

Corporate Medical Policy

Cardiac (Heart) Transplantation

File Name:	cardiac_heart_transplantation
Origination:	1/1986
Last CAP Review:	6/2019
Next CAP Review:	6/2020
Last Review:	8/2019

Description of Procedure or Service

A heart transplant and a retransplant consists of replacing a diseased heart with a healthy donor heart. Transplantation is used for patients with refractory end-stage cardiac disease.

In the United States, approximately 6.5 million people 20 year of age or older have heart failure and 309,000 die each year from this condition. The reduction of cardiac output is considered to be severe when systemic circulation cannot meet the body's needs under minimal exertion.

Heart failure may be due to a number of differing etiologies, including ischemic heart disease, cardiomyopathy, or congenital heart defects. The leading indication for heart transplant has shifted over time from ischemic to non-ischemic cardiomyopathy. During the period 2009 to 2014, nonischemic cardiomyopathy was the dominant underlying diagnosis among patients 18-39 years (64%) and 40-59 years (51%) undergoing transplant operations. Ischemic cardiomyopathy was the dominant underlying primary diagnosis among the heart transplant recipients 60-69 years (50%) and 70 years and older (55%). Overall, ischemic cardiomyopathy is the underlying heart failure diagnosis in approximately 40% of men and 20% of women who receive a transplant. Approximately 3% of the heart transplants during this time period were in adults with congenital heart disease.

Innovations in medical and device therapy for patients with advanced heart failure have improved the survival of patients awaiting heart transplantation. The demand for heart transplants far exceeds the availability of donor organs, and the length of time patients are on the waiting list for transplants has increased. According to data from the Organ Procurement and Transplantation Network (OPTN), in 2017, a total of 3244 heart transplants were performed in the United States. As of July 2018, there were 4003 patients on the waiting list for a heart transplant. The chronic shortage of donor hearts has led to the prioritization of patients awaiting transplantation to ensure greater access for individuals most likely to derive benefit. Prioritization criteria are issued by OPTN and fulfilled through a contract with the United Network for Organ Sharing (UNOS).

From 2008 to 2015, approximately 4% of heart transplants were repeat transplantations. Heart retransplantation raises ethical issues due to the lack of sufficient donor hearts for initial transplants. UNOS does not have separate organ allocation criteria for repeat heart transplant recipients.

Regulatory Status

Heart transplantation is a surgical procedure and, therefore, is not subject to regulations by the U.S. Food Na Drug Administration.

The U.S. Food and Drug Administration regulates human cells and tissues intended for implantation, transplantation, or infusion through the Center for Biologics Evaluation and

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Research, under Code of Federal Regulation title 21. Heart transplants are included in these regulations.

******Note: This Medical Policy is complex and technical. For questions concerning the technical language and/or specific clinical indications for its use, please consult your physician.***

Policy

BCBSNC will cover human heart transplantation when it is considered medically necessary because the medical criteria and guidelines shown below are met.

Benefits Application

This medical policy relates only to the services or supplies described herein. Please refer to the Member's Benefit Booklet for availability of benefits. Member's benefits may vary according to benefit design; therefore member benefit language should be reviewed before applying the terms of this medical policy.

Coverage is not provided for organs sold rather than donated to the recipient.

When Cardiac (Heart) Transplantation is covered

- I. Benefit eligibility is considered for **adult** patients with end-stage, irreversible, refractory, symptomatic heart disease requiring maximal continuous medical and/or mechanical support and who have:
 - A. Accepted Indications for Transplantation
 1. Hemodynamic compromise due to heart failure demonstrated by any of the following 3 bulleted items,
 - a) Maximal VO_2 (oxygen consumption) <10 ml/kg/min with achievement of anaerobic metabolism
 - b) Refractory cardiogenic shock
 - c) Documented dependence on intravenous inotropic support to maintain adequate organ perfusion, **or**
 2. Severe ischemia consistently limiting routine activity not amenable to bypass surgery or angioplasty, **or**
 3. Recurrent symptomatic ventricular arrhythmias refractory to ALL accepted therapeutic modalities
 - B. Probable Indications for Cardiac Transplantation
 1. Maximal $\text{VO}_2 <14$ ml/kg/min and major limitation of the patient's activities, **or**
 2. Recurrent unstable ischemia not amenable to bypass surgery or angioplasty, **or**
 3. Instability of fluid balance/renal function not due to patient noncompliance with regimen of weight monitoring, flexible use of diuretic drugs, and salt restriction
 - C. The following conditions are inadequate indications for transplantation unless other factors as listed above are present.
 1. Ejection fraction $<20\%$
 2. History of functional class III or IV symptoms of heart failure
 3. Previous ventricular arrhythmias
 4. Maximal $\text{VO}_2 >15$ ml/kg/min
- II. Benefit eligibility is considered for **pediatric** heart transplantation in the following clinical situations:
 - A. Patients with heart failure with persistent symptoms at rest who require one or more of the following:
 1. continuous infusion of intravenous inotropic agents, **or**
 2. mechanical ventilatory support, **or**

