

Performance Measures

Note: The text in this section was adapted from the Centers for Medicare & Medicaid Services publication, *Medicare Quality Improvement Priorities* (August 2003, CMS Publication Number 11041).

Acute Myocardial Infarction National Project Overview

Over 300,000 Medicare patients are hospitalized for heart attack (acute myocardial infarction) each year. Many do not receive important therapies that are known to be beneficial. The National Acute Myocardial Infarction Project focuses on increasing the use of appropriate care processes to improve patient outcome.

Public Health Importance

Cardiovascular disease is America's biggest killer. Every minute an American dies of coronary heart disease. Each year, approximately 1.1 million people experience an acute myocardial infarction (AMI) or heart attack. Almost two-thirds of heart attack patients do not make a complete recovery, and people who survive the acute phase have a chance of related illness and death that is two to nine times higher than that of the general population. One third dies during the acute phase. Older Americans bear the brunt of this medical burden. Over 80 percent of all heart attack-related deaths occur in individuals age 65 or older.¹

Heart disease is the leading cause of hospitalization among persons age 65 or older. In 1996, AMI accounted for 394,850 hospitalizations among Medicare beneficiaries, or about 12 hospitalizations for every 1,000 enrollees. The payments to hospitals for these episodes totaled over \$3.6 billion, or about \$9,780 per discharge.²

Main Objective

To decrease the morbidity and mortality associated with AMI in Medicare beneficiaries.

Process Objectives

To increase the use of the following care processes for patients hospitalized with AMI:

- Administration of aspirin within 24 hours before or after hospital arrival
- Administration of beta blocker within 24 hours of hospital arrival
- Timely initiation of reperfusion therapy (either thrombolytic agent or percutaneous coronary intervention)
- Aspirin prescribed at discharge
- Beta blocker prescribed at discharge
- Angiotensin converting enzyme (ACE) inhibitor prescribed at discharge if left ventricular ejection fraction (LVEF) is impaired
- Smoking cessation counseling during hospitalization

The project also includes select related measures as well as test measures for future quality improvement activities.

Clinical Background

Clinical Trials

Multiple clinical trials have demonstrated the efficacy of aspirin, beta blockers, early reperfusion, and ACE inhibitors for appropriate patients with AMI.

CMS Measure Specifications for Acute Myocardial Infarction

<i>Quality Measures</i>	<i>Criterion Met or Acceptable Alternative</i>
1. Acute myocardial infarction (AMI) patients without aspirin contraindications who received aspirin within 24 hours before or after hospital arrival.	Aspirin at Arrival. Documentation that aspirin was prescribed within 24 hours before or after hospital arrival in cases where there is no documentation of one or more of the following potential contraindications/reasons for not prescribing aspirin on arrival: <ul style="list-style-type: none">• Aspirin allergy• Active bleeding on arrival or within 24 hours after arrival• Warfarin/Coumadin as pre-arrival medication

<i>Quality Measures</i>	<i>Criterion Met or Acceptable Alternative</i>
	<ul style="list-style-type: none"> Other reason documented by a physician, nurse practitioner, or physician assistant for not prescribing aspirin on arrival
<p>2. AMI patients without aspirin contraindications who are prescribed aspirin at hospital discharge.</p>	<p>Aspirin Prescribed at Discharge. Documentation that aspirin was prescribed at discharge in cases where there is no documentation of one or more of the following potential contraindications/reasons for not prescribing aspirin at discharge:</p> <ul style="list-style-type: none"> Aspirin allergy Active bleeding on arrival or during hospital stay Warfarin/Coumadin prescribed at discharge Other reason documented by a physician, nurse practitioner, or physician assistant for not prescribing aspirin at discharge
<p>3. AMI patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACEI) contraindications who are prescribed an ACEI at hospital discharge.</p>	<p>ACEI for LVSD. Documentation that an ACEI was prescribed at discharge in patients with LVSD who are not participating in an ACEI alternative clinical trial at the time of discharge and where there is no documentation of a potential contraindication/reason for not prescribing an ACEI at discharge (ACEI allergy, moderate or severe aortic stenosis, or other reason documented by a physician, nurse practitioner, or physician assistant for not prescribing an ACEI at discharge). LVSD is defined as documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular function (LVF) consistent with moderate or severe systolic dysfunction. When there are two or more documented LVFs, the LVF closest to discharge is used.</p>
<p>4. AMI patients with a history of smoking cigarettes who are given smoking cessation advice or counseling during stay.</p>	<p>Adult Smoking Cessation Advice/Counseling. Documentation of smoking cessation advice or counseling in patients with a history of smoking cigarettes anytime during the year prior to hospital arrival. Smoking cessation advice/counseling includes prescription of a cessation aid.</p>
<p>5. AMI patients without beta blocker contraindications who are prescribed a beta blocker at hospital discharge.</p>	<p>Beta Blocker Prescribed at Discharge. Documentation that a beta blocker was prescribed at discharge in cases where there is no documentation of one or more of the following potential contraindications/reasons for not</p>

