04-70000-22

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Subject: Whole Body Dual X-ray Absorptiometry (DEXA) to Determine Body Composition and Other Body Composition Techniques

Position Statement	Billing/Coding	Reimbursement	Program Exceptions	Definitions	Related Guidelines
Other	References	Updates			

DESCRIPTION:

Measurements of body composition have been used to study how lean body mass and body fat change during health and disease. Also, measurements of body compositions have provided a research tool to study the metabolic effects of aging, obesity and various wasting conditions such as occurs with AIDS or post- bariatric surgery. Skinfold thickness, waist circumference and body mass index (BMI) are used to assess body composition. A variety of techniques have been researched, including anthropomorphic measures, bioelectrical impedance, and dual energy X-ray absorptiometry (DEXA or DXA) scans. All of these techniques are based in part on assumptions regarding 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. All techniques will introduce variation based how the underlying assumptions and formulas apply to different populations of subjects (e.g., different age groups, ethnicities, or underlying conditions). Anthropomorphic, bioelectrical, underwater weighing and DEXA techniques are briefly reviewed as followed.

Anthropomorphic Techniques

Anthropomorphic techniques for the estimation of body composition include measurements of skin-fold thickness at various sites, bone dimensions, and limb circumference. These measurements are used in various equations to predict body density and body fat. Due to its ease of use, measurements of skin-fold thickness are one of the most commonly used 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 gender.

Bioelectrical Impedance

Bioelectrical impedance is based on the relationship between the volume of the conductor (e.g., the human body), the conductor's length (e.g., height), the components of the conductor (e.g., fat and fat-free mass), and its impedance. 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 combined with anthropomorphic data to give body compartment measures. This technique involves attaching surface electrodes to various locations on the arm and foot. Alternatively, the patient can stand on pad electrodes.

Underwater Weighing

Underwater weighing (UWW) has generally been considered the reference standard for body composition studies. This technique requires the use of a specially constructed tank in which the subject is seated on a suspended chair. The subject is then submerged in the water while exhaling. While valued as a research tool, UWW is not suitable for routine clinical use. UWW is based on the assumption that the body can be divided into 2 compartments with constant densities, i.e., adipose tissue with a density of 0.9gm/cm3 and lean body mass (e.g., muscle and bone) with a density of 1.1g/cm3. One limitation of the underlying assumption is the variability in density between muscle and bone; for example, bone has a higher density than muscle, and bone mineral density varies with age and other conditions. In addition, the density of body fat may vary, depending on the relative components of its constituents (e.g., glycerides, sterols, glycolipids).

DEXA

While the above techniques assume 2 body compartments, dual energy X-ray absorptiometry can estimate 3 body compartments consisting of fat mass, lean body mass, and bone mass. DEXA 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 the soft tissue composition. When 2 X-ray energies are used, only 2 tissue compartments can be measured; therefore, soft tissue measurements (e.g., fat and lean body mass) can only be measured in areas where no bone is present. DEXA also has the ability to determine body composition in defined regions, (e.g., in the arms, legs, trunk). DEXA 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% – 85%, and can be variable in certain disease states.

Summary and Analysis of Evidence: In a review Kuriyan (2018) described commonly used methods for body composition analysis and provided a brief introduction on the latest techniques available. Body composition is known to be associated with several diseases, such as cardiovascular disease, diabetes, cancers, osteoporosis and osteoarthritis. Body composition measurements are useful in assessing the effectiveness of nutritional interventions and monitoring the changes associated with growth and disease conditions. Changes in body composition occur when there is a mismatch between nutrient intake and requirement. Altered body composition is observed in conditions such as wasting and stunting when the nutritional intake may be inadequate. Overnutrition on the other hand leads to obesity. Many techniques are available for body composition assessment, which range from simple indirect measures to more sophisticated direct volumetric measurements. Some of the methods that are used today include anthropometry, tracer dilution, densitometry, dual-energy X-ray absorptiometry, air displacement plethysmography and bioelectrical impedance analysis. The methods vary in their precision and accuracy. Imaging techniques such as nuclear magnetic resonance imaging and computed tomography have become powerful tools due to their ability of visualizing and quantifying tissues, organs, or constituents such as muscle and adipose tissue. However, these methods are still considered to be research tools due to their cost and complexity of use.

Bioelectrical impedance analysis (BIA) is a relatively simple, inexpensive and non-invasive technique to measure body composition and is therefore suitable in field studies and larger surveys. Böhm and Heitmann (2023) performed an overview of BIA-derived body fat percentages (BF%) from 55 published studies of healthy populations aged 6-80 years. In addition, the relationship between body mass index (BMI) and body composition is documented in the context of BIA as a good alternative to closely differentiate which composition of the body better relates to the risk of cardiovascular diseases (CVDs)and all-cause mortality. The authors concluded that BIA-estimated percentage of BF varies greatly with population and age. BIA-estimated BF% is directly and closely related to various health outcomes such as CVDs, which is in contrast to BMI where both high and low BMIs are associated with increased risk of developing chronic diseases. Studies, among others using BIA, suggest that low BMI may reflect low muscle and high BMI fat mass (FM). BIA-derived lean and FM is directly associated with morbidity and mortality. To the contrary, BMI is rather of limited use for measuring BF% in epidemiological studies.

