

# Rural Promising Practice Issue Brief: Osteoporosis Risk Assessment Using Osteoporosis Self-Assessment Tool (OST) and other Interventions at Rural Facilities

## Executive Summary

Osteoporosis is a musculoskeletal disease occurring when an individual has a decrease in bone mineral density.<sup>1</sup> As the United States (U.S.) population continues to age, the rates of osteoporosis will double in the next 15 years and the rates of hip fractures are projected to almost triple by 2040.<sup>2</sup> Osteoporosis is underdiagnosed due to the lack of visible symptoms until an individual experiences a fracture.<sup>1</sup> Approximately, 25 percent of men over the age of 50 will have at least one osteoporosis-related fracture in their lifetime.<sup>1</sup>

Each year, around 80,000 men have a hip fracture.<sup>1</sup> Of those who experience a hip fracture, one in three will die within the first year following the fracture and another 30 percent will experience a second fracture.<sup>1</sup> Osteoporosis-related fractures can lead to chronic pain, long-term disability, increased levels of dependence, and death.<sup>3</sup> After the age of 50, men begin losing their bone mass, and by the age of 80, have lost approximately 25 percent of their bone mass.<sup>4</sup>

For men, the risk factors for developing osteoporosis include a small frame, certain heredity factors, hormone changes, a sedentary lifestyle, low vitamin levels, the inability to absorb calcium, alcohol and tobacco use, and changes in metabolic activity in their bones.<sup>4</sup> Chronic conditions, such as chronic obstructive pulmonary disease, cardiovascular disease, and certain medications also contribute to bone loss.<sup>1</sup>

Rural Veterans at risk for osteoporosis tend to be older and sicker than the general population and may be unaware of their vulnerability to fractures. They also face additional health care challenges, such as the need to travel significant distances for testing and treatment. By identifying and educating at-risk Veterans at their local health care facility, the number of individuals who suffer from osteoporosis fractures will decrease along with the cost incurred from medical treatment and care. Preventing severe fractures helps Veterans stay independent and in their communities longer, and also helps avoid costly medical procedures and rehabilitation.

To increase the number of male Veterans diagnosed with osteoporosis, three Department of Veterans Affairs (VA) medical facilities, including Ann Arbor, MI; West Lafayette, IN; and Monticello, NY, established the Osteoporosis Self-Assessment Tool (OST) program to improve screening for osteoporosis for their patient population. The primary tool for this screening program is the OST, a risk formula based on age and weight, which has been proven to be a reliable screening tool for osteoporosis in both female and male populations.<sup>4</sup>

Patient Aligned Care Teams (PACTs) used the OST and conducted a medication review to identify Veterans at high risk for osteoporosis. Veterans at risk for developing osteoporosis received education about the disease and were offered a Dual X-ray Absorptiometry (DXA) test, which measures bone mineral density.

### Who Can Use This Rural Promising Practice?

Primary care providers, registered nurses, clinical pharmacy specialists, and other health care professionals can adopt this program, which uses OST scores to identify Veterans at risk for osteoporosis. Members of care teams support health promotion and disease prevention and are ideal for this program. By implementing the OST program into the PACT model at health care facilities within the Veterans Health Administration (VHA), providers can identify Veterans with the highest risk of osteoporosis, allowing for effective ways to provide osteoporosis screening, prevention, and treatment.

Findings suggest that the routine use of OST in male Veterans over the age of 50 helps clinicians identify Veterans with a probability of low bone density and their needs for further osteoporosis clinical evaluation. Identifying Veterans with potential low bone density improves early detection of osteoporosis, potentiates referral for critical testing, and provides earlier treatments.<sup>5</sup>

## Need Addressed

According to the National Osteoporosis Foundation, approximately one in four men aged 50 and older will have an osteoporotic fracture in their lifetime.<sup>6</sup> In recent years, osteoporosis in men has been recognized as a serious public health concern. As the life expectancy rate among men continues to increase, the prevalence of osteoporosis and osteoporosis-related fractures will likely continue to increase as well. Many Veterans at risk for osteoporosis are not routinely screened, resulting in negative health consequences, including increased risk for fractures, poor health outcomes, institutionalization, loss of independence, and even death.