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3. mechanical circulatory support.
- B. Patients with pediatric heart disease with symptoms of heart failure who do not meet the above criteria but who have:
1. severe limitation of exercise and activity (if measurable, such patients would have a peak maximum VO_2 (oxygen consumption) $<50\%$ predicted for age and sex), **or**
 2. cardiomyopathies or previously repaired or palliated congenital heart disease and significant growth failure attributable to the heart disease, **or**
 3. near sudden death and/or life-threatening arrhythmias untreatable with medications or an implantable defibrillator, **or**
 4. restrictive cardiomyopathy with reactive pulmonary hypertension, **or**
 5. reactive pulmonary hypertension and potential risk of developing fixed, irreversible elevation of pulmonary vascular resistance that could preclude orthotopic heart transplantation in the future, **or**
 6. anatomical and physiological conditions likely to worsen the natural history of congenital heart disease in infants with a functional single ventricle, **or**
 7. anatomical and physiological conditions that may lead to consideration for heart transplantation without systemic ventricular dysfunction.

Retransplantation in patients with graft failure, due to either technical reasons or hyperacute rejection is considered medically necessary.

Retransplantation in patients with chronic rejection, moderate graft vasculopathy or recurrent disease is considered medically necessary when the patient meets general patient section criteria as outlined above.

When Cardiac (Heart) Transplantation is not covered

Benefit eligibility is not available when the following clinical conditions are present:

Potential contraindications subject to the judgment of the transplant center:

- Known current malignancy, including metastatic cancer
- Recent malignancy with high risk of recurrence
- Untreated systemic infection making immunosuppression unsafe, including chronic infection
- Other irreversible end-stage disease not attributed to heart or lung disease
- History of cancer with a moderate risk of recurrence
- Systemic disease that could be exacerbated by immunosuppression
- Psychosocial conditions or chemical dependency affecting ability to adhere to therapy

Policy Specific potential contraindications:

- Pulmonary hypertension that is fixed as evidenced by pulmonary vascular resistance (PVR) greater than 5 Woods units, or transpulmonary gradient (TPG) greater than or equal to 16 mm/Hg despite treatment
- Severe pulmonary disease despite optimal medical therapy, not expected to improve with heart transplantation*

* Some patients may be candidates for combined heart-lung transplantation—see Corporate Medical Policy titled, Heart-Lung Transplantation.

Heart transplants that require planned concurrent coronary artery bypass graft surgery are considered experimental.

Policy Guidelines

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The evidence for heart transplantation in patients who have end-stage heart failure includes case series and registry data. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related morbidity and mortality. Heart transplantation remains a viable treatment for those with severe heart dysfunction despite appropriate medical management with medication, surgery, or medical devices. Given the exceedingly poor survival rates without transplantation for these patients, evidence of posttransplant survival is sufficient to demonstrate that heart transplantation provides a survival benefit. Heart transplantation is contraindicated in patients in whom the procedure is expected to be futile due to comorbid disease or in whom posttransplantation care is expected to significantly worsen comorbid conditions. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

The evidence for individuals who have a prior heart transplant complicated by graft failure or severe dysfunction of heart requiring heart retransplant includes, case series and registry data. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related morbidity and mortality. Despite improvements in the prognosis for many patients with graft failure, cardiac allograft vasculopathy, and severe dysfunction of transplanted heart, heart retransplant remains a viable treatment for those who have exhausted other medical or surgical remedies, yet are still with severe symptoms. Given the exceedingly poor survival rates without retransplantation for patients who have exhausted other treatments, evidence of posttransplant survival is sufficient to demonstrate that heart retransplantation provides a survival benefit in appropriately selected patients. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

Individual transplant centers may differ in their guidelines, and individual patient characteristics may vary within a specific condition. In general, heart transplantation is contraindicated in patients who are not expected to survive the procedure, or in whom patient-oriented outcomes, such as morbidity or mortality, are not expected to change due to comorbid conditions unaffected by transplantation e.g., imminently terminal cancer or other disease. Further, consideration is given to conditions in which the necessary immunosuppression would lead to hastened demise, such as active untreated infection. However, stable chronic infections have not always been shown to reduce life expectancy in heart transplant patients.

