MASSACHUSETTS

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Medical Policy

Whole Body Dual X-Ray Absorptiometry to Determine Body Composition

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Policy Number: 577

BCBSA Reference Number: 6.01.40 (For Plan internal use only)
NCD/LCD: NA

Related Policies

- Bone Mineral Density Studies, #450
- Vertebral Fracture Assessment with Densitometry, #449

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity
Medicare HMO Blue℠ and Medicare PPO Blue℠ Members

Dual x-ray absorptiometry (DXA) body composition studies are considered **INVESTIGATIONAL**.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	This is **not** a covered service.
Commercial PPO and Indemnity	This is **not** a covered service.
Medicare HMO Blue℠	This is **not** a covered service.
Medicare PPO Blue℠	This is **not** a covered service.

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

CPT Codes

There is no specific CPT code for this service.

ICD Diagnosis Codes

Investigational for all diagnoses.

Description

Body Composition Measurement

Body composition measurements can be used to quantify and assess the relative proportions of specific body compartments such as fat and lean mass (eg, bones, tissues, organs, muscles).[1,] These measurements may be more useful in informing diagnosis, prognosis, or therapy than standard assessments (eg, body weight, body mass index) that do not identify the contributions of individual body compartments or their particular relationships with health and disease. While these body composition measurements have been most frequently utilized for research purposes, they may be useful in clinical settings to:

- Evaluate the health status of undernourished patients, those impacted by certain disease states (eg, anorexia nervosa, cachexia), or those undergoing certain treatments (eg, antiretroviral therapy, bariatric surgery).
- Evaluate the risk of heart disease or diabetes by measuring visceral fat versus total body fat.
- Assess body composition changes related to growth and development (eg, infancy, childhood), aging (eg, sarcopenia), and certain disease states (eg, HIV, diabetes).
- Evaluate patients in situations where body mass index is suspected to be discordant with total fat mass (eg, body-building, edema).

A variety of techniques have been researched, including most commonly, anthropomorphic measures, bioelectrical impedance, and dual-energy x-ray absorptiometry (DXA). All of these techniques are based in part on assumptions about the distribution of different body compartments and their density, and all rely on formulas to convert the measured parameter into an estimate of body composition. Therefore, all techniques will introduce variation based on how the underlying assumptions and formulas apply to different populations of subjects (ie, different age groups, ethnicities, or underlying conditions). Techniques using anthropomorphics, bioelectrical impedance, underwater weighing, and DXA are briefly reviewed below.

Anthropomorphic Techniques

Anthropomorphic techniques for the estimation of body composition include measurements of skinfold thickness at various sites, bone dimensions, and limb circumference.[1,2,] These measurements are used in various equations to predict body density and body fat. Due to its ease of use, measurement of skinfold thickness is 1 of the most common techniques. The technique is based on the assumption that the subcutaneous adipose layer reflects total body fat but this association may vary with age and sex. Skinfold thickness measurement precision and utility can also be affected by operator experience and a lack of applicable reference data for specific patient populations or percentile extremes.

Bioelectrical Impedance

Bioelectrical impedance analysis is based on the relation between the volume of the conductor (ie, human body), the conductor's length (ie, height), the components of the conductor (ie, fat and fat-free mass), and its impedance.[1,2,] The technique involves attaching surface electrodes to various locations on the arm and foot. Alternatively, the patient can stand on pad electrodes. Estimates of body composition are based on the assumption that the overall conductivity of the human body is closely related to lean tissue. The impedance value is then combined with anthropomorphic data and certain other patient-specific parameters (eg, age, gender, ethnicity) to give body compartment measures. These measures are calculated based on device manufacturer-specific regression models, which are generally proprietary. Bioelectrical impedance measures can be affected by fat distribution patterns, hydration status, ovulation, and temperature.

Underwater Weighing
Underwater weighing requires the use of a specially constructed tank in which the subject is seated on a suspended chair.[1,] The subject is then submerged in the water while exhaling; the difference between weight in air and weight in water is used to estimate total body fat percentage. While valued as a research tool, weighing people underwater is typically not suitable for routine clinical use. This technique is based on the assumption that the body can be divided into 2 compartments with constant densities: adipose tissue, with a density of 0.9 g/cm^3, and lean body mass (ie, muscle and bone), with a density of 1.1 g/cm^3. One limitation of the underlying assumption is the variability in density between muscle and bone; eg, bone has a higher density than muscle, and bone mineral density varies with age and other conditions. Also, the density of body fat may vary, depending on the relative components of its constituents (eg, glycerides, sterols, glycolipids).

Dual-energy X-ray Absorptiometry
While the cited techniques assume 2 body compartments, DXA can estimate 3 body compartments consisting of fat mass, lean body mass, and bone mass.[1,2,] DXA systems use a source that generates x-rays at 2 energies. The differential attenuation of the 2 energies is used to estimate the bone mineral content and soft tissue composition. When 2 x-ray energies are used, only 2 tissue compartments can be measured; therefore, soft tissue measurements (ie, fat and lean body mass) can only be measured in areas in which no bone is present. DXA can also determine body composition in defined regions (ie, the arms, legs, and trunk). DXA measurements are based in part on the assumption that the hydration of fat-free mass remains constant at 73%. Hydration, however, can vary from 67% to 85% and can vary by disease state. Other assumptions used to derive body composition estimates are considered proprietary by DXA manufacturers. The use of DXA for bone mineral density assessment in patients diagnosed with or at risk of osteoporosis is addressed separately in policy #450. Vertebral fracture assessment with densitometry by DXA is addressed separately in policy #449.

Summary

Description
Using low-dose x-rays of 2 different energy levels, whole-body dual-energy x-ray absorptiometry (DXA) measures lean tissue mass, total and regional body fat, as well as bone density. DXA scans have become a tool for research on body composition (eg, as a more convenient replacement for underwater weighing). This evidence review addresses potential applications in clinical care rather than research use of the technology.

Summary of Evidence
For individuals who have a clinical condition associated with abnormal body composition who receive dual-energy x-ray absorptiometry (DXA) body composition studies, the evidence includes systematic reviews and several cross-sectional studies comparing DXA with other techniques. Relevant outcomes are symptoms and change in disease status. The available studies were primarily conducted in research settings and often used DXA body composition studies as a reference standard. Systematic reviews with meta-analyses exploring the clinical validity of DXA measurements against reference methods for the quantification of fat mass indicate strong overall agreement between these modalities, but raise concerns regarding precision and reliability in some populations, particularly those without existing clinical conditions for which risk of adverse outcomes is influenced by abnormal visceral adiposity. More importantly, no studies were identified in which DXA body composition measurements were actively used in patient management. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have a clinical condition managed by monitoring changes in body composition over time who receive serial DXA body composition studies, the evidence includes several prospective studies monitoring patients over time. Relevant outcomes are symptoms and change in disease status. The studies used DXA as a tool to measure body composition and were not designed to assess the accuracy of DXA. None of the studies used DXA findings to make patient management decisions or addressed how serial body composition assessment might improve health outcomes. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Policy History

Date	Action
11/2024	Annual policy review. References updated. Policy statements unchanged.
11/2023	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2022	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2021	Annual policy review. Policy statements unchanged.
11/2020	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2019	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2018	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
1/2016	Annual policy review. New references added.
2/2016	Annual policy review. Abbreviation in policy statement changed to DXA.
2/2015	Annual policy review. New references added.
3/2014	Annual policy review. New references added.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
12/2011	New policy describing ongoing non-coverage. Effective 12/2011.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:
Medical Policy Terms of Use
Managed Care Guidelines
Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

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