National Imaging Associates, Inc.	
Clinical guidelines **CT BONE DENSITY STUDY**	**Original Date: April 1999**
CPT Codes: 77078	**Last Revised Date: March 2023~~April 2022~~**
Guideline Number: NIA_CG_060-2	**Implementation Date: January 2024~~3~~**

GENERAL INFORMATION

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*

INDICATIONS FOR CT BONE DENSITY STUDY

For first time baseline study[1-5]

Patient with suspected osteoporosis or osteopenia meeting any of the following criteria when DXA scanning is not available or for patients with advanced degenerative changes of the spine or who are severely obese (BMI > 35 kg/m) that may limit the efficacy of DXA scans

- Asymptomatic women 65 years of age or older
- For post-menopausal women age < 65 or during the menopause transition, and men < 70 having at least one of the following applicable risk factors for low bone mass or fractures:
  - Low body weight (< 127 lb. or 57.6 kg or BMI < 20 kg per m)
  - A history of fracture
  - History of maternal hip fracture that occurred after the age of 50 years
  - High risk medications (e.g., steroids or glucocorticosteroids, medroxyprogesterone acetate, anticonvulsants, heparin, lithium, estrogen receptor modulators, calcitonin, or bisphosphonates)
  - History of estrogen deficiency

~~* National Imaging Associates, Inc. (NIA) is a subsidiary of Magellan Healthcare, Inc.~~

- History of amenorrhea for greater than 1 year before the age of 42
- ~~[illegible]~~
- Conditions that cause or contribute to osteoporosis and fractures (e.g., malabsorption syndromes, inflammatory bowel disease and other gastrointestinal conditions, metabolic bone disease, hyperparathyroidism, hypogonadism, thyroid hormone therapy or hyperthyroidism, chemotherapy, long-term heparin therapy, rheumatologic and autoimmune diseases, renal failure, hematologic disorders, multiple myeloma, chronic alcoholism, cerebral palsy, etc.)
- Current use of cigarettes
- Loss of body height (> 4 cm (> 1.5 inches))[1]

- Men aged 70 or older
- Individuals with fragility fractures, including vertebral abnormalities that are indicative of osteoporosis, osteopenia, low bone mineral content, or vertebral fractures seen on other imaging studies/x-ray
- Individuals aged 50 years and older who develop a wrist, hip, spine, or proximal humerus fracture with minimal or no trauma, excluding pathologic fractures
- ~~Loss of body height (>4 cm (>1.5 inches))[1]~~
- ~~[illegible]~~
- ~~Amenorrhea for greater than 1 year before the age of 42~~
- Eating disorders, including anorexia nervosa and bulimia
- Individuals who have had gastric bypass for obesity (accuracy of DXA may be affected by obesity)
- Males and females greater than or equal to 50 years of age with advanced degenerative changes of the spine (with or without scoliosis), or other conditions that may falsely elevate bone marrow density

Follow-up of individuals with known osteoporosis or osteopenia[6, 7]

- In women with low to moderate risk reassess fracture risk in 2-4 years
- In post-menopausal women with a low bone mineral density at high risk for fractures on treatment, monitor the spine and hip every 1-3 years
- For patients on bisphosphonates, reassess fracture risk every 3-5 years
- No previous bone density within past 23 months **AND** meets any one of the above risk factor criteria. (More frequent BMD testing may be warranted in certain clinical situations and should be determined on a case-by-case basis.)

Indications for QCT/pQCT in pediatric and adolescent include[8]:

- Individuals receiving (or expected to receive) glucocorticoid therapy for more than 3 months
- Individuals receiving radiation or chemotherapy for malignancies

- Individuals with an endocrine disorder known to adversely affect BMD (e.g., hyperparathyroidism, hyperthyroidism, growth hormone deficiency or Cushing's syndrome)
- Individuals with bone dysplasias known to have excessive fracture risk (osteogenesis imperfecta, osteopetrosis) or high BMD, such as prolonged exposure to fluoride
- Individuals with medical conditions that could alter bone marrow density, such as: (chronic renal failure, inflammatory arthritides, eating disorders, organ transplantation, prolonged immobilization, sprue, inflammatory bowel disease, malnutrition, cystic fibrosis, osteomalacia, acromegaly, cirrhosis, HIV infection, prolonged exposure to fluorides, and hematologic disorders (thalassemia, sickle cell disease))

