

PERFORMANCE MEASURES

2018 ACC/AHA Clinical Performance and Quality Measures for Cardiac Rehabilitation



A Report of the American College of Cardiology/American Heart Association Task Force on Performance Measures

Developed in Collaboration With the American Association of Cardiovascular and Pulmonary Rehabilitation

Endorsed by the American College of Sports Medicine, the American Physical Therapy Association, the Canadian Association of Cardiovascular Prevention and Rehabilitation, the Clinical Exercise Physiology Association, the Heart Failure Society of America, the InterAmerican Heart Foundation, the International Council of Cardiovascular Prevention and Rehabilitation, the National Association of Clinical Nurse Specialists, and the Preventive Cardiovascular Nurses Association

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PREAMBLE

The American College of Cardiology (ACC)/American Heart Association (AHA) performance measurement sets serve as vehicles to accelerate translation of scientific evidence into clinical practice. Measure sets developed by the ACC/AHA are intended to provide practitioners and institutions that deliver cardiovascular services with tools to measure the quality of care provided and identify opportunities for improvement.

Writing committees are instructed to consider the methodology of performance measure development (1) and to ensure that the measures developed are aligned with ACC/AHA clinical guidelines. The writing committees also are charged with constructing measures that maximally capture important aspects of care quality, including timeliness, safety, effectiveness, efficiency, equity, and patient-centeredness, while minimizing, when possible, the reporting burden imposed on hospitals, practices, and/or practitioners.

Potential challenges from measure implementation may lead to unintended consequences. The manner in which challenges are addressed is dependent on several

factors, including the measure design, data collection method, performance attribution, baseline performance rates, reporting methods, and incentives linked to these reports.

The ACC/AHA Task Force on Performance Measures (Task Force) distinguishes quality measures from performance measures. Quality measures are those metrics that *may* be useful for local quality improvement but are not yet appropriate for public reporting or pay for performance programs (uses of performance measures). New measures are initially evaluated for potential inclusion as performance measures. In some cases, a measure is insufficiently supported by the guidelines. In other instances, when the guidelines support a measure, the writing committee may feel it is necessary to have the measure tested to identify the consequences of measure implementation. Quality measures may then be promoted to the status of performance measures as supporting evidence becomes available.

Gregg C. Fonarow, MD, FACC, FAHA
Chair, ACC/AHA Task Force on Performance Measures

1. INTRODUCTION

In 2016, the Task Force convened the writing committee to begin the process of revising the existing performance measures set for cardiac rehabilitation (CR) that was released in 2007 (2) and for which a focused update was issued in 2010 (3). The writing committee also was charged with the task of developing new measures to benchmark and improve the quality of care for patients eligible for CR.

The performance measures for CR included in the measure set are briefly summarized in [Table 1](#), which provides information on the measure number, measure title, and care setting. The detailed measure specifications

([Appendix A](#)) provide not only the information included in [Table 1](#) but also provide more detailed information including the measure description, numerator, denominator (including denominator exclusions and exceptions), rationale for the measure, guidelines that support the measure, measurement period, source of data, and attribution.

The writing committee developed a comprehensive CR measure set that includes 9 measures, including 6 performance measures and 3 quality measures as reflected in [Table 1 and Appendix A](#). The writing committee believes that implementation of this measure set by healthcare systems, healthcare providers, health insurance carriers, chronic disease management organizations, CR programs, and other groups who have responsibility for the delivery of care to persons with cardiovascular disease will enhance the structure, process, and outcomes of care provided to patients who are eligible for CR services.

1.1. Scope of the Problem

The 2017 AHA Heart Disease and Stroke Statistics report highlights the large number of patients who need CR each year, including 625,000 patients discharged from U.S. hospitals after an acute coronary syndrome, 954,000 patients who underwent percutaneous coronary interventions (PCI), 500,000 patients discharged with a new diagnosis of heart failure (HF), and 397,000 who underwent coronary artery bypass graft surgery (CABG) (4). Furthermore, data from the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project statistics show that >608,000 patients were discharged with a primary diagnosis of acute myocardial infarction (AMI) in 2012 with a length of stay (mean) of 4.6 days, charges (mean) of >\$72,000 per patient stay, and an in-hospital death rate of 5.16% (5). More than half a million patients with coronary atherosclerosis and other

TABLE 1 ACC/AHA 2018 Clinical Performance and Quality Measures for Cardiac Rehabilitation

No.	Measure Title	Care Setting	Attribution	Measure Domain
Performance Measures				
PM-1	CR Patient Referral From an Inpatient Setting	Inpatient	Facility Level	Communication and Care Coordination
PM-2	Exercise Training Referral for HF From Inpatient Setting	Inpatient	Facility Level	Communication and Care Coordination
PM-3	CR Patient Referral From an Outpatient Setting	Outpatient	Facility or Provider Level	Communication and Care Coordination
PM-4	Exercise Training Referral for HF From Outpatient Setting	Outpatient	Facility or Provider Level	Communication and Care Coordination
PM-5a	CR Enrollment-Claims Based	Outpatient	Provider Level	Effective Clinical Care
PM-5b	CR Enrollment-Registry/Electronic Health Records Based	Inpatient	Provider Level	Effective Clinical Care
Quality Measures				
QM-1	CR Time to Enrollment	Outpatient	Facility or Provider Level	Effective Clinical Care
QM-2	CR Adherence (≥36 sessions)	Outpatient	Facility or Provider Level	Effective Clinical Care
QM-3	CR Communication: Patient Enrollment, Adherence, and Clinical Outcomes	Outpatient	Facility or Provider Level	Communication and Care Coordination

ACC indicates American College of Cardiology; AHA, American Heart Association; CR, cardiac rehabilitation; HF, heart failure; PM, performance measure; and QM, quality measure.

heart diseases were treated in hospitals in 2012 with a mean length of stay of 3.7 days and associated charges of almost \$69,000 (5).

CR is a multidisciplinary, systematic approach to applying secondary prevention therapies of known benefit. After a myocardial infarction (MI), CR decreases recurrent MI and mortality rates based on a meta-analysis of 34 randomized trials (6). Participation in CR programs can also improve a patient's quality of life and ability to return to work more quickly (7,8). One observational study within a community demonstrated a 10-year absolute risk reduction in all-cause mortality of >12% in patients with CABG who participated in a CR program (9). Studies have also found that CR participation is associated with a 20% to 30% reduction in hospital readmission during the year after a cardiac event (8,10,11).

Even with the underlying evidence demonstrating the benefits of CR, most eligible patients are still not receiving this therapy. Analyses show that:

- Just under 35% of patients surveyed in the Behavioral Risk Factor Surveillance System, who had an AMI, received CR (12).
- Certain subpopulations, including ethnic minorities, women, and those with caregiver-related responsibilities, multiple comorbidities, limited program access, and inadequate health insurance coverage, are less likely to receive CR (13,14).

Data from the ACTION-Get With The Guidelines registry (2014) (4) on the current ST-elevation myocardial infarction/non-ST-elevation myocardial infarction measures related to CR continue to demonstrate an opportunity for improvement with 75.9% of patients with non-ST-elevation myocardial infarction receiving this referral and 84.5% for those with ST-elevation myocardial infarction. Rates of CR referral are even lower (approximately 60%) for patients who undergo PCI (15). Similarly, data from the Get With The Guidelines-Heart Failure registry showed that, in patients hospitalized for HF, only 10.4% (12.2% with HF with reduced ejection fraction [HFrEF] and 8.8% with HF with preserved ejection fraction [HFpEF]) received CR referral at discharge (16).