Research using different populations demonstrates that using various tools designed to evaluate an individual's risk of osteoporosis is appropriate when a DXA scan is not readily available. The OST is a simple tool that uses only weight and age to predict osteoporosis risk.<sup>7</sup> According to one study, the OST tool was found to have 91 percent sensitivity and 45 percent specificity in identifying osteoporosis among male Veterans.<sup>7</sup>

## Implementation

Primary care providers at three VA medical facilities (Ann Arbor, Monticello, and West Lafayette) implemented the OST program to identify Veterans at risk for osteoporosis for further screening and treatment. The OST program targeted Veterans over the age of 50 years old. In Ann Arbor, Veterans were excluded if they were age 88 or older, had previously been screened or treated for osteoporosis, or were receiving hospice care.

The primary care providers used the Veteran's age and weight to calculate their OST score. Figure 1 describes in more detail the OST and risk scores associated with osteoporosis.

Figure 1. Calculation of an OST Score.<sup>2,8</sup>

OST Score = [Weight (kg) – Age (years)] x 0.2,  
truncated to an integer

Osteoporosis risk:

- High: Score less than -3 for women, -2 for men
- Moderate: Score between 1 and -3
- Low: Score greater than 1

Program staff selected the OST risk score as the primary screening tool because it has been verified in multiple patient populations as a tool that is effective in identifying individuals at risk for osteoporosis based on risk factors, such as body weight and age.<sup>9,10</sup>

In Ann Arbor, the OST was calculated by an automated data tool, which then created a registry of Veterans at risk for osteoporosis. At the other two sites, the OST was manually calculated by PACT members.

## Medication Review

At two sites, PACT members also reviewed Veterans' medications to identify any potential adverse impact on bone health that could increase an individual's risk of osteoporosis. These medications include glucocorticoids, anticonvulsants, cancer chemotherapeutic agents, long-term heparin, proton pump inhibitors, excess thyroid hormone replacement, gonadotropin-releasing hormone (used for prostate cancer), and antiretroviral agents. If a Veteran was identified as high risk for osteoporosis through the medication reviews, the program team referred the Veteran for education, further screening (including a DXA scan), and potential treatment, if necessary.

## Education

PACT members provided to Veterans who had a moderate to high risk for osteoporosis verbal and print education on osteoporosis screening, prevention, and treatment. At one site, the program team attempted to notify Veterans twice by phone. If the team was still unable to reach the Veteran, a letter with more educational information was sent to the Veteran. The program team found that telephone contacts were much more successful in convincing at-risk Veterans to accept an offer for further radiological testing to confirm osteoporosis. At the other two locations, Veterans identified of being at risk for osteoporosis were counseled in person during their PACT visits.

## DXA Scans

DXA scans were offered to Veterans deemed to be at greatest risk for osteoporosis. However, even though a strong correlation between DXA scans and a beginning of osteoporosis treatment exists, many individuals did not receive needed DXA testing, which potentially delayed further needed treatment. By increasing DXA scans, providers can initiate critical strategies to increase access to osteoporosis medications and reduce negative health outcomes associated with fractures.<sup>11</sup>

## Promising Results

The three program sites screened a total of 867 Veterans and 168 Veterans (19 percent) were identified as being at high risk for osteoporosis. Of these, 53 Veterans completed radiological scans to confirm a diagnosis of osteoporosis.

### **This program demonstrates each of the criteria necessary to be a Promising Practice:**

**Improved Access:** By implementing the OST, PACT teams can identify Veterans at greatest risk of osteoporosis allowing PACT members to provide efficient and effective preventive services and refer those most at risk for additional testing.

