Cardiac Rehabilitation (Phase II Outpatient)

Coverage Policy

Coverage for cardiac rehabilitation (CR) varies across plans. Refer to the customer's benefit plan document for coverage details.

If benefit coverage is available for cardiac rehabilitation, then the following conditions apply.

An electrocardiographically-monitored program of outpatient cardiac rehabilitation is considered medically necessary within six months of ANY of the following events when it is individually prescribed by a physician AND a formal exercise stress test is completed following the event and prior to the initiation of the program:

- acute myocardial infarction (MI)
- coronary artery bypass grafting (CABG)
- percutaneous coronary vessel remodeling
- valve replacement or repair
- heart or heart-lung transplant
- coronary artery disease (CAD) associated with chronic stable angina that has failed to respond adequately to pharmacotherapy and is interfering with the ability to perform age-related activities of daily living and/or impairing functional abilities
- heart failure that has failed to respond adequately to pharmacotherapy and is interfering with the ability to perform age-related activities of daily living and/or impairing functional abilities
When medical necessity for outpatient cardiac rehabilitation has been established, the following coverage guidelines by risk * stratification apply based upon the metabolic equivalents (METS) achieved in the qualifying formal exercise stress test that was performed:

- high risk: up to a total of 36 sessions
- intermediate risk: up to a total of 24 sessions
- low risk: up to a total of 6 sessions

*See pages four and five in the General Background for definitions of risk categories

Additional cardiac rehabilitation services are considered medically necessary, based on the above listed criteria, when the individual has ANY of the following conditions:

- another documented myocardial infarction or extension of initial infarction
- another cardiovascular surgery or angioplasty
- new evidence of ischemia on an exercise test, including thallium scan
- new, clinically significant coronary lesions documented by cardiac catheterization

Cardiac rehabilitation programs without electrocardiographic (ECG) monitoring or attendant physician supervision are considered not medically necessary. In addition, non-ECG monitored cardiac rehabilitation programs are specifically excluded under many medical benefit plans.

Phase III or IV cardiac rehabilitation programs are not covered under most benefit plans because they are specifically excluded, educational and training in nature, and not medically necessary. Services that are education and training in nature are specifically excluded under many benefit plans. Please refer to the customer’s benefit plan document for coverage details.

**Overview**

This Coverage Policy addresses cardiac rehabilitation services that are provided on an outpatient basis.

**General Background**

The 2005 American Heart Association/American Association of Cardiovascular and Pulmonary Rehabilitation (AHA/AACVPR) scientific statement defines cardiac rehabilitation (CR) as coordinated, multifaceted interventions designed to optimize a cardiac patient’s physical, psychological, and social functioning, in addition to stabilizing, slowing, or even reversing the progression of the underlying atherosclerotic processes, thereby reducing morbidity and mortality (Leon, et al., 2005).

The candidates for CR/secondary prevention programs are patients who recently have had a myocardial infarction (MI); have undergone coronary artery bypass graft surgery (CABG) or percutaneous coronary interventions; heart transplant candidates or recipients; or patients with stable chronic heart failure, peripheral arterial disease with claudication, or other forms of cardiovascular disease or cardiac surgical procedures such as valvular heart disease (Leon, et al., 2005).

CR/secondary prevention programs currently include baseline patient assessments, nutritional counseling, aggressive risk-factor management (i.e., lipids, hypertension, weight, diabetes, and smoking), psychosocial and vocational counseling, and physical activity counseling and exercise training. Additionally, CR programs include the appropriate use of cardioprotective drugs that have evidence-based efficacy for secondary prevention (Leon, et al., 2005).

The early CR programs initiated mobilization after a myocardial infarction and were referred to as Phase I or inpatient CR. The goal was to condition the patient to safely carry out activities of daily living following discharge. Such programs entailed prescribing activity in rigid steps with successively higher metabolic equivalents (METs).
Comprehensive CR programs eventually grew to include four phases (Thompson, 2015; Goroll and Mulley; 2009):

- **Phase I (Inpatient):** Inpatient rehabilitation, usually lasting for the duration of hospitalization for an acute coronary event or surgery. It emphasizes a gradual, progressive approach to exercise and an education program that helps the patient understand the disease process, the rehabilitation process, and initial preventive efforts to slow the progression of disease. Submaximal exercise testing before hospital discharge is done to provide important prognostic information and help restore patient confidence.