Furthermore, in addition to a referral gap, an enrollment gap also exists in CR, with only about 50% of patients referred to CR actually enrolling and participating in CR (17-19). In addition, completion rates of CR are suboptimal (13,19). If CR participation rates were improved to at least 70%, it is estimated that approximately 25,000 deaths and 180,000 hospitalizations could be prevented each year (20). For all of the previously mentioned reasons, updating the existing CR measure set has been recognized as a high priority for the ACC and AHA. Particular attention has been given to the infrastructure and processes that are most likely to improve CR

participation by eligible patients and ultimately improve patient outcomes. This document serves to reflect those measures that were developed by the writing committee after comprehensive internal discussion, peer review, and public comment.

1.2. Disclosure of Relationships With Industry and Other Entities

The Task Force makes every effort to avoid actual, potential, or perceived conflicts of interest that could arise as a result of relationships with industry or other entities (RWI). Detailed information on the ACC/AHA policy on RWI can be found [online](#). All members of the writing committee, as well as those selected to serve as peer reviewers of this document, were required to disclose all current relationships and those existing within the 12 months before the initiation of this writing effort. ACC/AHA policy also requires that the writing committee chair and at least 50% of the writing committee have no relevant RWI.

Any writing committee member who develops new RWI during his or her tenure on the writing committee is required to notify staff in writing. These statements are reviewed periodically by the Task Force and by members of the writing committee. Author and peer reviewer RWI that are relevant to the document are included in the appendixes: [Appendix B](#) for relevant writing committee RWI and [Appendix C](#) for relevant peer reviewer RWI. Additionally, to ensure complete transparency, the writing committee members' comprehensive disclosure information, including RWI not relevant to the present document, is available [online](#). Disclosure information for the Task Force is also available [online](#).

The work of the writing committee was supported exclusively by the ACC and the AHA without commercial support. Members of the writing committee volunteered their time for this effort. Meetings of the writing committee were confidential and attended only by writing committee members and staff from the ACC, AHA, and the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), which served as a collaborator on this project.

2. METHODOLOGY

2.1. Literature Review

In developing the updated CR measure set, the writing committee reviewed evidence-based guidelines and statements that would potentially impact the construct of the measures. The clinical practice guidelines and scientific statements that most directly contributed to the development of these measures are shown in [Table 2](#).

TABLE 2 Associated Clinical Practice Guidelines and Other Clinical Guidance Documents**CLINICAL PRACTICE GUIDELINES**

1. 2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)
2. 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction (22)
3. 2015 ACC/AHA/SCAI Focused Update on Primary Percutaneous Coronary Intervention for Patients With ST-Elevation Myocardial Infarction (23)
4. 2013 ACCF/AHA Guideline for the Management of Heart Failure (24)
5. 2013 ACC/AHA Guideline on the Assessment of Cardiovascular Risk (25)
6. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease (26)
7. Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update: a guideline from the American Heart Association (27)
8. AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 update (28)
9. 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)
10. 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

PERFORMANCE MEASURES AND SCIENTIFIC STATEMENTS

1. ACCF/AHA/AMA-PCPI 2011 Performance Measures for Adults With Coronary Artery Disease and Hypertension (31)
2. ACC/AHA 2008 Performance Measures for Adults With ST-Elevation and Non-ST-Elevation Myocardial Infarction (32)
3. Acute Myocardial Infarction in Women: A Scientific Statement From the American Heart Association (33)
4. Preventing and Experiencing Ischemic Heart Disease as a Woman: State of the Science: A Scientific Statement From the American Heart Association (34)
5. ACCF/AHA/AMA-PCPI 2011 Performance Measures for Adults With Heart Failure (35)
6. 2012 ACCF/AATS/SCAI/STS Expert Consensus Document on Transcatheter Aortic Valve Replacement (36)

AATS indicates American Association for Thoracic Surgery; ACC, American College of Cardiology; ACCF, American College of Cardiology Foundation; ACP, American College of Physicians; AHA, American Heart Association; AMA, American Medical Association; PCPI, Physician Consortium for Performance Improvement; PCNA, Preventive Cardiovascular Nurses Association; SCAI, Society for Cardiovascular Angiography and Interventions; and STS, Society of Thoracic Surgeons.

2.2. Definition and Selection of Measures

The writing committee reviewed both recent clinical practice guidelines and other clinical guidance documents (Table 2). The writing committee also examined available information on gaps in care to address which new measures might be appropriate as performance measures or quality measures for this measure set update.

The writing committee took into consideration a number of additional factors, including:

- Previous feedback from the National Quality Forum endorsement process and from the Centers for Medicare & Medicaid Services (CMS) has included suggestions to incorporate enrollment in the next version of the CR performance measures.
- CMS approved HF_rEF as a covered indication for CR beginning in February 2014. Other insurance carriers

have also approved coverage for patients with HF. In addition, the “2013 ACCF/AHA Guideline for the Management of Heart Failure” included a Class I recommendation for exercise training for patients with HF (24). These factors highlighted the need to incorporate such patients in the updated version of the CR measures.

- As ACC and AHA have recently worked with CMS to establish a consensus core set of cardiovascular performance measures, the writing committee decided to not include the CR referral performance measure as a separate measure because of concerns about the difficulty for some centers to collect the measure. However, the writing committee did include the CR referral measure as a component of the composite “defect free care” measure for MI (37). This suggests that a goal of the updated version of the CR performance measures should be to improve the ease of collection, while maintaining high-quality standards for data that are collected.
- Input from CMS has also requested the e-specification of the performance measures, a process that is difficult given that electronic health records generally do not include CR referral as a discrete data field, making it necessary to use manual chart abstraction or local electronic health record systems to collect data on CR referral. The CR referral measure is currently included in ACC and AHA registries, an important step that may serve as an example for ways in which vendors of electronic health records can include the CR referral measure, as well as other measures included in the updated CR measure set.
- Growing evidence suggests that alternative models of CR delivery (e.g., home-based, electronic/mobile technology-based) are both feasible and potentially helpful for increasing the reach of CR services, suggesting that the updated CR measure set should be broad enough in scope to allow for the inclusion of alternative models of CR delivery that are supported by published evidence.

CR measures were designed to cover 2 specific aspects of CR services: 1) referral of eligible patients to a CR program and 2) delivery of CR services through multidisciplinary CR programs. The measures also were designed to include all eligible patients who did not have a valid reason for exclusion from the measure. Measure exclusions are those reasons that remove a patient automatically from the denominator. For example, all measures excluded patients who were <18 years of age. In contrast to exclusions, denominator exceptions are those conditions that remove a patient from the denominator only if the numerator criteria are not met. Denominator exceptions are used in select cases to allow for a fairer

measurement of quality for those providers with higher risk populations. Exceptions are also used to defer to the clinical judgment of the provider. Exceptions have been listed in several of the measures. For example, in the case of the CR referral from an inpatient setting, a physician who recommends CR referral to an eligible patient is considered to have met performance even if the patient refuses, at the time of referral, because of ≥ 1 reasons (e.g., lack of transportation, patient preference). In such a case, the physician would receive credit for the measure. If the patient has told the physician that he/she does not wish to enroll in a CR program, the physician can document in the medical record that he/she has recommended referral but that the patient has refused CR. This is important because, in this scenario, the provider should not be penalized for the lack of a completed CR program referral as long as the CR referral recommendation and the patient refusal are documented. The writing committee closely examined which exceptions should be included for each measure.

