

Keep bones **strong** and minimize complications

Endocrinology testing for bone health



Osteopenia and osteoporosis: growing concerns in an aging population

Osteopenia affects 43.4 million people in the U.S. and is a precursor to osteoporosis.¹ Many patients with osteopenia aren't aware they have it, putting them at higher risk for osteoporosis.²

- By 2020, half of all Americans over age 50 will have weak bones³
- About 10.2 million Americans have osteoporosis today¹
- More than 2 million osteoporosis-related fractures occur annually in the U.S., with over 70% of these in women¹
- Studies suggest that about half of women and up to 1 in 4 men age 50 and older will break a bone due to osteoporosis⁴

Risk factors

- Increase in age
- Obesity
- History of smoking
- Post-menopausal women
- History of fractures
- Alcohol abuse
- Sedentary lifestyle
- Low intake of calcium/vitamin D
- Use of certain medications, such as thyroid hormone replacement

Osteoporosis may occur secondary to other diseases and conditions, including:⁶

- Metabolic disorders
- Nutritional or gastrointestinal conditions
- Collagen disorders
- Other diseases such as HIV and Chronic Obstructive Pulmonary Disease (COPD)

.....
\$17 billion⁵

annual cost of osteoporosis-related fractures
.....

Monitoring patients diagnosed with osteopenia and osteoporosis is key to minimizing complications.



Osteopenia warrants a closer look

Osteopenia (low bone density) is one of three classification categories for patients given a bone mineral density (BMD) test. If the BMD indicates osteopenia rather than osteoporosis, patients may not know it, because there are no early symptoms. Yet they are at an elevated risk for fracture. In fact, most fractures occur in patients with osteopenia.⁹

BMD and T-scores: one important way to identify increased risk for fracture

Bone density test results are reported using T-scores, which compare a patient's bone density to that of a healthy 30-year-old adult.

Category	T-scores Range
Normal bone density	-1 and above
Low bone density (osteopenia)	Between -1 and -2.5
Osteoporosis	-2.5 and below

~50%

of all adult patients may have osteopenia, or low bone density⁷

Weakening bones: a strong case for laboratory testing

Dual emission X-ray absorptiometry (DXA) imaging is the gold standard for BMD testing and diagnosing osteopenia and osteoporosis.

However, bone densitometry has limited usefulness for immediate follow-up of treatment of osteoporotic patients, because early and subtle changes in bone density cannot be detected.

Laboratory blood tests give you greater insight into your patients' bone health to help:

- Determine the underlying cause of bone density loss to aid in choosing treatment
- Manage treatment therapy
- Minimize complications, including pain, fracture, and restrictions in mobility

Lab testing for bone health can help you minimize complications

Osteopenia and osteoporosis: a continuum of care

Screening

Patient assessment
Presence of risk factors
Recent fractures

Diagnosis test to understand cause

- Serum calcium, phosphorus, total protein, albumin, liver enzymes, creatinine, and electrolytes
- 24-hour urine calcium, sodium, and creatinine
- FSH (for menopause)
- Testosterone (testing low levels in men)
- Vitamin D
- Overactive endocrine function (T4, TSH, PTH)
- Bone-specific alkaline phosphatase
- Osteocalcin
- CTx and NTx

Diagnosis

Assessing severity and Rx response

- X-ray
- Mineral bone density with DXA (for osteopenia/osteoporosis)

Diagnostic tests to define cause

- Serum calcium, phosphorus, total protein, albumin, liver enzymes, creatinine, and electrolytes
- 24-hour urine calcium, sodium, and creatinine
- FSH (for menopause)
- Testosterone (testing low levels in men)
- Vitamin D
- Overactive endocrine function (T4, TSH, PTH)
- Bone-specific alkaline phosphatase
- Osteocalcin
- CTx and NTx

Monitoring

Tests to assess response

If specific cause identified:

- Serum calcium, phosphorus, total protein, albumin, liver enzymes, creatinine, and electrolytes
- 24-hour urine calcium, sodium, and creatinine
- FSH (for menopause)
- Testosterone (testing low levels in men)
- Vitamin D
- Overactive endocrine function (T4, TSH, PTH)

Bone markers

- Bone-specific alkaline phosphatase
- Osteocalcin
- CTx and NTx

Dual X-ray absorptiometry

Other tests include computed tomography, magnetic resonance imaging, and ultrasound



Use testing from Quest Diagnostics to help monitor and manage your patients' osteopenia or osteoporosis

Laboratory testing can be used to investigate common or contributing causes of osteoporosis and detect early or subtle changes in bone density. Clinical guidelines recommend laboratory testing for all women with osteoporosis and men age 50 and over with osteoporosis.^{1,7,8}