- **Phase II (Outpatient Electrocardiographically-Monitored):** Multifaceted outpatient rehabilitation, lasting from hospital discharge to 2–12 weeks later. Phase II CR emphasizes safe physical activity to improve conditioning with continued behavior modification aimed at smoking cessation, weight loss, healthy eating, and other factors to reduce disease risk (see below).

- **Phase III (Supervised):** Supervised rehabilitation, lasting 6–12 months. Establishes a prescription for safe exercise that can be performed at home or in a community service facility, such as a senior center, and continues to emphasize risk-factor reduction.

- **Phase IV (Maintenance/Follow-Up):** This is usually an indefinite program. The goal is to encourage lifelong adherence to the healthy habits established during Phase III. Follow-up visits can occur at 6–12 month intervals. Blood pressure and pulse measurement, serum lipid levels, and even repeat maximal exercise tolerance tests can provide useful feedback to the patient and indicate areas that may require lifestyle changes to minimize coronary.

**Phase II (Outpatient Electrocardiographically-Monitored) Cardiac Rehabilitation (CR)**

Phase II CR is described by the U.S. Public Health Service as consisting of “comprehensive, long term programs involving medical evaluation, prescribed exercise, cardiac risk factor modification, education, and counseling.” These programs “are designed to limit the physiologic and psychological effects of cardiac illness, reduce the risk of sudden death or reinfarction, control cardiac symptoms, stabilize or reverse the atherosclerotic process, and enhance the psychosocial and vocational status of selected patients.” CR programs aim to reduce subsequent cardiovascular related morbidity and mortality. Phase II CR refers to outpatient, medically supervised programs that provide electrocardiogram (ECG) monitoring. The programs are typically initiated within one to three weeks after hospital discharge and generally administered within the six months following discharge from the hospital (Wenger, et al., 1995).

It is recommended that patients referred to CR undergo a symptom-limited exercise tolerance/stress test before entering the CR program. The exercise test is required to exclude important symptoms, ischemia, or arrhythmias that might require other interventions before exercise training. The exercise test also serves to establish baseline exercise capacity and to determine maximum heart rate for use in preparing an exercise prescription. These tests are generally done with the patient on their usual medications to mimic the heart rate response likely to occur during exercise training. Maximal heart rate is usually determined by an exercise stress test using the form of exercise anticipated (e.g., treadmill testing for a walking/jogging program or bicycle ergometer testing for a cycling program). Bicycle ergometry should be considered for individuals with balance deficits, mild neurologic impairment, or orthopedic limitations (Thompson, 2015; Goroll and Mulley, 2009; Davis, 2008; Ades and Hambrecht, 2007).

The prescribed activity level remains relatively low with Phase II CR. Exercise intensity is regulated by monitoring peak heart rate, which should not exceed the level achieved during the predischarge submaximal exercise test. The exercise training modalities used during Phase II, as in Phase I, usually consist of walking and stationary bicycling. The patient and family are educated about coronary risk (Goroll and Mulley; 2009).

Most Phase II exercise programs consist of three sessions per week for 12 weeks. However, the frequency and duration may be impacted by the level of cardiac risk stratification and the degree of limitation of exercise during the exercise stress test prior to initiation of rehabilitation. Risk stratification is used to identify patients at risk for death or reinfactation and to provide guidelines for the rehabilitative process.
The exercise program design is supervised by a physician, monitored by electrocardiographic equipment to ensure patient safety and conducted by professionals trained in emergency treatment, in facilities with emergency equipment available. Patients are evaluated to determine eligibility, risk category and exercise program. Exercise prescriptions are based on risk factors, and exercise capacity measured by heart rate and oxygen consumption. Exercise training is the principal component of the program, as it results in increased peak exercise capacity, usually expressed in METS. The MET is the total oxygen requirement of the body, with one MET equal to 3.5 milliliters of oxygen consumed per kilogram of body weight per minute. Exercise training is aimed to improve MET capacity, resulting in improved oxygen delivery and extraction, by exercising skeletal muscles, decreasing the cardiovascular requirements of exercise and increasing the amount of work that can be done before ischemia (i.e., blood deficiency) occurs.