For the purposes of this document, a CR program is defined as a systematic, medically supervised program that helps patients recuperate from their cardiac event; adopt and adhere to healthy lifestyle habits; address comorbid conditions (e.g., depression, diabetes mellitus, sleep apnea); monitor for safety issues, including new or recurrent signs or symptoms; and, adhere to evidence-based medical therapies. A CR program may include a traditional center-based CR program that incorporates

face-to-face interactions and supervised exercise training sessions or, importantly, may include other alternative CR delivery models that meet all criteria for a safe and effective CR program, as specified by AACVPR CR practice guidelines (38). Such alternative CR program models are defined as hospital outpatient-based programs. These programs may include traditional and/or novel delivery options (e.g., home-based CR models, remote monitoring, or mobile health strategies to link patients with CR professionals, either alone or in combination with center-based CR) as part of the program. The programs may also incorporate the core clinical and operational components of an industry-standard service that provides, tracks, and reports on safe and effective exercise. Lastly, the programs provide patient-centered disease management education aimed to progress patients toward improved outcomes in the clinical, functional, and behavioral domains.

During the course of developing the measure set, the writing committee evaluated the potential measures against the ACC/AHA attributes of performance measures (Table 3) to reach consensus on which measures should be advanced for inclusion in the final measure set. After the peer review and public comment period, the writing committee reviewed and discussed the comments received and further refined the measure set. The writing committee acknowledges that the new measures created in this set will need to be tested and validated over time. By publishing this measure set, the writing committee

TABLE 3 ACC/AHA Task Force on Performance Measures: Attributes for Performance Measures (39)

1. Evidence Based

High-impact area that is useful in improving patient outcomes	a) For structural measures, the structure should be closely linked to a meaningful process of care that in turn is linked to a meaningful patient outcome. b) For process measures, the scientific basis for the measure should be well established, and the process should be closely linked to a meaningful patient outcome. c) For outcome measures, the outcome should be clinically meaningful. If appropriate, performance measures based on outcomes should adjust for relevant clinical characteristics through the use of appropriate methodology and high-quality data sources.
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2. Measure Selection

Measure definition	a) The patient group to whom the measure applies (denominator) and the patient group for whom conformance is achieved (numerator) are clearly defined and clinically meaningful.
Measure exceptions and exclusions	b) Exceptions and exclusions are supported by evidence.
Reliability	c) The measure is reproducible across organizations and delivery settings.
Face validity	d) The measure appears to assess what it is intended to.
Content validity	e) The measure captures most meaningful aspects of care.
Construct validity	f) The measure correlates well with other measures of the same aspect of care.

3. Measure Feasibility

Reasonable effort and cost	a) The data required for the measure can be obtained with reasonable effort and cost.
Reasonable time period	b) The data required for the measure can be obtained within the period allowed for data collection.

4. Accountability

Actionable	a) Those held accountable can affect the care process or outcome.
Unintended consequences avoided	b) The likelihood of negative unintended consequences with the measure is low.

ACC indicates American College of Cardiology, and AHA, American Heart Association.

TABLE 4 Retired CR Measures From the 2007 Set

No.	Care Setting	Measure Title	Rationale for Retiring the Measure
B-1	N/A	Structure-Based Measurement Set	This measure will be considered for revision and/or maintenance by the AACVPR, because elements of this measure are currently used within AACVPR Program Certification.
B-2	N/A	Assessment of Risk for Adverse Cardiovascular Events	This measure will be considered for revision and/or maintenance by the AACVPR, because it is specific to CR programming and outcomes and is used within the AACVPR CR Registry and Program Certification.
B-3	N/A	Individualized Assessment and Evaluation of Modifiable Cardiovascular Risk Factors, Development of Individualized Interventions, and Communication With Other Health Care Providers	This measure is being replaced by AACVPR with patient-related outcomes measures, which currently include improvement in functional capacity, blood pressure control, and depression, as well as a process measures related to intervention for tobacco use. AACVPR will continue to evaluate and develop new measures related to CR programming and outcomes to use within the AACVPR CR Registry and Program Certification.
B-4	N/A	Monitor Response to Therapy and Document Program Effectiveness	This measure will be considered for revision and/or maintenance by AACVPR as elements are used within the AACVPR CR Registry and Program Certification.

AACVPR indicates American Association of Cardiovascular and Pulmonary Rehabilitation; CR, cardiac rehabilitation; and N/A, not applicable.

encourages adoption of these performance measures, which will facilitate the collection and analysis of data needed to assess the validity of these measures. In the future, the writing committee anticipates having data that will allow it to reassess whether any measures included in this set should be modified, or potentially promoted from a quality measure to a performance measure.

3. ACC/AHA CR MEASURE SET PERFORMANCE MEASURES

3.1. Discussion of Changes to 2007 and 2010 CR Measure Set

After reviewing the existing guidelines, the 2007 measure set (2), and the 2010 focused update (3), the writing committee discussed which measures required revision to reflect updated science in the field of CR and identified which guideline recommendations could serve as the basis for new performance or quality measures. The writing committee also reviewed existing publicly available measure sets.

These subsections serve as a synopsis of the revisions that were made to previous measures and a description of why the new measures were created for both the inpatient and outpatient setting.

3.1.1. Retired Measures

The writing committee decided to retire the “Set B” CR performance measures (CR program measures)

included in the original 2007 CR measure set. This was done to avoid duplication of effort, because the “Set B” measures are currently being updated, tested, and implemented through a separate process by the AACVPR. The measures, along with a brief rationale for retiring the measures, are included in [Table 4](#).

3.1.2. Revised Measures

The writing committee reviewed and made changes to the inpatient and outpatient CR referral measures, as summarized in [Table 5](#). Minimal changes were made, primarily to those that improve ease of use of the measures and strengthen the construct of the measures. [Table 5](#) provides information on the updated measures including the care setting, title, and a brief rationale for revisions made to the measures.

3.1.3. New Measures

The writing committee created a comprehensive list of measures that can be used for patients who are eligible to participate in CR. This set includes 6 new performance measures, and 3 new quality measures. [Table 6](#) includes a list of the measures with information on the care setting and a brief rationale. Performance measures are typically those measures that target meaningful gaps in the quality of care and that are based on Class I clinical practice guidelines. Other

TABLE 5 Revised CR Measures

No.	Measure Title	Description	Rationale for Revision
PM-1	CR Referral From an Inpatient Setting	All patients hospitalized with a CR-eligible diagnosis or procedure should be referred to an outpatient CR program prior to hospital discharge	If patient refuses CR referral, referral order and patient materials should not be sent to the receiving CR program against the patient's wishes. CR referral would still be met as long as other aspects of CR referral have been met (CR referral recommended and documented).
PM-3	CR Referral From an Outpatient Setting	All outpatients who are eligible for CR and have not yet participated in CR should be referred to an outpatient CR program.	If patient refuses CR referral, referral order and patient materials should not be sent to the receiving CR program against the patient's wishes. CR referral would still be met as long as other aspects of CR referral have been met (CR referral recommended and documented).

CR indicates cardiac rehabilitation; and PM, performance measure.