The evaluation of a candidate who has a history of cancer must consider the prognosis and risk of recurrence from available information including tumor type and stage, response to therapy, and time since therapy was completed. Although evidence is limited, patients in whom cancer is thought to be cured should not be excluded from consideration for transplant. ISHLT guidelines have recommended to stratify each patient with pretransplant malignancy as to their risk of tumor recurrence and that cardiac transplantation should be considered when tumor recurrence is low based on tumor type, response to therapy and negative metastatic work-up. The guideline also recommended that the specific amount of time to wait to transplant after neoplasm remission will depend on these factors and no arbitrary time period for observation should be used.

Currently, Organ Procurement and Transplantation policy permits HIV-positive transplant candidates.

The British HIV Association and the British Transplantation Society 2017 updated guidelines on kidney transplantation in patients with HIV disease. These criteria may be extrapolated to other organs as follows:

- Adherent with treatment, particularly antiretroviral therapy
- Cluster of differentiation 4 count greater than 100 cells/mL (ideally >200 cells/mL) for at least 3 months
- Undetectable HIV viremia (<50 HIV-1 RNA copies/mL) for at least 6 months
- No opportunistic infections for at least 6 months

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- No history of progressive multifocal leukoencephalopathy, chronic intestinal cryptosporidiosis, or lymphoma.

Billing/Coding/Physician Documentation Information

This policy may apply to the following codes. Inclusion of a code in this section does not guarantee that it will be reimbursed. For further information on reimbursement guidelines, please see Administrative Policies on the Blue Cross Blue Shield of North Carolina web site at www.bcbsnc.com. They are listed in the Category Search on the Medical Policy search page.

Applicable codes: 33940, 33944, 33945, S2152

BCBSNC may request medical records for determination of medical necessity. When medical records are requested, letters of support and/or explanation are often useful, but are not sufficient documentation unless all specific information needed to make a medical necessity determination is included.

Scientific Background and Reference Sources

Some sources of information on patient selection criteria for heart transplantation are:

National Heart, Lung and Blood Institute (NHLBI) criteria published in January 1984

Medicare guidelines (Federal Register. 1987;52:10949)

"Recipient Selection for Cardiac Transplantation," by George A. Pantely. In: Cardiac Transplantation: A Manual for Health Care Professionals, J.S. Hosenpud, ed. New York: Springer-Verlag, 1991

"Selection of Patients for Cardiac Transplantation," by Andrea Hastillo and Michael L. Hess. In: Cardiac Transplantation, Mark E. Thompson, ed. Philadelphia: F.A. Davis Company, 1990

BCBSA Medical Policy Reference Manual - 7/10/98

Specialty Matched Consultant Advisory Panel 11/1999

Medical Policy Advisory Group 12/2/1999

Specialty Matched Consultant Advisory Group - 12/2001

BCBSA Medical Policy Reference Manual - 4:2002, 7.03.09

Specialty Matched Consultant Advisory Group - 11/2003

Specialty Matched Consultant Advisory Panel - 11/2005

Hunt SA, Abraham WT, Chin MH, Feldman AM, Francis GS, Ganiats TG, et al. ACC/AHA 2005 Guideline update for the diagnosis and management of chronic heart failure in the adult. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure). Retrieved 7/16/07 from http://www.guideline.gov/summary/summary.aspx?doc_id=7664&nbr=004463&string=cardiac+A+ND+transplant

BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 4/25/06

Cardiac (Heart) Transplantation

- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 8/13/09
- Specialty Matched Consultant Advisory Panel 6/2010
- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 11/11/10
- Organ Procurement and Transplantation Network (OPTN). Retrieved on May 19, 2011 from <http://optn.transplant.hrsa.gov/>
- Specialty Matched Consultant Advisory Panel review 6/2011
- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 11/10/11
- Medical Director review 1/2012
- Specialty Matched Consultant Advisory Panel review 6/2012
- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 11/8/12
- United Network for Organ Sharing (UNOS). Policy 3.7. Organ distribution: allocation of thoracic organs. UNOS Policies and Bylaws. 2009 (June 26). Retrieved from <http://optn.transplant.hrsa.gov/governance/policies/>
- Rosenthal D, Chrisant MR, Edens E et al. International Society for Heart and Lung Transplantation:
Practice guidelines for management of heart failure in children. J Heart Lung Transplant 2004; 23(12):1313-33. Retrieved from <http://www.jhltonline.org/article/PIIS1053249804002001/fulltext>
- Costanzo MR, Dipchand A, Starling R et al. The International Society of Heart and Lung Transplantation Guidelines for the care of heart transplant recipients. J Heart Lung Transplant 2010; 29(8):914-56. Retrieved from [http://www.jhltonline.org/article/S1053-2498\(10\)00358-X/fulltext](http://www.jhltonline.org/article/S1053-2498(10)00358-X/fulltext)
- Specialty Matched Consultant Advisory Panel review 6/2013
- Medical Director review 6/2013
- Organ Procurement and Transplantation Network (OPTN). Reviewed December 20, 2013. <http://optn.transplant.hrsa.gov/>
- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 11/14/13
- Specialty Matched Consultant Advisory Panel review 6/2014
- Medical Director review 6/2014
- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 11/13/14
- Specialty Matched Consultant Advisory Panel review 6/2015
- Medical Director review 6/2015
- BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 11/12/15
- Organ Procurement and Transplantation Network (OPTN). 2015;

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<http://optn.transplant.hrsa.gov/latestData/viewDataReports.asp>. Accessed February 2, 2016.

(OPTN) OPaTN. Organ Procurement and Transplantation Network: Policies (last updated November 2, 2015). 2015;
http://optn.transplant.hrsa.gov/ContentDocuments/OPTN_Policies.pdf#nameddest=Policy_09. Accessed February 2, 2016.

Fischer S, Glas KE. A review of cardiac transplantation. *Anesthesiol Clin*. Jun 2013;31(2):383-403. PMID 23711649

Rana A, Gruessner A, Agopian VG, et al. Survival benefit of solid-organ transplant in the United States. *JAMA Surg*. Mar 1 2015;150(3):252-259. PMID 25629390

Specialty Matched Consultant Advisory Panel review 6/2016

Medical Director review 6/2016

Specialty Matched Consultant Advisory Panel review 6/2017

Medical Director review 6/2017

OPTN, Organ Procurement and Transplantation Network: Policies (last updated June 1, 2017), 2017; http://optn.transplant.hrsa.gov/media/1200/optn_policies.pdf Accessed August 3, 2017.

BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 9/2017

Medical Director review 9/2017

Specialty Matched Consultant Advisory Panel review 6/2018

Medical Director review 6/2018

BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 8/2018

Medical Director review 8/2018

BCBSA Medical Policy Reference Manual [Electronic Version]. 7.03.09, 8/2018

Specialty Matched Consultant Advisory Panel review 6/2019

Medical Director review 6/2019

Policy Implementation/Update Information

1/86	Original Policy: Generally accepted medical practice on an individual consideration basis
8/88	Reviewed: Eligible for coverage on an individual consideration basis
11/90	Revised: Coverage language
9/93	Revised: Patient selection criteria citations added to coverage section
11/96	Reaffirmed: National Association reviewed 7/96