Prior to initiating CR, it is recommended there be documentation that the patient underwent exercise stress testing and did not experience ANY of the following:

- severe dyspnea at low exercise workload (< 5 METS)
- angina at low exercise workload (< 5 METS)
- heart rate > 120 beats per minute
- malignant ventricular arrhythmias
- ST segmental changes at low exercise workload (< 5 METS)
- significant ischemia at low work rates (< 5 METS)
- decreased systolic blood pressure during exercise

Contraindications to CR include the following (Ades and Hambrecht, 2007):

- marked progressive worsening of exercise tolerance suggesting an acute pathologic process
- worsening of dyspnea during exercise over the previous three to five days
- uncontrolled diabetes
- acute systemic illness or fever
- recent embolism
- acute pericarditis
- moderate to severe aortic stenosis
- MI within three weeks
- new onset of atrial fibrillation
- ventricular dysfunction, with a history of previous heart illness prior to a recent cardiac event
- acute thrombophlebitis
- unstable ischemia
- uncontrolled arrhythmias
- decompensated congestive heart failure (CHF)

Cardiac Risk Classification
The medically necessary frequency and duration of CR is determined by the individual's level of cardiac risk stratification based on the exercise stress test (Ades and Hambrecht, 2007; Wenger, et al., 1995).

High-Risk Patients

- High-risk patients are defined as having ANY of the following:
  - exercise test limited to less than or equal to five metabolic equivalents (METS)
  - marked exercise induced ischemia, as indicated by either anginal pain or 2 mm or more ST depression by ECG, or symptoms such as shortness of breath related to cardiac ischemia
  - severely depressed left ventricular function (i.e., ejection fraction less than or equal to 30%)
  - resting complex ventricular arrhythmia
  - ventricular arrhythmia appearing or increasing with exercise or occurring in the recovery phase of stress testing
  - decrease in systolic blood pressure of 15–20 mm Hg or more with exercise
- recent MI, less than six months, that was complicated by serious ventricular arrhythmia
- survivor of sudden cardiac arrest
- shock or CHF during a recent (i.e., less than three months) MI

Program description for high-risk patients:
- up to 36 sessions (e.g., 3 times/week for 12 weeks) of supervised exercise with continuous telemetry monitoring
- educational program for risk factor/stress reduction
- creation of an individual outpatient exercise program that can be self-monitored and maintained
- If no clinically significant arrhythmia is documented during the first three weeks of the program, the provider may have the patient complete the remaining portion without telemetry monitoring.

Intermediate-Risk Patients
- Intermediate-risk patients are defined as having ANY of the following:
  - exercise test limited to six to nine METS
  - ischemic ECG response to exercise of less than 2 mm of ST depression
  - uncomplicated MI, CAGB, or angioplasty AND a post-cardiac event maximal functional capacity of eight METS or less on ECG exercise test

Program description for intermediate-risk patients:
- up to 24 sessions of exercise training without continuous ECG monitoring
- geared to define an ongoing exercise program that is self-administered

Low-risk patients are defined as having exercise test greater than nine METS.

Program description for low-risk patients:
- up to six one-hour sessions involving risk-factor reduction education and supervised exercise to show safety and define a home program (e.g., three times/week for a total of two weeks or two sessions per week for three weeks)

Centers for Medicare and Medicaid Services (CMS)
CMS currently covers CR for the following indications (CMS, 2010):
- a documented acute myocardial infarction (AMI) within the preceding 12 months
- CAGB surgery
- stable angina pectoris
- heart valve replacement/repair
- percutaneous transluminal coronary angioplasty (PTCA) or coronary artery stenting
- heart or heart/lung transplant.