**Ann Arbor:** At the Ann Arbor facility, 485 Veterans were assessed for osteoporosis risk using a computer program that calculated Veterans' OST scores and incorporated prescription data. Of those screened, 58 Veterans (12 percent) were determined to be at high risk for osteoporosis; of those Veterans, 42 were identified by OST score and 16 were identified by medication review. Of the 58 high-risk Veterans, 33 were determined to be ineligible for the program due to advanced age, limited life expectancy, or the fact that they had already received screening/treatment. For the 25 Veterans who were determined to be eligible for a DXA scan, 16 requested a scan, six declined a scan, and three could not be reached by telephone and were mailed an educational letter that included an offer for a scan. For the 13 DXA scans that were completed, 10 (77 percent) showed bone disease, including five osteoporosis and five with osteopenia (low bone mass).

**Monticello:** At the Monticello facility, 228 Veterans were assessed for osteoporosis risk using the OST and a medication review. Of the 228 Veterans screened, 24 (10.5 percent) were deemed to be at greatest risk for osteoporosis. Of the Veterans with greatest risk, 16 received nursing/provider education and were offered DXA scans. Of the 16 Veterans offered DXA scans, 12 declined testing and four had DXA scans ordered. At the completion of this program, only two DXA scan results had been received, both negative for bone disease.

**West Lafayette:** At the West Lafayette facility, 154 Veterans were assessed for osteoporosis risk using only the OST. Of the 154 Veterans screened, 86 (55.8 percent) were determined to be at risk and met DXA scan criteria and 33 Veterans had DXA scans completed during the program. The remaining 53 did not have DXA scans during the program, citing reasons that included: 1) a desire for time to "think about" the test, 2) ineligibility for DXA scan due to other medical conditions, or 3) insufficient time to discuss DXA scan during primary care appointment.

**Evidence of Clinical Impact:** At the three sites where this promising practice was implemented, between 10 and 55 percent of male Veterans aged 50 or above were determined to be at high risk for osteoporosis. The identification of individuals at risk for developing osteoporosis can help prevent serious fractures, allowing them to remain independent, reduce the need for institutional care, and improve health outcomes and quality of life. While this program was not formally evaluated, it is recommended that future implementation sites monitor health outcomes to identify improvements, increase in treatments, and reduction in fractures.

**Customer Satisfaction:** The program team did not conduct formal patient or provider surveys. Anecdotally, Veterans who tested positive for osteoporosis in the West Lafayette program appreciated that their primary care provider discussed the issue with them. In future implementation of this program, patient and provider satisfaction surveys should be considered, allowing for facilities to further refine their programs to meet the needs of health care professionals and patients.

**Return on Investment:** Early detection of osteoporosis risk can produce return on investment through a reduction in osteoporotic fractures. The screening is low cost and returns results almost instantaneously, allowing providers to quickly and cost-effectively identify at-risk Veterans. In addition, Veterans can be offered treatment and preventive care to reduce the risk of expensive fractures and improve quality of care.

**Operational Feasibility:** The OST screening program is simple to use and highly adaptable, making it a feasible program and begins the process of identifying patients at risk for osteoporosis. Calculating the OST score only requires basic patient information (e.g., age and weight) and can be used at any facility, making it relatively easy to implement and does not require special training materials. OST scores allow health care providers to identify patients who are most at risk for osteoporosis, targeting those individuals for further education, screening, and potential treatment, if needed.

The screening can be done quickly on a per-patient basis or for entire panels at once through a computer analysis. Additionally, the medication review can be conducted by different team members and adds specificity to an assessment for osteoporosis risk. There may be some additional staff time required depending on the method of calculation and how many additional screening criteria a provider may want to include (e.g., only including Veterans above a certain age, ensuring a Veteran is not in hospice care). However, there are no specific staffing requirements to implement the program.

**Strong Partnerships and/or Working Relationships:** The current program focused on PACT members within VA medical facilities. As the program continues to expand to additional PACTs and additional sites, strong partnerships will need to be formed with radiology departments due to the increase in potential DXA scans.