TABLE 6 New CR Measures

No.	Care Setting	Measure Title	Rationale for Creating New Measure	Rationale for Designating as a Quality Measure Versus a Performance Measure
PM-2	Inpatient	Exercise Training Referral for Heart Failure From Inpatient Setting	Exercise training is a Class I recommendation for patients with HFrEF and is typically provided through an outpatient CR program. Exercise training has been shown to help improve functional capacity for patients with HFrEF. In addition, CR has been shown to improve functional capacity, exercise duration, HRQOL, and mortality (Class IIa, Level of Evidence: B).	N/A
PM-4	Outpatient	Exercise Training Referral for Heart Failure From Outpatient Setting	Exercise training is a Class I recommendation for patients with HFrEF and is typically provided through an outpatient CR program. Exercise training has been shown to help improve functional capacity for patients with HFrEF. In addition, CR has been shown to improve functional capacity, exercise duration, HRQOL, and mortality (Class IIa, Level of Evidence: B).	N/A
PM-5a	Outpatient	CR Enrollment—Claims Based	Although CR referral is a critically important first step in CR participation, CR enrollment is the goal of CR referral and is essential for patients to receive the benefits associated with CR participation. This option, to use claims-based data, is included to allow flexibility in the measure assessment for healthcare organizations that may wish to use claims-based data, with or without the use of registry/electronic health record data.	N/A
PM-5b	Outpatient	CR Enrollment—Registry/Electronic Health Records Based	Although CR referral is a critically important first step in CR participation, CR enrollment is the goal of CR referral and is essential for patients to receive the benefits associated with CR participation. This option, to use registry/electronic health record data, is included to allow flexibility in the measure assessment for healthcare organizations that may wish to use registry/electronic health record data with or without the use of claims-based data.	N/A
QM-1	Inpatient	CR Time to Enrollment	Research indicates that earlier enrollment into CR improves overall enrollment, thus it may also be associated with better patient outcomes. Specifically, for every day that passes after hospital discharge, there is a ~1% decrease in participation (40). This measure may involve process improvement strategies at the patient, hospital, and program levels.	Earlier enrollment in CR (i.e., within the first 21 days after the qualifying event) is a safe and important goal to help optimize enrollment, participation and eventual patient outcomes of CR. However, because time to enrollment is not part of the Class I, Level of Evidence: A, clinical practice guidelines, this measure is being introduced as a QM.
QM-2	Outpatient	CR Adherence (≥36 sessions)	Research demonstrates a graded dose response in which attending ≥36 sessions is associated with lower risks of death and MI at 4 years, compared with attending fewer sessions (41).	Although observational data show an association between dose of CR and patient outcomes, optimal outcomes occur with a full dose CR (i.e., attending all 36 sessions prescribed sessions). Although achievement of that level of adherence is a challenging goal, the writing committee proposed that this full dose measure be introduced as a QM, which CR programs and patients are encouraged to ideally achieve.
QM-3	Outpatient	CR Communication: Patient Enrollment Adherence and Clinical Outcomes	Research demonstrates that care coordination and communication among healthcare providers helps to improve quality of care, patient satisfaction, and patient outcomes.	Although extremely important, CR communication to referring/primary healthcare providers is not part of Class I clinical practice recommendations. However, such care coordination is considered a standard of care and is included as a QM that CR programs are encouraged to ideally achieve.

CR indicates cardiac rehabilitation; HFrEF, heart failure with reduced ejection fraction; HRQOL, health-related quality of life; MI, myocardial infarction; N/A, not applicable; PM, performance measures; and QM, quality measure.

measures that are important, but are not based on Class I clinical practice guidelines or are lacking in other important characteristics (e.g., questions of feasibility, validity), are recommended as quality measures. If additional evidence supports the importance of the proposed quality measures, they may be changed to performance measures in the future. Performance and quality measures are designed to help healthcare

providers reduce gaps in the quality of care that they provide to their patients.

The measures are structured in a typical format in which the goal is to seek a higher performance score, ideally nearing 100%.

For more detailed information on the measure construct, please refer to the detailed measure specifications for each measure in [Appendix A](#).

4. AREAS FOR FURTHER RESEARCH

Additional areas for further research that will potentially have an impact on CR performance and quality measures include:

- Impact of CR performance and quality measures on CR participation, adherence, and related clinical outcomes, for all eligible patients, including those from underrepresented groups, such as racial/ethnic minorities, women, and the elderly.
- Use of CR performance and quality measures and subsequent impact on healthcare expenditures, compared with no-use of the measures.
- Comparative effectiveness of center-based versus novel CR delivery models on CR participation, adherence, and related clinical outcomes.
- Comparative effectiveness of center-based versus novel CR delivery models in implementing CR performance and quality measures to improve CR participation and adherence rates.
- Impact of the inclusion of CR performance measures in pay-for-performance strategies on CR participation, adherence, and outcomes.
- Novel performance and quality measures to stimulate higher CR participation and adherence rates.
- Performance and quality measures to promote longer term adherence to secondary prevention therapies, after completion of early outpatient (Phase 2) CR.
- The role of CR performance measures in new patient populations that are not included

in this set of measures, such as patients with HFpEF, peripheral arterial disease, and atrial fibrillation.

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KEY WORDS ACC/AHA Performance Measures, cardiac rehabilitation, performance measures, quality measures, quality indicators

APPENDIX A. CARDIAC REHABILITATION MEASURE SET

Performance Measures for Cardiac Rehabilitation

SHORT TITLE: PM-1 Referral From Inpatient Setting

PM-1: Cardiac Rehabilitation Patient Referral From an Inpatient Setting

Measure Description: Percentage of patients, age ≥18 y, hospitalized with a qualifying event/diagnosis for CR in the previous 12 mo including: an MI, CSA, or who, during hospitalization, have undergone CABG surgery, PCI, cardiac valve repair/replacement, or heart transplantation, are to be referred to an outpatient CR program.

Numerator	<p>Patients with a qualifying event/diagnosis who have been referred to an outpatient CR program prior to hospital discharge Referral is defined as:</p> <ol style="list-style-type: none"> 1. Documented communication* between the healthcare provider and the patient to recommend an outpatient CR program AND 2A. Official referral order† is sent to outpatient CR program OR 2B. Documentation of patient refusal to justify why patient information was not sent to the CR program‡ <p>Note: Performance is met if steps 1 AND either 2A (official referral order transmitted) OR 2B (patient refusal documented in the patient's medical record) are completed and documented.</p> <p>*All communications must maintain appropriate confidentiality as outlined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA). †All patient information required for enrollment should be transmitted to the CR program. Necessary patient information may be found in the hospital discharge summary. ‡Patients who refuse a CR referral should not have their data transmitted to the receiving CR program against their will.</p>
Denominator	All patients with a qualifying event/diagnosis in the previous 12 mo including: MI, PCI, CABG, CSA, valve repair/replacement, or heart transplantation, who are discharged from the hospital during the reporting period
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients age <18 y ■ Patients who leave during hospitalization against medical advice ■ Patients who die during hospitalization ■ Patients who are transferred to another hospital for inpatient care ■ Patients who are already participating in a CR program before hospitalization
Denominator Exceptions	<ul style="list-style-type: none"> ■ Documentation of a patient-oriented reason that precludes referral to CR (e.g., no traditional CR program available to the patient, within 60 min [travel time] from the patient's home, or patient does not have access to an alternative model of CR delivery that meets all criteria for a CR program) ■ Documentation of a medical reason that precludes referral to CR (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation) ■ Documentation of a healthcare system reason that precludes referral to CR (e.g., patient is discharged to a nursing care or long-term care facility, or patient lacks medical coverage for CR)
Measurement Period	Encounter
Sources of Data	Medical record or other database (e.g., administrative, clinical, registry)
Attribution	Measure reportable at facility level
Care Setting	Inpatient

Rationale

CR services have been shown to help reduce morbidity and mortality in persons who have experienced a recent coronary artery disease event, but these services are used in <30% of eligible patients (42).
 A key component to outpatient CR program utilization is the appropriate and timely referral of patients. Generally, the most important time for this referral to take place is while the patient is hospitalized for a qualifying event/diagnosis (e.g., MI, CSA, CABG, PCI, and cardiac valve repair/replacement).
 This performance measure has been developed to help healthcare systems implement effective steps in their systems of care that will optimize the appropriate referral of a patient to an outpatient CR program.
 This measure is designed to serve as a stand-alone measure or, preferably, to be included within other performance measurement sets that involve disease states or other conditions for which CR services have been found to be appropriate and beneficial (e.g., after MI, CABG surgery). This performance measure is provided in a format that is meant to allow easy and flexible inclusion into such performance measurement sets.
 Effective referral of appropriate inpatients to an outpatient CR program is the responsibility of the healthcare team within a healthcare system that is primarily responsible for providing cardiovascular care to the patient during hospitalization.
 Published evidence suggests that automatic referral systems, accompanied by strong and supportive advice and guidance from a healthcare professional, can significantly help improve CR referral and enrollment.