CMS lists the following cardiac rehabilitation program requirements:
- Physician-prescribed exercise each day cardiac rehabilitation items and services are furnished.
- Cardiac risk factor modification, including education, counseling, and behavioral intervention at least once during the program, tailored to individual needs.
- Psychosocial assessment; outcomes assessment; and an individualized treatment plan detailing how components are utilized for each individual.
In 2010, CMS updated criteria on the frequency and duration of cardiac rehabilitation services stating that cardiac rehabilitation items and services must be furnished in a physician’s office or a hospital outpatient setting. All settings must have a physician immediately available and accessible for medical consultations and emergencies at all time items and services are being furnished under the program. Cardiac rehabilitation program sessions are limited to a maximum of two 1-hour sessions per day for up to 36 sessions over up to 36 weeks, with the option for an additional 36 sessions over an extended period of time if approved by the Medicare contractor.

**Literature Review**

Clark et al. (2005), from the University of Alberta Evidence-based Practice Center for the AHRQ Technology Assessment Program, conducted a meta-analysis of coronary heart disease management programs. The purpose of the study was to determine the effectiveness of secondary cardiac prevention programs with and without exercise components. The interventions tested in the trials, and frequency and duration of the interventions, varied substantially among the studies. The studies enrolled highly selected patient populations. After reviewing 46 randomized controlled trials in 188,821 patients with coronary artery disease, the authors concluded that secondary prevention programs for patients already diagnosed with cardiac disease improved processes of care, enhanced quality of life/function status, reduced recurrent myocardial infarctions, reduced hospitalizations, and reduced long-term mortality in patients with established CAD.

**Professional Societies/Organizations**

The American College of Cardiology (ACC) guideline recommendations are classified as Class I, Class IIa, Class IIb, and Class III. The classification system is described as follows:

- **Class I**: Benefit >>> Risk; Procedure/Treatment should be performed/administered
- **Class IIa**: Benefit >> Risk; Additional studies with focused objectives needed. It is reasonable to perform procedure/administer treatment
- **Class IIb**: Benefit ≥ Risk; Additional studies with broad objectives needed; additional registry data would be helpful. Procedure/treatment may be considered.
- **Class III**: Risk ≥ Benefit; Procedure/treatment should not be performed/administered, since it is not helpful and may be harmful.

The weight of evidence supporting each recommendation is classified as follows:

- **Level A**: Multiple populations evaluated. Data derived from multiple randomized clinical trials or meta-analyses.
- **Level B**: Limited populations evaluated. Data derived from a single randomized trial or nonrandomized studies.
- **Level C**: Very limited populations evaluated. Only consensus opinion of experts, case studies, or standard of care.

The 2013 update of the 2004 American College of Cardiology Foundation (ACCF)/American Heart Association (AHA) practice guideline for the management of patients with ST-elevation MI (STEMI) recommends under posthospitalization plan of care that exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI. Class I recommendation with Level of Evidence: A (O’Gara, et al., 2013). There has been no update to this guideline since 2013.

The 2013 ACC/AHA guideline for the management of heart failure recommends that exercise training (or regular physical activity) is safe and effective for patients with heart failure who are able to participate to improve functional status. Class I recommendation with Level of Evidence: A. Cardiac rehabilitation can be useful in clinically stable patients with heart failure to improve functional capacity, exercise duration, health-related quality of life, and mortality. Class IIa recommendation with Level of Evidence: B (Yancy, et al., 2013). There has been no update to this guideline since 2013.

The 2012 focused update to the 2007 ACC/AHA guideline for the management of patients with unstable angina/non-ST-elevation MI recommends CR/secondary prevention programs, when available, for patients with unstable angina/non ST-elevation MI, particularly those with multiple modifiable risk factors and those with moderate- to high-risk patients in whom supervised or monitored exercise training is warranted. Class I recommendation with Level of Evidence: B. The patient’s risk after unstable angina/non-ST-elevation MI should
be assessed on the basis of an in-hospital determination of risk. A physical activity history or an exercise test to guide initial prescription is beneficial. Class I recommendation with Level of Evidence: B (Anderson, et al., 2013; 2007). There has been no update to this guideline since 2012.

The 2011 updated ACC/AHA practice guideline for coronary artery bypass graft (CABG) recommends that CR should be offered to all eligible patients after CABG Class I recommendation with Level of Evidence: A (Hillis et al., 2011). There has been no update to this guideline since 2011.