BACKGROUND

Bone mineral density (BMD) measurement identifies patients with low bone density and increased fracture risk. Methods for measuring BMD are non-invasive, painless, and available on an outpatient basis. Dual energy x-ray absorptiometry (DXA), previously referred to as DEXA, is the most commonly used method of evaluating BMD and is the only BMD technology for which World Health Organization (WHO) criteria for the diagnosis of osteoporosis can be used. Patients who have a BMD that is 2.5 standard deviations below that of a "young normal" adult (T-score at or below -2.5) are deemed to have osteoporosis. Quantitative computed tomography (QCT) has not been validated for WHO criteria but can identify patients with low BMD compared to the QCT reference database, and it can be used to identify patients who are at risk of fracture.

OVERVIEW:

DXA – Dual energy x-ray absorptiometry (DXA) is most often used to measure bone mineral density due to its low radiation exposure, low precision error, and capacity to measure multiple skeletal sites (spine, hip, or total body).

Axial DXA – This provides the "gold standard". Axial DXA predicts fracture risk at the site being measured.

Peripheral DXA – This device measures BMD at peripheral sites, generally at the heel or wrist. It is relatively cheap and portable and is an option when there is limited access to axial DXA.

Quantitative computed tomography (QCT) – QCT measures volumetric integral, trabecular, and cortical bone density at the spine and hip and can be used to determine bone strength. Radiation dose is increased when compared with DXA. Indications are the same for QCT as DXA; however, DXA is recommended as the first-line test in most cases.[1, 2]

Fracture Risk Assessment - The fracture risk assessment ~~(FRAX)~~(FRAX) tool ~~developed by the WHO~~ estimates the 10-year risk of having a fracture based on factors such as age, sex, body mass index (BMI), previous fractures, parental fracture history, glucocorticoid use, rheumatoid arthritis, and conditions predisposing to secondary osteoporosis (insulin-dependent diabetes, osteogenesis imperfecta in adults, untreated long-standing hyperthyroidism, hypogonadism or premature menopause (<45 years), chronic malnutrition, or malabsorption and chronic liver disease) and tobacco and alcohol use. Based on FRAX, a 65-year-old woman, without any additional conditions increasing fracture risk, has a 9.3% 10-year risk of developing a fracture. This value is therefore used as the risk level cut-off recommending screening in patients younger than 65.[9]

Ethnicity and Screening - Due to the potential negative consequences of fractures and the lack of an optimal age at which to screen populations of different ethnicity, the US Preventive Services Task Force (USPSTF) now recommends screening all women aged 65 and older regardless of race and ethnicity.

Follow-up Imaging – Follow-up imaging is performed on patients at risk of developing osteoporosis or to evaluate the outcome of osteoporosis treatment. Follow-up imaging is generally performed at 1-2 years after initiation of therapy for osteoporosis and subsequently every 2 years unless clinical circumstances prompt earlier imaging. In patients at increased risk for developing osteoporosis, imaging may be performed more frequently, particularly with patients with certain medical conditions and taking medications predisposing to fracture. The later population includes those undergoing long-term therapy with common medications such as heparin or glucocorticoids.

Pediatric and Adolescent patients - As QCT can assess both volume and density of bone in the axial and appendicular skeleton, it may be more useful than DXA scans in children. Bone mineral density measurement in children and adolescents is indicated whenever clinical management is likely to be impacted by the test results.

~~**POLICY HISTORY**~~

~~**Date**~~	~~**Summary**~~
	~~Updated references~~ ~~Added section on DJD of spine and qCT~~
~~April 2022~~	• ~~Added new section regarding pediatric and adolescent patients~~
~~June 2021~~	• ~~Added vertebral abnormalities indicative of osteoporosis, osteopenia, low bone mineral content, or vertebral fracture~~ • ~~Added - Individuals age 50 years and older who develop a wrist, hip, spine, or proximal humerus fracture with minimal or no trauma, excluding pathologic fractures~~

