity of that care—was considered to be a possible predictor. Including VHA primary care visits as a predictor is also necessary in order to adjust for the possibility that patients with fewer primary care visits in the VHA might be receiving osteoporosis care from an outside provider.

Sex, fracture location, and number of primary care visits were found to have statistically significant associations with compliance for osteoporosis management. Being female was associated with a three-fold increased probability of compliance, and vertebral fracture patients were more than twice as likely to have compliant care compared to hip fracture patients. See Table 3.

Table 3: Predictors of Osteoporosis Management by Multivariate Logistic Regression.

Covariates	Odds Ratio	p
Heart Failure	1.25	0.198
Diabetes	1.03	0.843
Cancer	1.07	0.638
Age ≥75	1.08	0.534
Male	0.33	<0.001
Hip vs. Vertebral Fracture	0.39	<0.001
≥2 Primary Care Visits	2.58	<0.001

A second logistic regression model was used to assess factors associated with one-year mortality after fracture. Fracture location (hip vs. vertebral) and sex were analyzed as potential predictors in this model, while heart failure, diabetes, cancer and age were included to control for confounding. Heart failure, cancer, age and hip fracture were associated with an increased risk of death in the year following a fracture. See Table 4.

Table 4: Predictors of One-Year Mortality by Multivariate Logistic Regression.

Covariates	Odds Ratio	p
Heart Failure	1.93	<0.001
Diabetes	0.98	0.891
Cancer	1.44	0.015
Age ≥75	2.02	<0.001
Male	1.67	0.200
Hip vs. Vertebral Fracture	1.83	<0.001

Conclusion

In VHA, men were less likely than women to be appropriately managed for osteoporosis after a fracture, and hip fractures were less likely to be associated with osteoporosis management when compared with vertebral fractures. One-year mortality after a fracture was 20.5 percent; 25.1 percent for hip fracture and 14.4 percent for vertebral fracture.

After adjustment for the presence of exemptions, compliance based on HEDIS criteria among patients with two or more VHA primary care visits in the prior year was 45 percent.

Recommendation

The Under Secretary for Health should implement a plan to ensure that patients with hip or vertebral fracture are appropriately evaluated and treated for osteoporosis.

Comments

The Under Secretary for Health agreed with the findings and conclusions and provided acceptable improvement plans. See Appendix A for the complete text of the Under Secretary's comments. We will continue to follow up until all actions are complete.

(original signed by:)
JOHN D. DAIGH, JR., M.D.
Assistant Inspector General for
Healthcare Inspections

Appendix A

Under Secretary for Health Comments

Department of Veterans Affairs **Memorandum**

Date: June 24, 2010

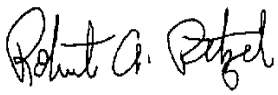
From: Under Secretary for Health

Subject: **OIG Draft Report, Management of Osteoporosis in Veterans with Fractures, (WebCIMS 440506)**

To: Assistant Inspector General for Healthcare Inspections (54)

1. I have reviewed the draft report and concur with its findings and recommendation.

2. Thank you for the opportunity to review the draft report. A complete action plan to address the report's recommendation is attached. If you have any questions, please contact Linda H. Lutes, Director, Management Review Service (10B5) at (202) 461-7014.



Robert A. Petzel, M.D.

Attachment

VETERANS HEALTH ADMINISTRATION (VHA)
Action Plan

OIG Draft Report, Management of Osteoporosis in Veterans with Fractures, (WebCIMS 455078)

Date of Draft Report: May 19, 2010

Recommendations/Actions	Status	Completion Date

Recommendation 1. **The Under Secretary for Health should implement a plan to ensure that patients with hip or vertebral fracture are appropriately evaluated and treated for osteoporosis.**

VHA Comments

Concur

VHA's plan to ensure that patients with hip or vertebral fractures are appropriately evaluated and treated for osteoporosis includes provider education, patient education and surveillance components.