The 2011 ACC/AHA/Society for Cardiovascular Angiography and Interventions (SCAI) update to the 2005 practice guideline for percutaneous coronary intervention recommends for patients entering a formal cardiac rehabilitation program after percutaneous intervention (PCI), treadmill exercise testing is reasonable. Medically supervised exercise programs (cardiac rehabilitation) should be recommended to patients after PCI, particularly for moderate to high-risk patients for whom supervised exercise training is warranted. Class I recommendation with Level of Evidence: A (Levine, et al., 2011).

The updated 2011 AHA/ACCF secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease guideline recommendations for cardiac rehabilitation states:

- All eligible patients with acute coronary syndrome (ACS) or whose status is immediately post coronary artery bypass surgery or post-PCI should be referred to a comprehensive outpatient cardiovascular rehabilitation program either prior to hospital discharge or during the first follow-up office visit (Class I recommendation with Level of Evidence: A).
- All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (Class I recommendation with Level of Evidence: A), chronic angina (Class I recommendation with Level of Evidence: B), and/or peripheral artery disease (Class I recommendation with Level of Evidence: A) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.
- A home-based cardiac rehabilitation program can be substituted for a supervised, center-based program for low-risk patients (Class I recommendation with Level of Evidence: A).
- A comprehensive exercise-based outpatient cardiac rehabilitation program can be safe and beneficial for clinically stable outpatients with a history of heart failure (Class IIa recommendation with Level of Evidence: B).


The American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR)/ACC/AHA 2007 performance measures on CR for referral to CR/secondary prevention services were updated in 2010. The 2010 document updates the two measures that describe the opportunities to improve referrals to outpatient CR and CR patient referral from an inpatient setting. The updated performance measures state all patients hospitalized with a primary diagnosis of an acute myocardial infarction (MI) or chronic stable angina (CSA), or who during hospitalization have undergone coronary artery bypass graft (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery, or cardiac transplantation are to be referred to an early outpatient cardiac rehabilitation/secondary prevention (CR) program. The performance measures state all patients evaluated in an outpatient setting who within the past 12 months have experienced an acute MI, CABG surgery, a PCI, cardiac valve surgery, or cardiac transplantation, or who have CSA and have not already participated in an early outpatient cardiac rehabilitation/secondary prevention (CR) program for the qualifying event/diagnosis are to be referred to such a program. The authors noted that there is growing evidence for the benefits of CR in persons with other cardiovascular conditions, including heart failure and peripheral vascular disease. Pooled data from randomized clinical trials of CR demonstrate a mortality benefit of approximately 20–25%. The patients who are appropriate for entry into a CR program include persons 18 years of age or older who, during the previous year, have had one or more of the qualifying diagnoses previously noted. The period for early outpatient CR typically begins 1–3 weeks after the index cardiovascular event and lasts up to 3–6 months (Thomas, et al., 2007, 2010).
In 2007, the AHA and the AACVPR updated their 2000 scientific statement addressing the core components of CR/secondary prevention programs. The update presents the current information on the evaluation, interventions, and expected outcomes in each of the core components of CR/secondary prevention programs which is in agreement with the 2006 AHA/American College of Cardiology (ACC) secondary prevention guidelines, including baseline patient assessment, nutritional counseling, risk factor management (lipids, blood pressure, weight, diabetes mellitus, and smoking), psychosocial interventions, and physical activity counseling and exercise training. Symptom-limited exercise testing is strongly recommended prior to participation in an exercise-based CR program. The evaluation may be repeated as changes in clinical condition warrant. Test parameters should include assessment of heart rate and rhythm, signs, symptoms, ST-segment changes, hemodynamics, perceived exertion, and exercise capacity. On the basis of patient assessment and the exercise test if performed, it is recommended to risk stratify the patient to determine the level of supervision and monitoring required during exercise training (Balady, et al., 2007). There has been no update to this guideline since 2007.

The 2007 ACC/AHA focused update of the 2002 practice guideline for the management of patients with chronic stable angina recommends medically supervised programs (CR) for at-risk patients (e.g., recent coronary syndrome or revascularization, heart failure). It is recommended that the patient’s risk should be assessed with a physical activity history. Where appropriate, an exercise test is useful to guide the exercise prescription. Physical activity of 30–60 minutes, seven days per week (minimum five days per week) is recommended. All patients should be encouraged to obtain 30–60 minutes of moderate-intensity aerobic activity, such as brisk walking, on most, preferably all, days of the week, supplemented by an increase in daily activities (such as walking breaks at work, gardening, or household work) (Fraker, et al., 2007). There has been no update to this guideline since 2007.