	• ~~Added- History of maternal hip fracture that occurred after the age of 50 years~~ • ~~Added- History of estrogen deficiency~~
~~May 2020~~	• ~~Changed indications for asymptomatic women and men~~ • ~~Added imaging for men age >70~~ • ~~Updated timing for follow up studies~~
~~April 2019~~	• ~~Changed language by removing "screening" in the following: "For first time baseline screening study" AND "For screening follow-up of individuals with known osteoporosis or osteopenia"~~ • ~~Removed erroneous chart information that was not intended for inclusion in guideline~~ • ~~Updated references~~

REFERENCES:

1. American College of Radiology. ACR Appropriateness Criteria® Osteoporosis and Bone Mineral Density. American College of Radiology (ACR). Updated 2022. Accessed December 14, 2022. https://acsearch.acr.org/docs/69358/Narrative/
2. 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. doi:10.1007/s00198-014-2794-2
3. Curry SJ, Krist AH, Owens DK, et al. Screening for Osteoporosis to Prevent Fractures: US Preventive Services Task Force Recommendation Statement. *Jama*. Jun 26 2018;319(24):2521-2531. doi:10.1001/jama.2018.7498
4. International Society for Clinical Densitometry. Adult Positions. International Society for Clinical Densitometry (ISCD). Updated May 28, 2019. Accessed December 14, 2022. https://iscd.org/learn/official-positions/adult-positions/
5. Jeremiah MP, Unwin BK, Greenawald MH, Casiano VE. Diagnosis and Management of Osteoporosis. *Am Fam Physician*. Aug 15 2015;92(4):261-8.
6. Eastell R, Rosen CJ, Black DM, Cheung AM, Murad MH, Shoback D. Pharmacological Management of Osteoporosis in Postmenopausal Women: An Endocrine Society* Clinical Practice Guideline. *J Clin Endocrinol Metab*. May 1 2019;104(5):1595-1622. doi:10.1210/jc.2019-00221
7. Shoback D, Rosen CJ, Black DM, Cheung AM, Murad MH, Eastell R. Pharmacological Management of Osteoporosis in Postmenopausal Women: An Endocrine Society Guideline Update. *J Clin Endocrinol Metab*. 2020;105(3):587-594. doi:10.1210/clinem/dgaa048
8. American College of Radiology (ACR), Society for Pediatric Radiology (SPR), Society of Skeletal Radiology (SSR). ACR–SPR–SSR practice parameter for the performance of musculoskeletal quantitative computed tomography (QCT). American College of Radiology. Updated 2018. Accessed December 14, 2022. https://www.acr.org/-/media/ACR/Files/Practice-Parameters/qct.pdf
9. Centre for Metabolic Bone Diseases, Kanis JA. FRAX® Fracture Risk Assessment Tool. University of Sheffield. Accessed December 14, 2022. https://www.sheffield.ac.uk/FRAX/tool.jsp

~~**ADDITIONAL RESOURCES**~~

~~1. Affordable Care Act (ACA) Nondiscrimination in Health Programs and Activities; §92.206 Equal Program Access on the Basis of Sex; Final Rule, [Section 1557]. Department of Health and Human Services. Updated May 18, 2016. Accessed December 14, 2022. https://www.federalregister.gov/documents/2016/05/18/2016-11458/nondiscrimination-in-health-programs-and-activities~~