Clinical Recommendation(s)

- 2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)**
 1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)
- 2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)**
 1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)
- AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)**
 1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)

APPENDIX A. CONTINUED**SHORT TITLE: PM-1** Continued**Clinical Recommendation(s)****AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)**

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (*Class I; Level of Evidence: A*) or current/prior symptoms of heart failure and an LVEF $\leq 35\%$. (*Class I; Level of Evidence: B*)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (*Class I, Level of Evidence: A*)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A*)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CR, cardiac rehabilitation; CSA, chronic stable angina; CVD, cardiovascular disease; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention; and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX A. CONTINUED

SHORT TITLE: PM-2 Exercise Training Referral for HFrEF From Inpatient Setting

PM-2: Exercise Training Referral for HFrEF From an Inpatient Setting

Measure Description: Percentage of patients, age ≥18 y, hospitalized with a primary diagnosis of HFrEF in the previous 12 mo, who are referred for outpatient exercise training (or regular physical activity), typically delivered in the setting of an outpatient CR program.

Numerator Patients hospitalized with primary diagnosis of HFrEF who have been referred to an outpatient CR program before hospital discharge. Referral is defined as:

1. Documented communication* between the healthcare provider and the patient to recommend an outpatient CR program **AND**
- 2A. Official referral order† is sent to outpatient CR program **OR**
- 2B. Documentation of patient refusal to justify why patient information was not sent to the CR program‡

Note: Performance is met if steps 1 AND either 2A (official referral order transmitted) OR 2B (patient refusal documented in the patient's medical record) are completed and documented.

*All communications must maintain appropriate confidentiality as outlined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

†All patient information required for enrollment should be transmitted to the CR program. Necessary patient information may be found in the hospital discharge summary.

‡Patients who refuse a CR referral should not have their data transmitted to the receiving CR program against their will.

Denominator All patients who have had HFrEF during the previous 12 mo, who are discharged from the hospital during the reporting period

- Denominator Exclusions**
- Patients age <18 y
 - Patients who leave during hospitalization against medical advice
 - Patients who die during hospitalization
 - Patients who are transferred to another hospital for inpatient care
 - Patients who are already participating in a CR program before hospitalization

- Denominator Exceptions**
- Documentation of a patient-oriented reason that precludes referral to CR (e.g., no traditional CR program available to the patient, within 60 min [travel time] from the patient's home, or patient does not have access to an alternative model of CR delivery that meets all criteria for a CR program)
 - Documentation of a medical reason that precludes referral to CR (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation)
 - Documentation of a healthcare system reason that precludes referral to CR (e.g., patient is discharged to a nursing care or long-term care facility, or patient lacks medical coverage for CR)

Measurement Period Encounter

Sources of Data Medical record or other database (e.g., administrative, clinical, registry)

Attribution Measure reportable at facility level

Care Setting Inpatient

Rationale

Exercise training services have been shown to improve functional status and may help reduce morbidity and mortality in persons with stable chronic heart failure with reduced HFrEF. However, these services are used in a minority of eligible patients (42,53).

A key component to outpatient exercise training (typically carried out in a CR program) is the appropriate and timely referral of patients. Generally, the most important time for this referral to take place is while the patient is hospitalized for a HFrEF.

This performance measure has been developed to help healthcare systems implement effective steps in their systems of care that will optimize the appropriate referral of a patient to an outpatient exercise training program.

This measure is designed to serve as a stand-alone measure or, preferably, to be included within other performance measurement sets that involve patients with HFrEF. This performance measure is provided in a format that allows for easy and flexible inclusion into such performance measurement sets.

Effective referral of appropriate inpatients to an outpatient exercise training program is the responsibility of the healthcare team within a healthcare system that is primarily responsible for providing cardiovascular care to the patient with HFrEF during hospitalization.

Published evidence suggests that automatic referral systems, accompanied by strong and supportive advice and guidance from a healthcare professional, can significantly help improve CR referral and enrollment, where exercise training typically takes place for patients with HFrEF.

Clinical Recommendation(s)

2013 ACCF/AHA Guideline for the Management of Heart Failure (24)

1. Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status (54–60). (Class I, Level of Evidence: A)

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF ≥35%. (Class I; Level of Evidence: B)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CR, cardiac rehabilitation; CVD, cardiovascular disease; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; and PCI, percutaneous coronary intervention.

APPENDIX A. CONTINUED

SHORT TITLE: PM-3 Referral From Outpatient Setting**PM-3: Cardiac Rehabilitation Patient Referral From an Outpatient Setting**

Measure Description: Percentage of patients, age ≥ 18 y, evaluated in an outpatient setting, who within the previous 12 mo have had a qualifying event/diagnosis for CR including: MI, CABG surgery, a PCI, cardiac valve surgery, or heart transplantation, or who have CSA and have not already participated in a CR program for the qualifying event/diagnosis are to be referred to such a program.

Numerator	<p>Patients in an outpatient clinical practice who have had a qualifying event/diagnosis during the previous 12 mo, who have been referred to an outpatient CR program</p> <p>Referral is defined as:</p> <ol style="list-style-type: none"> 1. Documented communication* between the healthcare provider and the patient to recommend an outpatient CR program <p>AND</p> <ol style="list-style-type: none"> 2A. Official referral order† is sent to outpatient CR program <p>OR</p> <ol style="list-style-type: none"> 2B. Documentation of patient refusal to justify why patient information was not sent to the CR program‡ <p>Note: Performance is met if steps 1 AND either 2A (official referral order transmitted) OR 2B (patient refusal documented in the patient's medical record) are completed and documented. If a patient has had multiple qualifying events, at least 1 referral made in the past 12 mo should be captured.</p> <p>*All communications must maintain appropriate confidentiality as outlined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).</p> <p>†All patient information required for enrollment should be transmitted to the CR program. Necessary patient information may be found in the hospital discharge summary.</p> <p>‡Patients who refuse a CR referral should not have their data transmitted to the receiving CR program against their will.</p>
Denominator	All patients in an outpatient clinical practice who have had a qualifying event/diagnosis during the previous 12 mo including: MI, PCI, CABG, CSA, valve repair/replacement, or heart transplantation
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients age <18 y ■ Patients who leaves clinic visit against medical advice ■ Patients have participated in or had already completed CR program
Denominator Exceptions	<ul style="list-style-type: none"> ■ Documentation of a patient-oriented reason that precludes referral to CR (e.g., no traditional CR program available to the patient, within 60 min [travel time] from the patient's home, or patient does not have access to an alternative model of CR delivery that meets all criteria for a CR program) ■ Documentation of a medical reason that precludes referral to CR (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation) ■ Documentation of a healthcare system reason that precludes referral to CR (e.g., patient resides in a nursing care or long-term care facility, or patient lacks medical coverage for CR)
Measurement Period	Encounter
Sources of Data	Medical record or other database (e.g., administrative, clinical, registry)
Attribution	Measure reportable at provider and facility level
Care Setting	Outpatient

Rationale

CR services have been shown to help reduce morbidity and mortality in persons who have experienced a recent coronary artery disease event, but these services are used in <30% of eligible patients (42). A key component to CR utilization is the appropriate and timely referral of patients to an outpatient CR program. Although referral takes place generally while the patient is hospitalized for a qualifying event (e.g., MI, CSA, CABG, PCI, or cardiac valve repair/replacement), there are many instances in which a patient can and should be referred from an outpatient clinical practice setting (e.g., when a patient does not receive such a referral while in the hospital, or when the patient fails to follow through with the referral for whatever reason).

This performance measure has been developed to help healthcare systems implement effective steps in their systems of care that will optimize the appropriate referral of a patient to an outpatient CR program.

