

1 **Clinical Practice Guideline:** **Bone Density Screening – Peripheral**

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3 **Date of Implementation:** **July 13, 2006**

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5 **Product:** **Specialty**

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8 **GUIDELINES**

9 American Specialty Health – Specialty (ASH) considers Peripheral Bone Density  
10 Screening medically necessary when following United States Preventive Services Task  
11 Force (USPSTF) guidelines.

12  
13 The current US Preventive Services Task Force (USPSTF) recommends screening for  
14 osteoporosis with bone measurement testing to prevent osteoporotic fractures in women  
15 65 years and older. The USPSTF recommends screening for osteoporosis with bone  
16 measurement testing to prevent osteoporotic fractures in postmenopausal women younger  
17 than 65 years who are at increased risk of osteoporosis, as determined by a formal clinical  
18 risk assessment tool. (June, 2018). Risk factor determination should be performed using  
19 the FRAX tool or another valid and reliable tool. The USPSTF concludes that the current  
20 evidence is insufficient to assess the balance of benefits and harms of screening for  
21 osteoporosis to prevent osteoporotic fractures in men. The most commonly used bone  
22 measurement test used to screen for osteoporosis is central dual-energy x-ray  
23 absorptiometry (DXA); other screening tests include peripheral DXA and quantitative  
24 ultrasound (QUS). Central DXA measures bone mineral density (BMD) at the hip and  
25 lumbar spine. Most treatment guidelines recommend using BMD, as measured by central  
26 DXA, to define osteoporosis and the treatment threshold to prevent osteoporotic fractures.

27  
28 **DESCRIPTION/BACKGROUND**

29 Several tools are available to assess osteoporosis risk: the Simple Calculated Osteoporosis  
30 Risk Estimation (SCORE; Merck), Osteoporosis Risk Assessment Instrument (ORAI),  
31 Osteoporosis Index of Risk (OSIRIS), and the Osteoporosis Self-Assessment Tool (OST).  
32 These tools seem to perform similarly and are moderately accurate at predicting  
33 osteoporosis. The FRAX tool (University of Sheffield), which assesses a person’s 10-year  
34 risk of fracture, is also a commonly used tool. The FRAX tool includes questions about  
35 previous DXA results but does not require this information to estimate fracture risk.  
36 Because the benefits of treatment are greater in persons at higher risk of fracture, one  
37 approach is to perform bone measurement testing in postmenopausal women younger than  
38 65 years who have a 10-year FRAX risk of major osteoporotic fracture (MOF) (without  
39 DXA) greater than that of a 65-year-old white woman without major risk factors. Bone  
40 density measurement is performed as a screen for conditions such as osteopenia and  
41 osteoporosis, bone weakening conditions due to bone resorption occurring at a faster rate  
42 than bone formation. This change in bone density can be due to aging or disease processes

1 and is related to a multitude of factors, including hormonal changes, calcium consumption,  
2 diet, and level of physical activity. Having osteopenia and/or osteoporosis is a risk factor  
3 for fracture, and because these disease processes begin weakening bones long before  
4 fractures occur, early screening for, and treatment of, decreased bone density can be useful  
5 for preventing fractures. Studies have shown that screening those at risk for osteoporosis  
6 can reduce the risk of fractures associated with falls or other injuries. The most commonly  
7 used bone measurement test used to screen for osteoporosis is central DXA; other  
8 screening tests include peripheral DXA and quantitative ultrasound (QUS). All the  
9 osteoporosis drug therapy studies reviewed by the USPSTF used central DXA to determine  
10 eligibility for study enrollment. Peripheral DXA measures BMD at the lower forearm and  
11 heel. Quantitative ultrasound also evaluates peripheral sites and has similar accuracy in  
12 predicting fracture risk as DXA, while avoiding the risk of radiation exposure; however, it  
13 does not measure BMD. (June, 2018)

14  
15 For peripheral bone density measurement, there are three (3) different types of scans that  
16 can be performed to test bone density: photon absorptiometry, peripheral dual energy x-  
17 ray absorptiometry, and ultrasound.

18  
19 Photon absorptiometry uses low doses of radiation but is very slow compared to all other  
20 bone density tests using radiation. Although very popular in the past, this method is no  
21 longer as commonly used. The radioactive source gradually decays and must be replaced  
22 over time. It is also not as accurate as other tests using radiation such as dual energy x-ray  
23 absorptiometry (DXA).

24  
25 A modified version of the DXA scan is called peripheral dual energy x-ray absorptiometry  
26 (P-DXA). This uses the x-ray technique of DXA but only measures density in the limbs  
27 such as the wrist or the heel. It uses low doses of radiation and is faster than traditional  
28 DXA.

29  
30 Ultrasound uses sound waves to determine bone mineral density (BMD) for heel scan  
31 screenings. Ultrasound is rapid and does not use radiation. This technique is generally used  
32 as a prescreening tool for bone mineral density. If evidence of bone loss is detected, the  
33 patient is generally referred for a more comprehensive scan of the hip and spine using  
34 DXA. The most commonly used type of ultrasound for a heel scan is quantitative  
35 ultrasound, and there are numerous devices using slightly varying techniques designed for  
36 this type of ultrasound. Quantitative ultrasound works by evaluating two measures,  
37 broadband ultrasound attenuation (BUA) and speed of sound (SOS). SOS is a measurement  
38 of how quickly sound travels through the bone, while BUA is a measure of how much  
39 sound is absorbed by the bone.