Performance Measures

<i>Quality Measures</i>	<i>Criterion Met or Acceptable Alternative</i>
	<p>prescribing a beta blocker at discharge:</p> <ul style="list-style-type: none"> • Beta blocker allergy • Bradycardia (heart rate less than 60 bpm) on day of discharge or day prior to discharge while not on a beta blocker • Second or third degree heart block on electrocardiogram (ECG) on arrival or during hospital stay and does not have a pacemaker • Systolic blood pressure less than 90 mm Hg on day of discharge or day prior to discharge while not on a beta blocker • Other reason documented by a physician, nurse practitioner, or physician assistant for not prescribing a beta blocker at discharge
<p>6. AMI patients without beta blocker contraindications who received a beta blocker within 24 hours after hospital arrival.</p>	<p>Beta Blocker at Arrival. Documentation that a beta blocker was prescribed within 24 hours after hospital arrival in cases where there is no documentation of one or more of the following potential contraindications/reasons for not prescribing a beta blocker on arrival:</p> <ul style="list-style-type: none"> • Beta blocker allergy • Bradycardia (heart rate less than 60 bpm) on arrival or within 24 hours after arrival while not on a beta blocker • Heart failure on arrival or within 24 hours after arrival • Second or third degree heart block on ECG on arrival or within 24 hours after arrival and does not have a pacemaker • Shock on arrival or within 24 hours after arrival • Systolic blood pressure less than 90 mm Hg on arrival or within 24 hours after arrival • Other reason documented by a physician, nurse practitioner, or physician assistant for not prescribing a beta blocker on arrival
<p>7a. AMI patients receiving primary thrombolytic therapy during the hospital stay with a time from hospital arrival to thrombolysis of 30 minutes or less.</p>	<p>Median Time to Thrombolytic Therapy. Time from arrival to initial administration of a thrombolytic agent is ≤ 30 minutes in patients with ST segment elevation or LBBB documented on the interpretation of the 12-lead ECG done closest to hospital arrival (includes ECGs done up to one hour prior to hospital arrival and ECGs done after hospital arrival).</p>

<i>Quality Measures</i>	<i>Criterion Met or Acceptable Alternative</i>
8a. AMI patients receiving primary percutaneous transluminal coronary angioplasty (PTCA) during the hospital stay with a time from hospital arrival to PTCA of 90 minutes or less.	Median Time to PTCA. Time from arrival to PTCA is ≤ 90 minutes in patients with ST segment elevation or LBBB documented on the interpretation of the 12-lead ECG done closest to hospital arrival (includes ECGs done up to one hour prior to hospital arrival and ECGs done after hospital arrival). Patients who received thrombolytic therapy during the hospital stay are excluded. If the date/ time the lesion is first accessed is documented, this is used as the PTCA time.

Clinical Background (continued)

For example, in the Second International Study of Infarct Survival (ISIS-2), the early use of aspirin in patients with an evolving myocardial infarction was associated with a 23 percent reduction in short-term mortality.³ In pooled analyses, long-term use of aspirin after an AMI reduces vascular mortality by 13 percent, nonfatal myocardial infarction by 31 percent, and nonfatal stroke by 42 percent.⁴

The early use of beta-blockers reduced short-term mortality from 4.3 to 3.7 percent in the First International Study of Infarct Survival and from 4.9 to 4.3 percent in the Metoprolol in Acute Myocardial Infarction (MIAMI) trial.⁵ In pooled analyses, long-term use of beta blockers after an AMI reduces mortality by 23 percent.⁶

The use of prompt acute reperfusion (either thrombolytic therapy or primary percutaneous coronary interventions) in appropriate patients has been shown to reduce mortality. A benefit of 23 lives saved per 1,000 treated with thrombolytic therapy per hour of earlier treatment has been described.⁷ Similarly, in patients treated with primary angioplasty during the first several hours after onset of symptoms, the survival benefit depends on time to reperfusion.⁸

ACE inhibitors, given long-term after an AMI, have been shown to reduce mortality in patients with impaired left ventricular systolic function. A 20 percent reduction was found in the Survival and Ventricular Enlargement (SAVE) trial, 27 percent reduction in the Acute Infarction Ramipril Efficacy (AIRE) trial, and 22 percent reduction in the Trandolapril Cardiac Evaluation (TRACE) trial.⁹⁻¹¹ Smoking cessation after AMI decreases mortality. Patients who continue to smoke heavily have a mortality rate that is 1.33 to 2.55 times that of patients who quit.¹²

Clinical Guidelines

The American College of Cardiology and the American Heart Association summarized the scientific evidence and published clinical guidelines for the management of AMI in 1996 and an update in 1999.^{13,14} Guidelines for the management of patients with non-ST-segment elevation myocardial infarction were published in 2000 and updated in 2002.^{15,16} The process objectives for

Performance Measures

the Centers for Medicare & Medicaid Service's (CMS) AMI national project are consistent with recommendations in these guidelines. The quality measures are not clinical guidelines, but adapt information from the guidelines in order to measure performance.