## Office of Rural Health Rural Promising Practice Criteria

**Increased Access:** Measurable improvements in access to care and/or services. Examples include reduction in distance traveled to care, reduction in wait times, improved care coordination, and reduction in missed appointments.

**Evidence of Clinical Impact:** Positive results on outcomes of importance to rural Veterans based on evaluations conducted during the implementation of the program and at the end of the pilot period.

**Customer Satisfaction:** Increased patient, provider, partner, and/or caregiver satisfaction.

**Return on Investment:** Improvement in health system performance by 1) reducing the per capita costs of health care, and 2) improving or at least maintaining health outcomes, and/ or 3) positively impact the health care delivery system.

**Operational Feasibility:** Implementation is feasible and known barriers and facilitators of success could easily be shared across implementation sites.

**Strong Partnerships and/or Working Relationships:** Inclusion of VA and/or non-VA partners to maximize the efficacy of the intervention.

## Adoption Considerations

Facilities and providers that seek to adopt this program will need several elements before they can start identifying patients at risk for osteoporosis. First, providers should determine the method of calculating the OST score (e.g., manually or computer-calculated). Then, providers should either collect or identify the necessary patient data of age and weight for the OST calculation. Providers should also identify any additional screening criteria (e.g., medication review) and exclusion criteria (e.g., individuals younger than a certain age or in hospice) and determine how best to integrate those additional criteria after the calculation of the OST score. Finally, policies and procedures should be developed for contacting individuals identified as at risk as well as a

method to transmit these results to providers outside the implementation team.

Challenges include lack of knowledge about individual risk for osteoporosis and fracture among patients, resulting in limited or lack of screening and/or treatment. Risk assessments and additional patient counseling are useful to provide patient education and follow up. One site estimated that the total amount of time spent administering this program was approximately seven and half hours among three staff members to complete program activities, including chart review, contacting and educating Veterans, ordering additional tests, and documenting the encounter in the electronic medical record. The program team also developed templates and scripts to streamline the program activities.

For facilities considering developing a computerized database to identify patients at risk for osteoporosis, the facility should further consider the additional time needed to review the results with the patient. Another challenge may exist for many rural facilities. Obtaining a DXA scan may require patient travel, which may increase health care costs, potentially presenting a barrier to DXA scan completion. Program sites recommend that adopters create consistent policies and procedures for the handling of assessment results to avoid inconsistencies correlating OST with DXA results.

Due to the potential increase in DXA scans and the demand for radiological testing to confirm osteoporosis, the program team should work with the radiological department and community providers to ensure access to needed testing. Roughly, 170 Veterans needed radiological screening based on the number of Veterans identified by OST score as being at risk for osteoporosis. Program staff noted that this increased demand may overwhelm areas with limited DXA scanning capacity, especially in rural communities where the equipment to conduct these tests is limited.

When Veterans were notified of their DXA scan results, they were provided an opportunity to collaborate with their providers to develop a treatment plan to improve health outcomes and reduce potential fractures. While clinical staff oversaw the calculation of the OST, the simplicity of the calculation and the minimal data needed would allow support staff to take over the responsibility of screening Veterans.

## Conclusion and Next Steps

Osteoporosis risk is under-recognized and under-diagnosed in older male Veterans. The OST program presents an efficient means of determining patient risk. The process can be made even more efficient by involving support staff using computer programs to examine risk for entire panels. Providers can then use these scores to identify which of their Veterans are at risk for osteoporosis, confirm through screening, and then develop a treatment plan to prevent fractures and increase bone strength in Veterans either have or at severe risk for osteoporosis.

This program does not require specialized resources to implement. Both PACT members and other clinical support staff can calculate OST scores. An additional option is for a computer program, like the one used in Ann Arbor program site, to calculate OST scores for an entire panel at one time. The scores could be either transmitted to a provider before an appointment or automatically add those scores to a patient's electronic health record. Providers can then incorporate the information that the scores provide in their treatment of the patient. The final, important component of this program is to improve knowledge about osteoporosis among Veterans through patient education tools, such as brochures. Because this program is implemented at additional sites, data collection and analysis will be a critical to assess the impact and areas for additional refinements.