This measure is designed to serve as a stand-alone measure or, preferably, to be included within other performance measurement sets that involve disease states or other conditions for which CR services have been found to be appropriate and beneficial (e.g., after MI, CABG surgery). This performance measure is provided in a format that allows for easy and flexible inclusion into such performance measurement sets.

Referral of appropriate outpatients to a CR program is the responsibility of the healthcare provider within a healthcare system that is providing the primary cardiovascular care to the patient in the outpatient setting.

Published evidence suggests that automatic referral systems accompanied by strong and supportive advice and guidance from a healthcare professional can significantly help improve CR referral and enrollment.

Clinical Recommendation(s)**2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)**

1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)

1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)

1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)

Continued on the next page

APPENDIX A. CONTINUED

SHORT TITLE: PM-3 Continued

Clinical Recommendation(s)

2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (*Class I, Level of Evidence: A*) (2,44,49,61), chronic angina (*Class I, Level of Evidence: B*) (2,50), and/or peripheral artery disease (*Class I, Level of Evidence: A*) (62,63) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (*Class I; Level of Evidence: A*) or current/prior symptoms of heart failure and an LVEF 35%. (*Class I; Level of Evidence: B*)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (*Class I, Level of Evidence: A*)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A*)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CSA, chronic stable angina; CR, cardiac rehabilitation; CVD, cardiovascular disease; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention; and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX A. CONTINUED

SHORT TITLE: PM-4 Exercise Training Referral for HFrEF From Outpatient Setting**PM-4: Exercise Training Referral for HFrEF From an Outpatient Setting**

Measure Description: Percentage of patients, age ≥ 18 y, evaluated in an outpatient setting who within the previous 12 mo, have had a new HFrEF event or exacerbation, and have not participated in an exercise training program, such as provided in CR programs, for the qualifying event/diagnosis, are to be referred for exercise training.

Numerator	<p>Patients in an outpatient clinical practice who have had a new HFrEF event or exacerbation and have not participated in a supervised exercise training program (e.g., as a CR program) during the previous 12 mo, who have been referred to an outpatient CR program</p> <p>Referral is defined as:</p> <ol style="list-style-type: none"> 1. Documented communication* between the healthcare provider and the patient to recommend an outpatient CR program <p>AND</p> <ol style="list-style-type: none"> 2A. Official referral order† is sent to outpatient CR program <p>OR</p> <ol style="list-style-type: none"> 2B. Documentation of patient refusal to justify why patient information was not sent to the CR program‡ <p>Note: Performance is met if steps 1 AND either 2A (official referral order transmitted) OR 2B (patient refusal documented in the patient's medical record) are completed and documented.</p> <p>*All communications must maintain appropriate confidentiality as outlined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).</p> <p>†All patient information required for enrollment should be transmitted to the CR program. Necessary patient information may be found in the hospital discharge summary.</p> <p>‡Patients who refuse a CR referral should not have their data transmitted to the receiving CR program against their will.</p>
Denominator	All patients in an outpatient clinical practice who have had HFrEF during the previous 12 mo
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients age <18 y ■ Patients who leaves clinic visit against medical advice ■ Patients have already participated in or had already completed a CR program prior to clinic visit
Denominator Exceptions	<ul style="list-style-type: none"> ■ Documentation of a patient-oriented reason that precludes referral to CR (e.g., no traditional CR program available to the patient, within 60 min [travel time] from the patient's home, or patient does not have access to an alternative model of CR delivery that meets all criteria for a CR program) ■ Documentation of a medical reason that precludes referral to CR (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation) ■ Documentation of a healthcare system reason that precludes referral to CR (e.g., patient resides in a nursing care or long-term care facility, or patient lacks medical coverage for CR)
Measurement Period	Encounter
Sources of Data	Medical record or other database (e.g., administrative, clinical, registry)
Attribution	Measure reportable at provider and facility level
Care Setting	Outpatient

Rationale

CR services have been shown to help improve functional status and may help reduce morbidity and mortality in persons with stable chronic heart failure with reduced HFrEF. However, these services are used in a minority of eligible patients (42,53).

A key component to outpatient CR program utilization is the appropriate and timely referral of patients. Generally, the most important time for this referral to take place is while the patient is hospitalized for a HFrEF.

This performance measure has been developed to help healthcare systems implement effective steps in their systems of care that will optimize the appropriate referral of a patient to an outpatient CR program.

This measure is designed to serve as a stand-alone measure or, preferably, to be included within other performance measurement sets that involve patients with HFrEF.

This performance measure is provided in a format that allows for easy and flexible inclusion into such performance measurement sets.

Effective referral of appropriate inpatients to an outpatient CR program is the responsibility of the healthcare team within a healthcare system that is primarily responsible for providing cardiovascular care to the patient with HFrEF during hospitalization.

Published evidence suggests that automatic referral systems accompanied by strong and supportive advice and guidance from a healthcare professional can significantly help improve CR referral and enrollment.

Clinical Recommendation(s)**2013 ACCF/AHA Guideline for the Management of Heart Failure (24)**

1. Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status (54–60). (Class I, Level of Evidence: A)

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF $\leq 35\%$. (Class I; Level of Evidence: B)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CSA, chronic stable angina; CR, cardiac rehabilitation; CVD, cardiovascular disease; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; LVEF, left ventricular ejection fraction; MI, myocardial infarction; and PCI, percutaneous coronary intervention.

APPENDIX A. CONTINUED

SHORT TITLE: PM-5A Enrollment (Claims-Based)

PM-5A: Cardiac Rehabilitation Enrollment (Claims-Based)

Measure Description: Percentage of patients, age ≥ 18 y, with a qualifying event/diagnosis for CR including: MI, PCI, CABG, CSA, valve repair/replacement, or heart transplantation, who attend at least 1 session in a CR program.

Numerator	Patients with a qualifying event/diagnosis for CR who attend at least 1 CR session within 90 calendar d of hospital discharge after a qualifying event, or within 90 calendar d of the date of a qualifying outpatient procedure or office visit Note: Documentation should be provided for a patient attending at least 1 CR session occurring within 90 d of hospital discharge for at least 1 qualifying event.
Denominator	All patients with a qualifying event/diagnosis in the previous 12 mo including: MI, PCI, CABG, CSA, valve repair/replacement, or heart transplantation
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients age <18 y ■ Patients who are already participating in a CR program before hospitalization ■ Patients who leave against medical advice
Denominator Exceptions	None
Measurement Period	Encounter
Sources of Data	Medical record or other database (e.g., administrative or clinical)
Attribution	Measure reportable at facility level* *Healthcare system or where diagnosis occurred.
Care Setting	Inpatient or Outpatient

Rationale

Participation in CR significantly improves meaningful patient outcomes, including mortality, readmissions to acute care, functional capacity, psychosocial well-being, and health-related quality of life. There are geographic and demographic disparities related to CR, which can be influenced by changes in systems and processes that address barriers to participation (20).
 Although referral to CR is the first, critical step to involve patients in a CR program, actual enrollment in the CR program is essential to CR participation. Measuring CR enrollment will encourage both referring practitioners/facilities and CR programs to develop performance improvement activities that increase participation.

Clinical Recommendation(s)

2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)

1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)

1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)

1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)
2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (Class I, Level of Evidence: A) (2,44,49,61), chronic angina (Class I, Level of Evidence: B) (2,50), and/or peripheral artery disease (Class I, Level of Evidence: A) (62,63) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF $\geq 35\%$. (Class I; Level of Evidence: B)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (Class I, Level of Evidence: A)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CSA, chronic stable angina; CR, cardiac rehabilitation; CVD, cardiovascular disease; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention, and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX A. CONTINUED

SHORT TITLE: PM-5B Enrollment (Medical Records and/or Databases/Registries)**PM-5B: Cardiac Rehabilitation Enrollment (Medical Records and/or Databases/Registries)**

Measure Description: Percentage of patients, age ≥ 18 y, with a qualifying event/diagnosis for CR including: MI, PCI, CABG, CSA, valve repair/replacement, or heart transplantation, who attend at least 1 session in a CR program.

