

Medical Policy

Policy: 200908

Initial Effective Date: 08/27/2009

SUBJECT: Thoracic Electrical Bioimpedance

Annual Review Date: 10/02/2020

Last Revised Date: 10/02/2020

Definition: Thoracic electrical bioimpedance (TEB) is a noninvasive measure of cardiac output that detects changes in electrical impedance as blood is pumped into the aorta. Electrodes attached to the neck and chest transmit a small electrical current through the thoracic cavity. A second set of electrodes, placed alongside the first set, detect changes in impedance caused by intrathoracic phenomena, such as intracardiac blood flow. Blood pumped into the aorta causes a decrease in impedance, which is proportional to the volume of blood pumped. Cardiac output can be calculated based upon the magnitude of this decrease in impedance. TEB is suggested to provide a measurement of cardiac output similar to invasive techniques but without the risks of arterial or cardiac catheterization.

Medical Necessity: The Company considers TEB (CPT Code 93701) **medically necessary** and eligible for reimbursement providing that *all* of the following medical criteria are met:

- Assessment of cardiac function when the medical history, physical examination, and standard assessment tools cannot provide adequate clinical information; and
- Testing is required for proper management in the presence of *at least one* of the following:
 1. Primary cause of acute dyspnea uncertain (cardiogenic or pulmonary); or
 2. Required optimization of atrioventricular (A/V) interval with A/V sequential cardiac pacemakers; or
 3. Outpatient monitoring of continuous inotropic therapy in individuals with end stage congestive heart failure (CHF) in hospice care or those awaiting heart transplant; or
 4. Optimization of decompensated CHF fluid management cannot be achieved; or
 5. Evaluation for cardiac rejection following heart transplantation in lieu of myocardial biopsy;

AND

At least one of the following clinical conditions is present:

- Heart failure
- Acute respiratory failure
- Dyspnea
- Orthopnea
- Shortness of breath
- Heart replaced by transplant
- Fitting and adjustment of cardiac pacemaker

Medical Policy

Frequency limitations: The Company limits the frequency of TEB to one in a one day-time period. Repeat tests on different days will be considered medically necessary and eligible for reimbursement only when indicated by changes in signs, symptoms, or medical status as documented in the medical record.

NOTE: The Company considers TEB **not medical necessary** and **not** eligible for reimbursement when used to monitor patients with **any** of the following, and for all other uses:

- Proven or suspected disease involving severe regurgitation of the aorta; or
- During cardiac bypass surgery; or
- Minute ventilation sensor function pacemakers (may adversely affect the function of that type of pacemaker).

Documentation Requirements:

The Company reserves the right to request additional documentation as part of its coverage determination process. The Company may deny reimbursement when it has determined that the services performed were not medically necessary, investigational or experimental, not within the scope of benefits afforded to the member, and/or a pattern of billing or other practice has been found to be either inappropriate or excessive. Additional documentation supporting medical necessity for the services provided must be made available upon request to the Company. Documentation requested may include patient records, test results, and/or credentials of the provider ordering or performing a service. The Company also reserves the right to modify, revise, change, apply, and interpret this policy at its sole discretion, and the exercise of this discretion shall be final and binding.

NOTE: After reviewing the relevant documentation, the Company reserves the right to apply this policy to the service, or procedure, supply, product, or accommodation performed or furnished regardless of how the service, or procedure, supply, product, or accommodation was coded by the Provider.

Coverage may differ for Medicare Advantage plan members; please see any applicable national and/or local coverage determinations for details. This information may be available at the Centers for Medicare & Medicaid Services (CMS) website.

Medical Policy

Sources of Information:

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- Centers for Medicare & Medicaid Services (CMS). National coverage determination (NCD) for cardiac output monitoring by thoracic electrical bioimpedance (TEB) (20.16). Version number 3. Effective November 24, 2006.
- Harford M, Clark SH, Smythe JF, Gerry S, Villarroel M, Jorge J, ... Watkinson P. (2019). Non-invasive stroke volume estimation by transthoracic electrical bioimpedance versus Doppler echocardiography in healthy volunteers. *J Med Eng Technol*, 43(1):33–37.
- Saugel B, Cecconi M, Wagner JY, Reuter DA. (2015). Noninvasive continuous cardiac output monitoring in perioperative and intensive care medicine. *Br J Anaesth*, 114(4):562–575.
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- Viigimaa M, Talvik A, Wojciechowska W, Kawecka-Jaszcz K, Toft I, Stergiou GS, ... Coca A. (2013). Identification of the hemodynamic modulators and hemodynamic status in uncontrolled hypertensive patients. *Blood Press*, 22(6):362–370.
- Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, Colvin MM, ... Westlake C. (2017). 2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. *J Card Fail*, 23(8):628–651.

Applicable Code(s):	
CPT:	93701
HCPCS:	N/A
ICD10 Procedure Codes:	N/A