Provider Education - To improve evaluation, treatment, and follow-up of incident (newly diagnosed) cases of vertebral and hip fractures. The National Program Director Endocrinology and Diabetes will:

- Revise Information Letter (IL) 10-2009-009, Osteoporosis in Men, to include recommendations for improved communication between specialists who initially diagnose and treat hip and vertebral fractures and primary care teams responsible for follow-up for osteoporosis diagnosis/treatment. The recommendations for IL revisions will be devised in collaboration with Chief Consultant Primary Care and Chief Consultant Specialty care and will be consistent with specialty care-primary care interactions in the Patient Centered Medical Home new model of care.

  In Process September 30, 2010

- Conduct an educational teleconference regarding the Office of Inspector General (OIG) report, the IL and the Department of Health and Human Services U.S. Preventive Services Task Force (USPSTF) recommendations.

  Pending September 30, 2010

- Present an implementation plan summary via teleconference to VA clinical stakeholders (Chief Medical Officers, Chiefs of Staff, Primary Care, Surgery, Geriatrics, Women's Health, and Rehabilitative Medicine).

In Process September 30, 2010

Patient Education - To increase Veterans' awareness of post-fracture osteoporosis care, the Office of Patient Care Services (PCS) will collaborate with the Office of the Deputy Under Secretary for Health for Operations and Management (DUSHOM) to distribute the publication "Once is Enough: A Guide to Preventing Future Fractures" published by the National Institutes of Health Osteoporosis and Related Bone Disease National Resource Center, available at http:/lwww.niams.nih.gov/healthinfolbone/osteoporosis/fracturelpreventing fracture.pdf

In Process September 30, 2010

Surveillance - In an effort to increase the surveillance of Veterans with prior low-impact fractures, the Pharmacy Benefit Management's (PBM) Center for Medication Safety will collaborate with the appropriate PCS Offices to review the methodology and findings of the O1G report. These findings will be evaluated by PBM to discuss whether any refinements should be made to the existing Osteoporosis Registry.

In Process September 30, 2010

Once a final methodology is determined, PBM will use the registry and other clinical and administrative databases to conduct quarterly or semi-annual reviews of newly diagnosed patients. The goal is to identify any untreated and unscreened patients, refer them to their providers for follow-up, and reassess that follow-up was completed. A summary report will be provided to the DUSHOM quarterly for the first year and semi-annually thereafter.

In Process November 30, 2010

Veterans Health Administration June 2010

Appendix B

Excluded Discharge Codes

("Place of Disposition" field in VHA Patient Treatment File (PTF) SAS Dataset)

0 - VA Medical Center

1 - Military Hospital

2 - Other Federal Hospital

3 - Other Government Hospital

4 - Community Hospital

5 - VA Nursing Home Care Unit

7 – Community Nursing Home at VA Expense

B - State Home, Nursing Care

U - Hospice Care

Appendix C

Procedure and Diagnostic Codes for Bone Mineral Density Testing

CPT (outpatient)	76070 76071 76075 76076 76077	76078 76977 77078 77079 77080	77081 77082 77083 78350 78351
ICD9-CM (inpatient)	88.98		

*Procedure codes adapted from NCQA Measure Technical Specifications, 2008

Accepted Osteoporosis Medications

Bisphosphonates	alendronate, alendronate-cholecalciferol, ibandronate, risedronate
Estrogens	conjugated estrogens, conjugated estrogens synthetic, esterified estrogens, estradiol, estradiol, acetate, estradiol, cypionate, estradiol, valerate, estropipate, ethinyl estradiol
Miscellaneous Hormones	calcitonin, raloxifene, teriparatide
Sex Hormone Combinations	conjugated estrogens—medroxy-progesterone, estradiol-levonorgestrel, estradiol-norethindrone, estradiol-norgestimate, ethinyl estradiol-norethindrone

*Medications adapted from NCQA Measure Technical Specifications, 2008

OIG Contact and Staff Acknowledgments

OIG Contact	Prabu Selvam (202) 461-4671
Acknowledgments	Sheila Cooley, GNP Kathy Gudgell, RN Jerome E. Herbers, Jr., MD Rayda Nadal, RN

Appendix E

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