**Outpatient Non-ECG Monitored Cardiac Rehabilitation Programs**

Several outpatient intensive cardiac rehabilitation programs have been developed including, but not limited to, the Pritikin Program, the Ornish Program for Reversing Heart Disease and the Benson-Henry Institute Cardiac Wellness Program (CMS, 2010; 2014). These multicomponent programs include supervised exercise, behavioral interventions and counseling. According to CMS, intensive cardiac rehabilitation program sessions are limited to 72 one-hour sessions, up to six sessions per day, over a period of up to 18 weeks. There is a lack of comparative studies in the peer-reviewed published literature that outpatient intensive cardiac rehabilitation programs improve health outcomes compared to an electrocardiographically-monitored program of outpatient cardiac rehabilitation.

**The American Board of Internal Medicine’s (ABIM) Foundation Choosing Wisely® Initiative:** No relevant recommendations found.

**Use Outside of the US**

The European Association for Cardiovascular Prevention and Rehabilitation, The American Association of Cardiovascular and Pulmonary Rehabilitation, and The Canadian Association of Cardiac Rehabilitation joint position statement on Aerobic Exercise Intensity Assessment and Prescription in Cardiac Rehabilitation concludes that “In current cardiac rehabilitation practice, the choice of the aerobic training stimulus intensity in individual patients remains largely a matter of clinical judgement. This European, US and Canadian joint position statement provides evidence-based indications for a shift from a ‘range-based’ to a ‘threshold-based’ aerobic exercise intensity prescription, to be combined with thorough clinical evaluation and exercise-related risk assessment. The importance of functional evaluation through exercise testing prior to starting an aerobic training program is strongly emphasized, and an incremental cardiopulmonary exercise test, when available, is proposed as the gold standard for a physiologically comprehensive exercise intensity assessment and prescription. This would allow professionals to match the unique physiological responses of different exercise intensity domains to the individual patient pathophysiological and clinical status, maximizing the benefits obtainable from aerobic exercise training in cardiac rehabilitation” (Mezzani, et al., 2012).

**Coding/Billing Information**

Page 8 of 15
Medical Coverage Policy: 0073
Note: 1) This list of codes may not be all-inclusive.
   2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

<table>
<thead>
<tr>
<th>CPT®* Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>93798</td>
<td>Physician or other qualified health care professional services for outpatient cardiac rehabilitation; with continuous ECG monitoring (per session)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HCPCS Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G0422†</td>
<td>Intensive cardiac rehabilitation; with or without continuous ECG monitoring with exercise, per session</td>
</tr>
<tr>
<td>G0423†</td>
<td>Intensive cardiac rehabilitation; with or without continuous ECG monitoring, without exercise, per session</td>
</tr>
<tr>
<td>S9472†</td>
<td>Cardiac rehabilitation program, non-physician provider, per diem</td>
</tr>
</tbody>
</table>

†Note: Coverage of these services is limited to ECG monitored cardiac rehabilitation programs. Cardiac rehabilitation programs that are not electrocardiographically monitored are considered not medically necessary and therefore are not covered. In addition, these programs are specifically excluded under many medical benefit plans.

Considered Not Medically Necessary:

<table>
<thead>
<tr>
<th>CPT®* Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>93797</td>
<td>Physician or other qualified health care professional services for outpatient cardiac rehabilitation; without continuous ECG monitoring (per session)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICD-10-CM Diagnosis Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All codes</td>
<td></td>
</tr>
</tbody>
</table>


References


10. Braun LT. Cardiac Rehabilitation. In: UpToDate, Saperia, GM (Ed), UpToDate, Waltham, MA (Accessed on January 8, 2018.)


exercise testing: summary article [report of the American College of Cardiology/American Heart
Association Task Force on Practice Guidelines (Committee to Update the 1997 Exercise Testing

25. Goel K, Lennon RJ, Tilbury RT, Squires RW, Thomas RJ. Impact of cardiac rehabilitation on mortality
and cardiovascular events after percutaneous coronary intervention in the community. Circulation. 2011
May 31;123(21):2344-52.