Numerator	Patients with a qualifying event/diagnosis for CR who attend at least 1 CR session within 90 calendar d of hospital discharge after a qualifying event, or within 90 calendar d of the date of a qualifying outpatient procedure or office visit Note: Documentation should be provided for a patient attending at least 1 CR session occurring within 90 d of hospital discharge for at least 1 qualifying event.
Denominator	All patients who have been hospitalized for a qualifying event/diagnosis in the previous 12 mo including: MI, PCI, CABG, CSA, valve repair/replacement, or heart transplantation
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients age <18 y ■ Patients who die during hospitalization ■ Patients who are already participating in a CR program before hospitalization ■ Patients who leave against medical advice ■ Patients who have a qualifying event <90 d before the measurement period
Denominator Exceptions	<ul style="list-style-type: none"> ■ Documentation of a patient-oriented reason that precludes enrollment in CR (e.g., no traditional CR program available to the patient, within 60 min [travel time] from the patient's home, or patient does not have access to an alternative model of CR delivery that meets all criteria for a CR program) ■ Documentation of a medical reason that precludes enrollment in CR (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation) ■ Documentation of a healthcare system reason that precludes enrollment in CR (e.g., patient is discharged to a nursing care or long-term care facility, or patient lacks medical coverage for CR)
Measurement Period	Encounter
Sources of Data	Medical record or other database (e.g., clinical or registry)
Attribution	Measure reportable at provider level
Care Setting	Inpatient or Outpatient

Rationale

Participation in CR significantly improves meaningful patient outcomes, including mortality, readmissions to acute care, functional capacity, psychosocial well-being, and health-related quality of life. There are geographic and demographic disparities related to CR, which can be influenced by changes in systems and processes that address barriers to participation (20).

Although referral to CR is the first, critical step to involve patients in a CR program, actual enrollment in the CR program is essential to CR participation. Measuring CR enrollment will encourage both referring practitioners/facilities and cardiac rehabilitation programs to develop performance improvement activities that increase participation.

Clinical Recommendation(s)**2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)**

1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)

1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)

1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)

2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (Class I, Level of Evidence: A) (2,44,49,61), chronic angina (Class I, Level of Evidence: B) (2,50), and/or peripheral artery disease (Class I, Level of Evidence: A) (62,63) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF $\leq 35\%$. (Class I; Level of Evidence: B)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (Class I, Level of Evidence: A)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CSA chronic stable angina; CR, cardiac rehabilitation; CVD, cardiovascular disease; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention; and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX A. CONTINUED

Quality Measures for Cardiac Rehabilitation

SHORT TITLE: QM-1 Time to Enrollment

QM-1: Cardiac Rehabilitation Time to Enrollment (21 Days)

Measure description: Percentage of patients, age ≥18 y, with a qualifying event/diagnosis including MI, PCI, CABG, heart valve surgery/repair, and/or heart transplantation, who enroll in CR within 21 d of hospital discharge.

Numerator Patients discharged from the hospital after qualifying event/diagnosis, who are referred to CR, and who begin CR participation ≤21 d after hospital discharge*
 Referral is defined as:
 1. Documented communication† between the healthcare provider and the patient to recommend an outpatient CR program
AND
 2. Official referral order‡ is sent to outpatient CR program

*Day 0 is considered to be the day of hospital discharge.

†All communications must maintain appropriate confidentiality as outlined by the 1996 Health Insurance Portability and Accountability Act [HIPAA].

‡All patient information required for enrollment should be transmitted to the CR program. Necessary patient information may be found in the hospital discharge summary.

Note: If a patient has had multiple qualifying events, at least 1 referral made in the past 12 mo should be captured.

Denominator All patients discharged from the hospital after qualifying event/diagnosis including: MI, PCI, CABG, heart valve surgery/repair and/or heart transplantation, who are referred to CR, and who begin CR participation (at least 1 billed CR session)

Denominator Exclusions

- Patients age <18 y
- Patients who leave against medical advice

Denominator Exceptions

- Documentation of a patient-oriented reason that precludes CR participation after the patient has enrolled (e.g., patient moves to a new location that requires >60 min travel time to arrive at the enrolling CR program)
- Documentation of a medical reason that precludes CR participation after the patient has enrolled (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation)
- Documentation of a healthcare system reason that precludes CR participation after the patient has enrolled (e.g., patient is admitted to a nursing care or long-term care facility, or patient loses medical coverage for CR)

Measurement Period Encounter

Sources of Data Medical record or other database (e.g., administrative, clinical, registry)

Attribution Measure reportable at the facility or provider level

Care Setting Shared responsibility between healthcare centers and CR program

Rationale

Various factors influence CR, including patient-, medical-, program- and system-related issues. Current literature (single-site randomized, systematic review, and observational) suggests that targeting earlier enrollment in rehabilitation improves overall enrollment, such that for every day that passes after hospital discharge there is a ~1% decrease in program participation rate. One randomized trial targeted <10 d for time from qualifying event to enrollment and showed an 18% improvement in time to first visit in CR (64). A systematic review suggested 17 d as the optimal duration of time (65).

As with other CR performance measures, this quality measure addressing time from discharge to start in rehabilitation is important in that it can influence potential processes or barriers at the patient (conflict with return to work), hospital, provider, and program (workflow and throughput) levels.

Regarding patients who have undergone CABG surgery, 1 study found early CR enrollment to be safe and effective, compared with later CR enrollment (66).

Clinical Recommendation(s)

2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)

1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)

1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)

1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)

2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (Class I, Level of Evidence: A) (2,44,49,61), chronic angina (Class I, Level of Evidence: B)(2,50), and/or peripheral artery disease (Class I, Level of Evidence: A) (62,63) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF 35%. (Class I; Level of Evidence: B)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (Class I, Level of Evidence: A)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CR, cardiac rehabilitation; CVD, cardiovascular disease; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention, and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX A. CONTINUED

SHORT TITLE: QM-2 Cardiac Rehabilitation Adherence (≥36 sessions)**QM-2: Cardiac Rehabilitation Adherence (≥36 sessions)**

Measure Description: Percentage of patients, age ≥18 y, with a qualifying event/diagnosis for CR including: MI, PCI, CABG, heart valve repair/replacement, heart transplantation, or HFrEF, who have enrolled in CR and have participated in ≥36 sessions.

Numerator	Patients with a qualifying event/diagnosis who have enrolled in CR and have participated in ≥36 CR sessions by the end of the reporting period
Denominator	All patients with a qualifying event/diagnosis including: MI, PCI, CABG, CSA, valve repair/replacement, heart transplantation, or HFrEF and who were enrolled in CR at least 9 mo before the start of the reporting period Note: The denominator includes a cohort/sample of patients enrolled in CR. The reporting period represents when the performance of the denominator population is assessed. The measurement period represents the timeframe from which the sample in the denominator population completes the recommended number of CR sessions (e.g., adherence to ≥36 sessions). For this measure, the measurement period needs to be at least 9 mo.
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients age <18 y ■ Patients who leave against medical advice
Denominator Exceptions	<ul style="list-style-type: none"> ■ Documentation of a patient-oriented reason that precludes CR participation after the patient has enrolled (e.g., patient moves to a new location that requires >60 min travel time to arrive at the enrolling CR program) ■ Documentation of a medical reason that precludes CR participation after the patient has enrolled (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation) ■ Documentation of a healthcare system reason that precludes CR participation after the patient has enrolled (e.g., patient is admitted to a nursing care or long-term care facility, or patient loses medical coverage for CR)
Measurement Period	Quarterly
Sources of Data	Claims databases, medical record, or other database (e.g., administrative, clinical, registry)
Attribution	Measure reportable at the facility or provider level
Care Setting	Outpatient, CR program

Rationale

Participation in CR significantly improves meaningful patient outcomes, including mortality, readmissions to acute care, functional capacity, psychosocial well-being, and health-related quality of life. A dose-response relationship has been demonstrated between the number of CR sessions and long-term outcomes and has been estimated at 1% mortality reduction per session of CR attended (41,48,67,68). Attending ≥36 sessions is associated with lower risks of death and MI at 4 years compared with attending fewer sessions. Thus, the optimal dose of CR appears to be ≥36 CR sessions. Research suggests that the greater the number of CR sessions attended, the greater the reduction in mortality risk (41). With that in mind, the writing committee felt that a dose of ≥36 CR sessions (e.g., a full dose) would serve as an optimal target for this quality measure.