## Available Resources

The pilot program administrators of this Rural Promising Practice created several resources to aid in its replication at other sites of care, which are available upon request. They include:

- Bone Health Brochures, available from the National Osteoporosis Foundation
- "What is Osteoporosis?" patient handout from the National Institutes of Health

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## To Learn More

The Rural Promising Practices initiative is overseen by the U.S. Department of Veterans Affairs (VA) Office of Rural Health (ORH) as part of its targeted, solution-driven approach to improving care for the 3 million Veterans living in rural communities who rely on VA for health care. As VA's lead advocate for rural Veterans, ORH works to see that America's Veterans thrive in rural communities. To accomplish this, ORH leverages its resources to increase rural Veterans' access to care and services. To discuss implementing a Rural Promising Practice at your facility or to learn more, visit [www.ruralhealth.va.gov](http://www.ruralhealth.va.gov) or email [rural.health.inquiry@va.gov](mailto:rural.health.inquiry@va.gov)

5. Zimering, M.B., Shin, J.J., Shah, J., Wining, E., & Engelhart, C. (2007). Validation of a novel risk estimation tool for predicting low bone density in Caucasian and African American men veterans. *Journal of Clinical Densitometry*, 10(3), 289-297.
6. National Osteoporosis Foundation. (2016). Just for men. Available at: <https://www.nof.org/prevention/general-facts/just-for-men/>
7. Steuart Richards, J., Lazzari, A.A., Teves Qualler, D.A., Desale, S., Howard, R., & Kerr, G.S. (2014). Validation of the osteoporosis self-assessment tool in male veterans. *Journal of Clinical Densitometry: Assessment and Management of Musculoskeletal Health*, 17(1), 32-37.
8. International Osteoporosis Foundation. (2015). Facts and statistics. Retrieved from <https://www.iofbonehealth.org/facts-statistics>
9. Akesson, K., Marsh, D., Mitchell, P.J., McLellan, A.R., Stenmark, J., Pierroz, D.D.,...IOF Fracture Working Group. (2013). Capture the fracture: A best practice framework and global campaign to break the fragility fracture cycle. *Osteoporosis International*, 24(8), 2135-2152.
10. Adler, R.A., Tran, M.T., & Petkov, V.I. (2003, June). Performance of the osteoporosis self-assessment screening tool for osteoporosis in American men. *Mayo Clinic Proceedings*, 78(6), 723-727.
11. Curtis, J., Laster, A., Becker, D.J., Carbone, L., Gary, L.C., Kilgore, M.L.,...Delzell, E. (2009). The geographic availability and associated utilization of dual energy X-ray absorptiometry (DXA) testing among older persons in the United States. *Osteoporosis International*, 20(9), 1553-1561. <http://doi.org/10.1007/s00198-008-0821-x>

## References

1. Wilson, T., Nelson, S.D., Newbold, J., Nelson, R.E., & LaFleur, J. (2015). The clinical epidemiology of male osteoporosis: a review of the recent literature. *Clinical Epidemiology*, 7, 65-76. <http://doi.org/10.2147/CLEP.S40966>
2. Shekelle, P., Munjas, B., Liu, H., Wong, W., Paige, N., Goldzweig, C., Zhou, A., & Suttrop, M. (2007). Screening men for osteoporosis: Who & how. Department of Veterans Affairs. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK49063/>
3. International Osteoporosis Foundation. (2015). Impact of osteoporosis. Retrieved from <https://www.iofbonehealth.org/impact-osteoporosis>
4. Marx, K.A. & Quinn, C.C. (2009). Commentary: Male osteoporosis - policy gaps in prevention and treatment. *Journal of Aging and Social Policy*, 21, 119-129.

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