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- 9/99 Reformatted, Medical Term Definitions added.
- 12/99 Reaffirmed, Medical Policy Advisory Group
- 10/00 System coding changes.
- 1/01 Revised. Statements regarding the peak oxygen consumption levels under "When it is covered" and "When it is not covered" were removed.
- 12/01 Specialty Matched Consultant Advisory Group review. Changes made to When Cardiac (Heart) Transplant is not covered.
- 11/03 Biannual policy review. Specialty Matched Consultant Advisory Group review. Removed need for documentation of less than 50% survival over the next year for eligibility criteria. Changes made to noncovered section to include information on morbid obesity, smoking and drug addiction status Format changes for consistency.
- 4/04 Added code S2152 to Billing/Coding section.
- 1/6/05 Added code 33944 to Billing/Coding section.
- 11/17/05 Biennial review. Specialty Matched Consultant Advisory Panel review 11/7/05. In the section "When Cardiac Transplantation is not covered," the statement "insulin-dependent" removed from item 5 and "severe" added to description of complications. Item 6 regarding hypertension was deleted. No changes to coverage criteria.
- 11/19/07 Criteria for When Cardiac Transplantation is covered was revised. Added criteria for retransplantation. In the When it is not covered section, deleted Item 1 (age limitation) and Item 2 (myocardial infiltrative or inflammatory disease). Item 12 was moved to item 16 and revised to state "Pulmonary infarction or embolism during the preceding eight weeks is considered a relative contra-indication. Item 19 moved to Item 17 and revised to state "Heart transplants that require planned concurrent coronary artery bypass graft surgery." Updated medical terms and references. Specialty Matched Consultant Advisory Panel review meeting 10/29/07. No change to policy statement. (adn)
- 12/7/09 Medical criteria reformatted into numbered lists. Information regarding pediatric heart transplantation added to the When it is Covered section. Specialty Matched Consultant Advisory Panel review meeting 10/30/09. (adn)
- 8/3/2010 Specialty Matched Consultant Advisory Panel review meeting. Medical Policy number removed. No changes to policy statement.(mco)
- 7/19/11 Description section updated. References updated. Extensively revised the "When Covered" section for **adult** patients. Extensively revised the "When Not Covered" section. The contraindications to heart transplantation have been reformatted into "Absolute Contraindications" and "Relative Contraindications". **Absolute** contraindications include: Known malignancy, including metastatic cancer; Recent malignancy with high risk of recurrence; Untreated systemic infection making immunosuppression unsafe, including chronic infection; or Other irreversible end-stage disease not attributed to heart disease. **Relative** contraindications include: Pulmonary hypertension that is fixed as evidenced by pulmonary vascular resistance (PVR) greater than 5 Woods units, or trans-pulmonary gradient (TPG) greater than or equal to 16mm/Hg; Severe pulmonary disease despite optimal medical therapy, not expected to improve with heart transplantation; History of cancer with a moderate risk of recurrence; Systemic disease that could be exacerbated by immunosuppression; or

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- Psychosocial or dependence affecting ability to adhere to therapy conditions. Policy Guidelines updated. Specialty Matched Consultant Advisory Panel review 6/2011.(mco)
- 2/7/12 Revised “When not Covered” section. Absolute and Relative contraindications have been combined and revised to delegate contraindications that are “subject to the judgement of the transplant center” or “policy specific.” References updated. Policy Guidelines updated. Medical Director review. (mco)
- 7/10/12 Specialty Matched Consultant Advisory Panel review 6/2012. No changes to Policy Statements or clinical criteria. (mco)
- 1/29/13 References updated. Description section updated. No changes to Policy Statements. (mco)
- 7/16/13 Specialty Matched Consultant Advisory Panel review 6/2013. Medical Director review 6/2013. References updated. (mco)
- 1/14/14 Description section updated. Policy Guidelines updated. No changes to Policy Statements. References updated. (mco)
- 7/15/14 Specialty Matched Consultant Advisory Panel review 6/2014. Medical Director review 6/2014. No changes to Policy Statements. (mco)
- 3/10/15 Description section updated. References updated and expired links deleted or replaced with updated links. Policy Guideline section updated. Policy statement unchanged. (td)
- 9/1/15 Specialty Matched Consultant Advisory Panel review 6/2015. Medical Director review 6/2015. Policy Statement remains unchanged. (td)
- 4/1/16 Description section revised. Policy Guidelines section updated. References updated. (td)
- 7/26/16 Specialty Matched Consultant Advisory Panel review 6/2016. Medical Director review 6/2016.
- 7/28/17 Specialty Matched Consultant Advisory Panel review 6/2017. Medical Director review 6/2017. (jd)
- 10/13/17 Description section updated. Policy Guidelines extensively updated; no change to policy intent. Reference updated. Medical Director review. (jd)
- 7/27/18 Specialty Matched Consultant Advisory Panel review 6/2018. Medical Director review 6/2018. (jd)
- 9/28/18 Description section, policy guidelines, references updated. No change to policy intent. Medical Director review 8/2018. (jd)
- 7/1/19 Minor revisions, no change to policy intent. Specialty Matched Consultant Advisory Panel 6/2019. Medical Director review 6/2019. (jd)

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and diagnosis of disease. Medical practices and knowledge are constantly changing and BCBSNC reserves the right to review and revise its medical policies periodically.