In: Goroll AH, Mulley AG, editors. Primary care medicine: office evaluation and management of the adult

27. Hamm LF, Sanderson BK, Ades PA, Berra K, Kaminsky LA, Roitman JL, Williams MA. Core
competencies for cardiac rehabilitation/secondary prevention professionals: 2010 update: position
statement of the American Association of Cardiovascular and Pulmonary Rehabilitation. J Cardiopulm

28. Hammill BG, Curtis LH, Schulman KA, Whellan DJ. Relationship between cardiac rehabilitation and
2010 Jan 5;121(1):63-70.


Foundation; American Heart Association Task Force on Practice Guidelines; American Association for
Thoracic Surgery; Society of Cardiovascular Anesthesiologists; Society of Thoracic Surgeons. 2011
ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery. A report of the American College of
Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Developed in
collaboration with the American Association for Thoracic Surgery, Society of Cardiovascular

Cardiology; American Heart Association Task Force on Practice Guidelines; American College of Chest
Physicians; International Society for Heart and Lung Transplantation; Heart Rhythm Society. 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):
developed in collaboration with the American College of Chest Physicians and the International Society
for Heart and Lung Transplantation: endorsed by the Heart Rhythm Society. Circulation. 2005 Sep
20;112(12):e154-235.


33. Krumholz HM, Anderson JL, Bachelder BL, Fesmire FM, Fihn SD, Foody JM, et al; American College of
Cardiology/American Heart Association Task Force on Performance Measures; American Academy of
Family Physicians; American College of Emergency Physicians; American Association of Cardiovascular
and Pulmonary Rehabilitation; Society for Cardiovascular Angiography and Interventions; Society of
Hospital Medicine. ACC/AHA 2008 performance measures for adults with ST-elevation and non-ST-
elevation myocardial infarction: a report of the American College of Cardiology/American Heart
Association Task Force on Performance Measures (Writing Committee to Develop Performance
Measures for ST-Elevation and Non-ST-Elevation Myocardial Infarction) Developed in Collaboration
With the American Academy of Family Physicians and American College of Emergency Physicians
Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, Society for


39. Mezzani A, Hamm LF, Jones AM, McBride PE, Moholdt T, Stone JA, Urhausen A, Williams MA; European Association for Cardiovascular Prevention and Rehabilitation; American Association of Cardiovascular and Pulmonary Rehabilitation; Canadian Association of Cardiac Rehabilitation. Aerobic exercise intensity assessment and prescription in cardiac rehabilitation: a joint position statement of the European Association for Cardiovascular Prevention and Rehabilitation, the American Association of Cardiovascular and Pulmonary Rehabilitation and the Canadian Association of Cardiac Rehabilitation.


43. Pina I. Cardiac rehabilitation in patients with heart failure. In: UpToDate, Yeon, SB (Ed), UpToDate, Waltham, MA (Accessed on January 8, 2018.)


50. Thomas RJ, King M, Lui K, Oldridge N, Piña IL, Spertus J. AACVPR/ACCF/AHA 2010 Update: Performance Measures on Cardiac Rehabilitation for Referral to Cardiac Rehabilitation/Secondary Prevention Services Endorsed by the American College of Chest Physicians, the American College of Sports Medicine, the American Physical Therapy Association, the Canadian Association of Cardiac Rehabilitation, the Clinical Exercise Physiology Association, the European Association for Cardiovascular Prevention and Rehabilitation, the Inter-American Heart Foundation, the National Association of Clinical Nurse Specialists, the Preventive Cardiovascular Nurses Association, and the Society of Thoracic Surgeons. J Am Coll Cardiol. 2010 Sep 28;56(14):1159-67.


53. Wenger NK. Cardiac rehabilitation: Evidence of benefit in patients with coronary heart disease. In: UpToDate, Saperia, GM (Ed), UpToDate, Waltham, MA (Accessed on January 8, 2018.)

54. Wenger NK. Cardiac rehabilitation in older adults. In: UpToDate, Saperia, GM (Ed), UpToDate, Waltham, MA (Accessed on January 8, 2018.)