Elia (2013) examined body composition compared with simple anthropometry (W+H). Body composition calculated using whole-body bioelectrical impedance analysis (BIA), almost invariably with height (H) and often with weight (W), can help patient management and predict clinical outcomes. Use was made of original data and validation studies based on reference body composition methods: water dilution, densitometry, dual-energy X-ray absorptiometry, and more robust methods. Prediction of clinical outcomes, including mortality and length of hospital stay, was examined in six studies of chronic obstructive pulmonary disease and a study with multiple patient groups. Vector analysis, phase angle, multi-frequency BIA and segmental impedance were not considered. In a broad range of study populations, from neonates to older people, in health and disease, body composition calculated using BIA with simple anthropometry frequently offered no advantage over W+H alone, but in some situations it was superior and in others inferior. In predicting clinically relevant outcomes, the fat-free mass index (FFMI), established using BIA, had comparable and sometimes greater power than body mass index (BMI), but none of the reviewed papers used FFMI calculated from W+H or BMI to predict clinical outcomes. The authors concluded that a variable and generally weak evidence base was found to suggest that BIA with anthropometry is better at predicting body composition than simple anthropometry alone. No evidence was found from the reviewed studies that FFMI calculated from BIA and anthropometry was better at predicting clinical outcomes than FFMI calculated by simple anthropometry alone.

POSITION STATEMENT:

Whole body dual energy x-ray absorptiometry (DEXA, DXA) for body composition studies and testing are considered **experimental or investigational**. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

The determination of body composition in the research setting is considered **experimental or** investigational. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

BILLING/CODING INFORMATION:

There is no specific CPT or HCPCS code that describes whole body dual energy x-ray absorptiometry (DEXA/DXA) and other body composition techniques to determine body composition.

The following code may be used to describe bioelectrical impedance analysis (BIA) whole body composition assessment.

CPT Coding:

0358T	Bioelectrical impedance analysis whole body composition assessment, with interpretation and report **(investigational)**

REIMBURSEMENT INFORMATION:

Refer to section entitled **POSITION STATEMENT**.

PROGRAM EXCEPTIONS:

Federal Employee Program (FEP): Follow FEP guidelines.

State Account Organization (SAO): Follow SAO guidelines.

Medicare Advantage products:

No National Coverage Determination (NCD) and/or Local Coverage Determination (LCD) were found at the time of the last guideline reviewed date.

If this Medical Coverage Guideline contains a step therapy requirement, in compliance with Florida law 627.42393, members or providers may request a step therapy protocol exemption to this requirement if based on medical necessity. The process for requesting a protocol exemption can be found at Coverage Protocol Exemption Request.

DEFINITIONS:

No guideline specific definitions apply.

RELATED GUIDELINES:

For DEXA or DXA bone density study, see **Bone Mineral Density Studies 04-70000-21.**

For Thoracic Electrical Bioimpedance (TEB), see**Thoracic Electrical Bioimpedance (TEB) 01-93000-29.**

OTHER:

None applicable.

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COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 10/24/24.

GUIDELINE UPDATE INFORMATION:

03/15/04	New Medical Coverage Guideline.
12/15/04	Scheduled review. No change in investigational status. Updated references.
01/01/06	Scheduled review. No change in investigational status. Updated references.
09/15/06	Scheduled review. No change in investigational status. Added cross-reference to the Bone Mineral Density Studies Medical Coverage Guideline. Updated references.
08/15/07	Annual review, investigational status maintained, guideline reformatted, references updated.
09/15/08	Scheduled review. No change in position statement. Updated references. Added investigational statement back to ICD-9 diagnoses codes that support medical necessity.
01/01/09	Annual HCPCS coding update: deleted code 0028T.
09/15/09	Annual review. Added “and other body composition techniques” to MCG subject. Revised whole body DEXA position statement. Added position statement for other body composition techniques. Added related guideline link for thoracic electrical bioimpedance (TEB) guideline. Updated references.
09/15/11	Annual review; maintain experimental or investigational position statement. Updated references.
12/15/13	Annual review; maintain experimental or investigational position statement. Add Medicare Advantage products program exception. Updated references.
07/01/14	Quarterly HCPCS update; added 0358T.
11/01/15	Revision: ICD-9 Codes deleted.
01/01/16	Annual HCPCS code update. Revised 0358T code descriptor.
03/15/17	Revision; updated references.
11/15/19	Review; no change to position statement.
10/15/21	Review; revised position statement. Updated references.
11/15/23	Review; no change to position statement. Updated references.
11/15/24	Review; no change to position statement. Updated references.