Clinical Recommendation(s)**2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)**

1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)

1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)

2011 ACCF/AHA Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)

1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)

2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (Class I, Level of Evidence: A) (2,44,49,61), chronic angina (Class I, Level of Evidence: B) (2,50), and/or peripheral artery disease (Class I, Level of Evidence: A) (62,63) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

2013 ACCF/AHA Guideline for the Management of Heart Failure (24)

1. Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status (54-60). (Class I, Level of Evidence: A)

2011 ACCF/AHA Guideline for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF 35%. (Class I; Level of Evidence: B)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (Class I, Level of Evidence: A)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CR, cardiac rehabilitation; CVD, cardiovascular disease; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention, and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX A. CONTINUED

SHORT TITLE: QM-3 Cardiac Rehabilitation Outcomes Communication

QM-3: Cardiac Rehabilitation Communication: Patient Enrollment, Adherence, and Clinical Outcomes

Measure Description: Percentage of patients, age ≥18 y, for whom the receiving CR program has communicated to the referring provider and/or primary care provider regarding the patient's enrollment, attendance, and key clinical outcomes (e.g., changes in functional capacity, quality of life) in the CR program.

Numerator	<p>Patients referred by a healthcare provider to a receiving CR program, for whom the receiving CR program has provided written communication* to the referring provider and/or primary care provider regarding the patient's enrollment, attendance, and clinical outcomes in the CR program</p> <p>*Communication would include information on 3 factors: the patient's enrollment, attendance, and clinical outcomes in the CR program.</p>
Denominator	All patients with a qualifying event/diagnosis in the previous 12 mo including: MI, PCI, CABG, CSA, heart valve repair/replacement, or heart transplantation, who are referred to CR
Denominator Exclusions	<ul style="list-style-type: none"> ■ Patients <18 y ■ Patients who leave against medical advice ■ Patients who were already participating in a CR program
Denominator Exceptions	<ul style="list-style-type: none"> ■ Documentation of a patient-oriented reason that precludes CR participation after the patient has enrolled (e.g., patient moves to a new location that requires >60 min travel time to arrive at the enrolling CR program) ■ Documentation of a medical reason that precludes CR participation after the patient has enrolled (e.g., patient deemed by a medical provider to have a medically unstable, life-threatening condition or has other cognitive or physical impairments that preclude CR participation) ■ Documentation of a healthcare system reason that precludes CR participation after the patient has enrolled (e.g., patient is admitted to a nursing care or long-term care facility, or patient loses medical coverage for CR)
Measurement Period	Encounter
Sources of Data	Medical record or other database (e.g., administrative, clinical, registry)
Attribution	Measure reportable at the facility or provider level
Care Setting	Outpatient, CR Program

Rationale

A key function of CR is to help coordinate the care of patients, often with very complex cardiovascular conditions, who are referred to CR. Communication between the CR program and the referring provider helps provide greater coordination of care by providing information to the referring provider that will be of help in the management of the patient's cardiovascular disease.

Clinical Recommendation(s)

2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes (21)

1. All eligible patients with NSTEMI-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit (38,43-45). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Patients With ST-Elevation Myocardial Infarction (22)

1. Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI (44,46-48). (Class I, Level of Evidence: B)

2013 ACCF/AHA Guideline for the Management of Heart Failure (24)

1. Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status (54-60). (Class I, Level of Evidence: A)

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update (28)

1. All eligible patients with 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 (2,44,49,50). (Class I, Level of Evidence: A)

2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI (Class I, Level of Evidence: A) (2,44,49,61), chronic angina (Class I, Level of Evidence: B) (2,50), and/or peripheral artery disease (Class I, Level of Evidence: A) (62,63) within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update (27)

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease (Class I; Level of Evidence: A) or current/prior symptoms of heart failure and an LVEF ≤35%. (Class I; Level of Evidence: B)

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery (29)

1. Cardiac rehabilitation is recommended for all eligible patients after CABG (2,44,49-52). (Class I, Level of Evidence: A)

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention (30)

1. 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; Level of Evidence: A)

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; ACS, acute coronary syndrome; AHA, American Heart Association; CABG, coronary artery bypass graft; CR, cardiac rehabilitation; CVD, cardiovascular disease; HF, heart failure; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI-ACS, non-ST-elevation myocardial infarction-acute coronary syndromes; PCI, percutaneous coronary intervention, and SCAI, Society for Cardiovascular Angiography and Interventions.

APPENDIX B. AUTHOR LISTING OF RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—2018 ACC/AHA CLINICAL PERFORMANCE AND QUALITY MEASURES FOR CARDIAC REHABILITATION

Committee Member	Employment	Consultant	Speaker	Ownership/ Partnership/ Principal	Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness
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Gaurav Banka	University of California Los Angeles—Fellow	None	None	None	None	None	None
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Jensen Chiu	Senior Associate—IMPAQ International	None	None	None	None	■ IMPAQ International, LLC†	None
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*No financial relationship.

†Significant (greater than \$5,000) relationship.

ACC indicates American College of Cardiology; AHA, American Heart Association; and, GRQ, Governmental Representation with Quality.

**APPENDIX C. PEER REVIEWER RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES—2018
 ACC/AHA CLINICAL PERFORMANCE AND QUALITY MEASURES FOR CARDIAC REHABILITATION**

Peer Reviewer	Representation	Consultant	Speakers Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness
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John Teeters	Official ACC BOG	None	None	None	None	None	None
Philip Ades	Official AHA	None	None	None	None	None	None
Leslie Cho	Official AHA	None	None	None	■ Lilly*	None	None
Todd Brown	Official AACVPR	None	None	None	None	None	None
Suresh Mulukutla	Content: ACTION Steering Committee	None	None	None	None	None	None
Deepak L. Bhatt	Content: NCDR SQOC	■ Duke Clinical Research Institute: Bristol-Myers Squibb/Pfizer ■ Duke Clinical Research Institute: Eli Lilly	None	None	■ AstraZeneca† ■ Bristol Myers Squibb† ■ Eli Lilly and Company† ■ EVOLVE Short DAPT Study: Boston Scientific	None	None
Jneid Hani	Content: ACC/AHA TFDS	None	None	None	None	None	None
Lee Fleisher	Content: ACC/AHA TFPG	■ NQF*	None	None	None	None	None

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*No financial relationship.

†Significant (greater than \$5,000) relationship.

AACVPR indicates American Association of Cardiovascular and Pulmonary Rehabilitation; ACC, American College of Cardiology; AHA, American Heart Association; BOG, Board of Governors; NCDR, National Cardiovascular Data Registry; NQF, National Quality Forum; SQOC, Science and Quality Oversight Committee; TFDS, Task Force on Data Standards; TFPG, Task Force on Practice Guidelines; and TFPM, Task Force on Performance Measures.