Bone health testing from Quest Diagnostics

Test Name	Test Code	Description	CPT Code(s)*
Vitamin D, 25-Hydroxy, Total, Immunoassay	17306	Used to diagnose vitamin D deficiency and toxicity and to monitor response to supplementation. Vitamin D is essential for adequate calcium absorption and basic bone support	82306
QuestAssureD™ 25-Hydroxyvitamin D (D ₂ , D ₃), LC/MS/MS	92888	Used to diagnose vitamin D deficiency and toxicity and to monitor response to supplementation; suitable for adults and children age 3 and older. Vitamin D is essential for adequate calcium absorption and basic bone support	82306
PTH, Intact and Calcium	8837	Used to measure parathyroid hormone levels. High parathyroid hormone levels are associated with excessive bone loss, as an overactive parathyroid gland draws calcium from bone	82310 83970
PTH, Intact without Calcium	35202	Used to measure parathyroid hormone levels. High parathyroid hormone levels are associated with excessive bone loss, as an overactive parathyroid gland draws calcium from bone	83970
C-Telopeptide (CTx)	17406(X)	Useful in monitoring therapy to slow or halt osteoporotic bone loss. The test is also useful to assess bone resorption in patients with metabolic bone disease	82523
Collagen Cross-Linked N-Telopeptide (NTx), Urine	36167(X)	Useful in monitoring therapy to slow or halt osteoporotic bone loss. The test is also useful to assess bone resorption in patients with metabolic bone disease	82523 82570
Alkaline Phosphatase, Bone Specific	29498	Used for therapeutic monitoring of osteoporosis	84075
Osteocalcin, N-MID	16322	Measures the serum osteocalcin levels which are related to the rate of bone turnover in various disorders of bone metabolism	83937
Calcium	303	Calcium blood levels are controlled by a complex interaction of parathyroid hormone and vitamin D, and useful in diagnosis of bone disorders	82310

* The CPT codes provided are based on AMA guidelines and are for informational purposes only. CPT coding is the sole responsibility of the billing party. Please direct any questions regarding coding to the payer being billed.

Get the insights you need from the lab that knows endocrinology

Count on actionable results to help you do your best for your patients

- Comprehensive endocrinology tests across disease areas, including tests for bone health
- Reliable and accurate result reporting aligned to endocrine guidelines
- Endocrinology interpretation guides and algorithms
- Medical and scientific expertise from Quest Diagnostics Nichols Institute and Athena Diagnostics



Please contact your Quest Diagnostics sales representative for more information about our bone health testing.

To speak to an endocrinology specialist, call 1.866.MYQUEST (1.866.697.8378).

References

1. Camacho PM, Petak SM, Binkley N, *et al.* American Association of Clinical Endocrinologists and American College of Endocrinology clinical practice guidelines for the diagnosis and treatment of postmenopausal osteoporosis-2016. *Endocr Pract.* 2016;22(Suppl 4).
2. National Osteoporosis Foundation. Healthy bones for life: patient's guide. 2014.
3. American Academy of Orthopaedic Surgeons. Bone health basics. Available at www.orthoinfo.org/topic.cfm?topic=A00578. Accessed February 9, 2017.
4. National Osteoporosis Foundation. What is osteoporosis and what causes it? Available at www.nof.org/patients/what-is-osteoporosis. Accessed February 6, 2017.
5. Burge R, Dawson-Hughes B, Solomon DH, *et al.* Incidence and economic burden of osteoporosis-related fractures in the United States, 2005–2025. *J Bone Miner Res.* 2007;22:465-475.
6. Cosman F, de Beur SJ, LeBoff MS, *et al.* Clinician's guide to prevention and treatment of osteoporosis. *Osteoporos Int.* 2014; 25(10): 2359–2381.
7. Looker AC, Orwoll ES, Johnston, Jr. CC, *et al.* Prevalence of low femoral bone density in older U.S. adults from NHANES III. *J Bone Miner Res.* 1997;12:1761–1768.
8. Watts NB, Bilezikian JP, Camacho PM, *et al.* AACE postmenopausal osteoporosis guidelines. *Endocr Pract.* 2010;16(Suppl 3).

QuestDiagnostics.com

Quest, Quest Diagnostics, any associated logos, and all associated Quest Diagnostics registered or unregistered trademarks are the property of Quest Diagnostics. All third-party marks—® and ™—are the property of their respective owners. © 2017 Quest Diagnostics Incorporated. All rights reserved. SB6201 5/2017