2. Panday K, Gona A, Humphrey MB. Medication-induced osteoporosis: screening and treatment strategies. *Therapeutic advances in musculoskeletal disease*. 2014;6(5):185-202. doi:10.1177/1759720X14546350
3. Unnanuntana A, Gladnick BP, Donnelly E, Lane JM. The assessment of fracture risk. *J Bone Joint Surg Am*. 2010;92(3):743-753. doi:10.2106/JBJS.I.00919
4. Ward RJ, Roberts CC, Bencardino JT, et al. ACR Appropriateness Criteria(®) Osteoporosis and Bone Mineral Density. *J Am Coll Radiol*. May 2017;14(5s):S189-s202. doi:10.1016/j.jacr.2017.02.018
5. Yin M, RoyChoudhury A, Nishiyama K, et al. Bone density and microarchitecture in hepatitis C and HIV-coinfected postmenopausal minority women. *Osteoporos Int*. Apr 2018;29(4):871-879. doi:10.1007/s00198-017-4354-z
1. Affordable Care Act (ACA) Nondiscrimination in Health Programs and Activities; §92.206 Equal Program Access on the Basis of Sex; Final Rule, [Section 1557]. Department of Health and Human Services. Updated May 18, 2016. Accessed December 7, 2021. https://www.federalregister.gov/documents/2016/05/18/2016-11458/nondiscrimination-in-health-programs-and-activities
2. Panday K, Gona A, Humphrey MB. Medication-induced osteoporosis: screening and treatment strategies. *Therapeutic advances in musculoskeletal disease*. 2014;6(5):185-202. doi:10.1177/1759720X14546350
3. Unnanuntana A, Gladnick BP, Donnelly E, Lane JM. The assessment of fracture risk. *J Bone Joint Surg Am*. 2010;92(3):743-753. doi:10.2106/JBJS.I.00919
4. Ward RJ, Roberts CC, Bencardino JT, et al. ACR Appropriateness Criteria(®) Osteoporosis and Bone Mineral Density. *J Am Coll Radiol*. May 2017;14(5s):S189-s202. doi:10.1016/j.jacr.2017.02.018
5. M TY, RoyChoudhury A, Nishiyama K, et al. Bone density and microarchitecture in hepatitis C and HIV-coinfected postmenopausal minority women. *Osteoporos Int*. Apr 2018;29(4):871-879. doi:10.1007/s00198-017-4354-z

POLICY HISTORY

Date	Summary
March 2023	• Updated references • Added section on DJD of spine and qCT • General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline • Removed additional resources
April 2022	• Added new section regarding pediatric and adolescent patients
~~June 2021~~	~~Added vertebral abnormalities indicative of osteoporosis, osteopenia, low bone mineral content, or vertebral fracture~~ ~~Added - Individuals age 50 years and older who develop a wrist, hip, spine, or proximal humerus fracture with minimal or no trauma, excluding pathologic fractures~~ ~~Added - History of maternal hip fracture that occurred after the age of 50 years~~ ~~Added - History of estrogen deficiency~~
~~May 2020~~	~~Changed indications for asymptomatic women and men~~ ~~Added imaging for men age >70~~ ~~Updated timing for follow up studies~~
~~April 2019~~	~~Changed language by removing "screening" in the following: "For first time baseline screening study" AND "For screening follow up of individuals with known osteoporosis or osteopenia"~~ ~~Removed erroneous chart information that was not intended for inclusion in guideline~~ ~~Updated references~~

~~**Reviewed / Approved by NIA Clinical Guideline Committee**~~

Reviewed / Approved by NIA Clinical Guideline Committee

Disclaimer: *National Imaging Associates, Inc. (NIA) authorization policies do not constitute medical advice and are not intended to govern or otherwise influence the practice of medicine. These policies are not meant to supplant your normal procedures, evaluation, diagnosis, treatment and/or care plans for your patients. Your professional judgement must be exercised and followed in all respects with regard to the treatment and care of your patients. These policies apply to all Evolent Health LLC subsidiaries including, but not limited to, National Imaging Associates ("NIA"). The policies constitute only the reimbursement and coverage guidelines of NIA. Coverage for services varies for individual members in accordance with the terms and conditions of applicable Certificates of Coverage, Summary Plan Descriptions, or contracts with governing regulatory agencies. NIA reserves the right to review and update the guidelines at its sole discretion. Notice of such changes, if necessary, shall be provided in accordance with the terms and conditions of provider agreements and any applicable laws or regulations.*

~~**GENERAL INFORMATION**~~

~~It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.~~

~~**Disclaimer:** Magellan Healthcare service authorization policies do not constitute medical advice and are not intended to govern or otherwise influence the practice of medicine. These policies are not meant to supplant your normal procedures, evaluation, diagnosis, treatment and/or care plans for your patients. Your professional judgement must be exercised and followed in all respects with regard to the treatment and care of your patients. These policies apply to all Magellan Healthcare subsidiaries including, but not limited to, National Imaging Associates ("Magellan"). The policies constitute only the reimbursement and coverage guidelines of Magellan. Coverage for services varies for individual members in accordance with the terms and conditions of applicable Certificates of Coverage, Summary Plan Descriptions, or contracts with governing regulatory agencies. Magellan reserves the right to review and update the guidelines at its sole discretion. Notice of such changes, if necessary, shall be provided in accordance with the terms and conditions of provider agreements and any applicable laws or regulations.~~