40  
41 The advantage of these devices is the ability to bring bone density screening assessments  
42 to a large portion of the population who otherwise would not be able to have testing. These

1 machines cost considerably less than those evaluating the hip and spine. However, it is  
 2 important to note that density changes in the heel and wrist occur much slower than those  
 3 in the hip or spine. The heel may be normal in bone density even when sites such as the  
 4 hip or spine are already significantly abnormal. The rate of false negative findings is,  
 5 however, low enough to support the use of these techniques as a screening procedure.

6  
 7 There are inherent risks in any procedure that involves radiation such as the photon  
 8 absorptiometry and x-ray, and as such these should be used only after the benefits and risks  
 9 have been assessed.

## 10 **EVIDENCE REVIEW**

### 11 **DXA**

12 Bone measurement testing with central DXA is the most commonly used and studied  
 13 method for the diagnosis of osteoporosis. Central DXA uses radiation to measure BMD at  
 14 central bone sites (hip and lumbar spine), which is the established standard for diagnosis  
 15 of osteoporosis and for guiding decisions about treatment. DXA can also be used at  
 16 peripheral bone sites (such as the lower forearm and heel) to identify persons with low  
 17 bone mass; however, most treatment guidelines recommend follow-up with central DXA  
 18 before initiating treatment for osteoporosis. Screening with peripheral DXA and other  
 19 imaging techniques may help increase access to screening in geographic locations (e.g.,  
 20 rural areas) where machines that perform central DXA may not be available. The USPSTF  
 21 identified 2 studies ( $n = 712$ ) that reported on the accuracy of peripheral DXA at the  
 22 calcaneus to identify osteoporosis; compared with central DXA, the area under the curve  
 23 (AUC) ranged from 0.67 to 0.80 in women with a mean age of 61 years.

### 24 **QUS**

25 Quantitative ultrasound is another imaging technique used at peripheral bone sites (most  
 26 commonly the calcaneus), and it does not require radiation exposure. Compared with  
 27 central DXA, the AUC for QUS measured at the calcaneus in women ranged from 0.69 to  
 28 0.90, with a pooled estimate of 0.77 (95% CI, 0.72-0.81; 7 studies;  $n = 1969$ ). In men, the  
 29 AUC ranged from 0.70 to 0.93, with a pooled estimate of 0.80 (95% CI, 0.67-0.94; 3  
 30 studies;  $n = 5142$ ). However, QUS does not measure BMD, that is the current diagnostic  
 31 criteria for osteoporosis. In addition, drug therapy trials for osteoporosis treatment  
 32 generally use central DXA measurement of BMD as criteria for inclusion of study  
 33 populations. Thus, before QUS results could be routinely used to initiate treatment without  
 34 any further DXA measurement, a method for converting or adapting QUS results to the  
 35 DXA scale needs to be developed. Chou et al. (2014) demonstrated, “in a multiracial  
 36 referral population heel BMD predicts central osteoporosis and prevalent vertebral  
 37 fractures equally well in African American as in Caucasian women and may be better than  
 38 central BMD in assessing fragility in glucocorticoid users.” These studies indicate that  
 39 quantitative ultrasound is an effective and safe prescreening tool for bone mineral density  
 40 that is quick and involves no radiation. Peripheral DXA was found to be a useful  
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 42

1 measurement of bone density but does involve the use of radiation, and as such should be  
2 used with care after the benefits and risks have been considered. Hashimi and Elfandi  
3 (2016) aimed to find out whether heel ultrasound is as good as central bone densitometry  
4 scanning in diagnosing osteoporosis in patients who are at high risk of osteoporosis. The  
5 recruited patients attended for a DEXA scan of the left hip and lumbar spine. All subjects  
6 had an ultrasound of the left heel using the quantitative heel ultrasound machine. The  
7 results of DEXA scan were blinded from the results of ultrasound and vice versa. The  
8 sensitivity and specificity of the ultrasound heel test to predict osteoporosis were 53%  
9 (95%CI: 29-77) and 86% (95%CI: 75-96) respectively. Specificity for predicting bone  
10 mineral density (BMD)-defined osteoporosis was high (86%), but sensitivity was low  
11 (53%). Authors concluded that heel ultrasound result in the osteoporotic range was highly  
12 predictive of BMD-defined osteoporosis. A positive ultrasound heel test in high-risk  
13 patients is more useful in ruling in osteoporosis than a negative test to rule out osteoporosis.

### 14 15 **PRACTITIONER SCOPE AND TRAINING**

16 Practitioners should practice only in the areas in which they are competent based on their  
17 education training and experience. Levels of education, experience, and proficiency may  
18 vary among individual practitioners. It is ethically and legally incumbent on a practitioner  
19 to determine where they have the knowledge and skills necessary to perform such services.

20  
21 It is best practice for the practitioner to appropriately render services to a patient only if  
22 they are trained, equally skilled, and adequately competent to deliver a service compared  
23 to others trained to perform the same procedure. If the service would be most competently  
24 delivered by another health care practitioner who has more skill and expert training, it  
25 would be best practice to refer the patient to the more expert practitioner.

26  
27 Best practice can be defined as a clinical, scientific, or professional technique, method, or  
28 process that is typically evidence-based and consensus driven and is recognized by a  
29 majority of professionals in a particular field as more effective at delivering a particular  
30 outcome than any other practice (Joint Commission International Accreditation Standards  
31 for Hospitals, 2020).

32  
33 Depending on the practitioner’s scope of practice, training, and experience, a member’s  
34 condition and/or symptoms during examination or the course of treatment may indicate the  
35 need for referral to another practitioner or even emergency care. In such cases it is prudent  
36 for the practitioner to refer the member for appropriate co-management (e.g., to their  
37 primary care physician) or if immediate emergency care is warranted, to contact 911 as  
38 appropriate. See the *Managing Medical Emergencies (CPG 159 – S)* clinical practice  
39 guideline for information.

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