**Cardiac Output Monitoring by Thoracic Electrical Bioimpedance (TEB) (NCD 20.16)**

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<tr>
<th>Policy Number</th>
<th>Approved By</th>
<th>Current Approval Date</th>
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<td>20.16</td>
<td>UnitedHealthcare Medicare Reimbursement Policy Committee</td>
<td>10/08/2014</td>
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**IMPORTANT NOTE ABOUT THIS REIMBURSEMENT POLICY**

This policy is applicable to UnitedHealthcare Medicare Advantage Plans offered by UnitedHealthcare and its affiliates.

You are responsible for submission of accurate claims. This reimbursement policy is intended to ensure that you are reimbursed based on the code or codes that correctly describe the health care services provided. UnitedHealthcare reimbursement policies use Current Procedural Terminology (CPT®*), Centers for Medicare and Medicaid Services (CMS), or other coding guidelines. References to CPT or other sources are for definitional purposes only and do not imply any right to reimbursement.

This reimbursement policy applies to all health care services billed on CMS 1500 forms and, when specified, to those billed on UB04 forms (CMS 1450). Coding methodology, industry-standard reimbursement logic, regulatory requirements, benefits design and other factors are considered in developing reimbursement policy. This information is intended to serve only as a general resource regarding UnitedHealthcare’s reimbursement policy for the services described and is not intended to address every aspect of a reimbursement situation. Accordingly, UnitedHealthcare may use reasonable discretion in interpreting and applying this policy to health care services provided in a particular case. Further, the policy does not address all issues related to reimbursement for health care services provided to UnitedHealthcare enrollees. Other factors affecting reimbursement may supplement, modify or, in some cases, supersede this policy. These factors may include, but are not limited to: legislative mandates, the physician or other provider contracts, and/or the enrollee’s benefit coverage documents. Finally, UnitedHealthcare strives to minimize these variations.

UnitedHealthcare may modify this reimbursement policy at any time by publishing a new version of the policy on this Website. However, the information presented in this policy is accurate and current as of the date of publication.

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Summary
Overview
Thoracic electrical bioimpedance (TEB) devices, a form of plethysmography, monitor cardiac output by non-invasively measuring hemodynamic parameters, including: stroke volume, systemic vascular resistance, and thoracic fluid status. Under a previous coverage determination, effective for services performed on and after July 1, 1999, use of TEB was covered for the "noninvasive diagnosis or monitoring of hemodynamics in patients with suspected or known cardiovascular disease." In reconsidering this policy, the Centers for Medicare & Medicaid Services (CMS) concluded that this use was neither sufficiently defined nor supported by available clinical literature to offer the guidance necessary for practitioners to determine when TEB would be covered for patient management. Therefore, CMS revised its coverage policy language in response to a request for reconsideration to offer more explicit guidance and clarity for coverage of TEB based on a complete and updated literature review.

Reimbursement Guidelines
Nationally Covered Indications
Effective for services performed on and after January 23, 2004, TEB is covered for the following uses:

1. Differentiation of cardiogenic from pulmonary causes of acute dyspnea when medical history, physical examination, and standard assessment tools provide insufficient information, and the treating physician has determined that TEB hemodynamic data are necessary for appropriate management of the patient.
2. Optimization of atrioventricular (A/V) interval for patients with A/V sequential cardiac pacemakers when medical history, physical examination, and standard assessment tools provide insufficient information, and the treating physician has determined that TEB hemodynamic data are necessary for appropriate management of the patient.
3. Monitoring of continuous inotropic therapy for patients with terminal congestive heart failure, when those patients have chosen to die with comfort at home, or for patients waiting at home for a heart transplant.
4. Evaluation for rejection in patients with a heart transplant as a predetermined alternative to a myocardial biopsy. Medical necessity must be documented should a biopsy be performed after TEB.
5. Optimization of fluid management in patients with congestive heart failure when medical history, physical examination, and standard assessment tools provide insufficient information, and the treating physician has determined that TEB hemodynamic data are necessary for appropriate management of the patient.

Nationally Non-Covered Indications
1. TEB is non-covered when used for patients:
   a. With proven or suspected disease involving severe regurgitation of the aorta;
   b. With minute ventilation (MV) sensor function pacemakers, since the device may adversely affect the functioning of that type of pacemaker;
   c. During cardiac bypass surgery; or,
   d. In the management of all forms of hypertension (with the exception of drug- resistant hypertension as outlined below).
2. All other uses of TEB not otherwise specified remain non-covered.
Other
Medicare Administrative Contractors have discretion to determine whether the use of TEB for the management of drug-resistant hypertension is reasonable and necessary. Drug resistant hypertension is defined as failure to achieve goal blood pressure in patients who are adhering to full doses of an appropriate 3-drug regimen that includes a diuretic. Effective November 24, 2006, after reconsideration of Medicare policy, CMS will continue current Medicare policy for TEB.

CPT/HCPCS Codes

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<th>Code</th>
<th>Description</th>
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<tr>
<td>93701</td>
<td>Bioimpedance-derived physiologic cardiovascular analysis</td>
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References Included (but not limited to):

**CMS NCD**
NCD 20.16 Cardiac Output Monitoring by Thoracic Electrical Bioimpedance (TEB)

**CMS LCD(s)**
Numerous LCDs

**CMS Article(s)**
Numerous Articles

**UnitedHealthcare Medicare Advantage Coverage Summaries**
Cardiovascular Diagnostic Procedures

**UnitedHealthcare Medical Policies**
Electrical Bioimpedance For Cardiac Output Measurement

History

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<tr>
<th>Date</th>
<th>Revisions</th>
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| 10/08/2014 | • Annual review  
|           | • Administrative updates     |
| 09/11/2013 | Administrative updates       |
| 04/25/2012 | Administrative updates       |