Opportunity for Improvement

In 1992, CMS initiated the Cooperative Cardiovascular Project (CCP), a quality improvement project focusing on AMI in the Medicare population. The project began as a pilot initiative in four states and was subsequently expanded nationally.^{17, 18} The National Acute Myocardial Infarction Project, initiated in 1999, continued to measure national performance in the care of AMI. Data from this project demonstrate the ongoing need for improvement in AMI care.

Select quality measure rates between the years 2000 and 2001 are shown below. National average rates are listed; it should be recognized, however, that substantial geographic variation exists.¹⁹ Patients with contraindications for the therapy are omitted from the analysis. Thus, because all patients in the analysis are considered eligible candidates for the therapy, the target rate for the indicator is 100 percent.

The results indicate that guideline-based therapies are substantially underutilized:

- Aspirin administration on admission, 83%
- Aspirin prescribed at discharge from the hospital, 84%
- Beta blocker prescribed at discharge, 78%
- ACE inhibitor prescribed at discharge, 71%
- Smoking cessation advice given during hospitalization, 39%

Because the use of these therapies is associated with improved survival, increasing use nationwide could save 3,000 lives per year.^{11, 14}

References

1. American Heart Association. 1999 Heart and stroke statistical update. Dallas, TX. American Heart Association, 1998.
2. Health Care Financing Review: Medicare and Medicaid statistical supplement, 1998. Health Care Financing Administration. Baltimore, MD, 1998.
3. ISIS-2 (Second International Study of Infarct Survival) Collaborative Group. Randomised trial of intravenous streptokinase, oral aspirin, both or neither among 17187 cases of acute myocardial infarction: ISIS-2. *Lancet*. 1988;2:349-360.
4. Antiplatelet Trialists' Collaboration. Secondary Prevention of Vascular Disease by Prolonged Antiplatelet Treatment. *BMJ*. 1988;296:320-31.
5. The MIAMI Trial Research Group. Metoprolol in acute myocardial infarction (MIAMI). A randomized placebo-controlled international trial. *Eur Heart J*. 1985;6:199-226.
6. Yusuf S, Peto R, Lewis J, Collins R, Sleight P. Beta blockade during and after myocardial infarction: An overview of randomized trials. *Progress in Cardiovascular Disease*. 1985;27:335-371.

7. Trent R, Adams J, Jennings K, Rawles J. Impact of resuscitation and thrombolysis on mortality rate from acute myocardial infarction. *Int J Cardiol.* 1995;49:33-37.
8. Brodie BR, Stuckey TD, Wall TC, Kissling G, Hansen CJ, Muncy DB, Weintraub RA, Kelly TA. Importance of time to reperfusion for 30-day and late survival and recovery of left ventricular function after primary angioplasty for acute myocardial infarction. *J Am Coll Cardiol.* 1998;32:1312-9.
9. Pfeffer MA, Braunwald E, Moye LA, Basta L, Brown EJ Jr, Cuddy TE, Davis BR, Geltman EM, Goldman S, Flaker GC, et al.: Effect of captopril on mortality and morbidity in patients with left ventricular dysfunction after myocardial infarction. Results of the survival and ventricular enlargement trial. The SAVE investigators. *N Engl J Med.* 1992;327:669-77.
10. The Acute Infarction Ramipril Efficacy (AIRE) Study Investigators. Effect of ramipril on mortality and morbidity of survivors of acute myocardial infarction with clinical evidence of heart failure. *Lancet.* 1993;342:821-8.
11. Kober L, Torp-Pedersen C, Carlsen JE, Bagger H, Eliassen P, Lyngborg K, Videbaek J, Cole DS, Auclert L, Pauly NC. A clinical trial of the angiotensin-converting-enzyme inhibitor trandolapril in patients with left ventricular dysfunction after myocardial infarction. trandolapril cardiac evaluation (TRACE) study group. *N Engl J Med.* 1995 Dec 21;333 (25):1670-6.
12. Burling TA, Singleton EG, Bigelow GE, Baile WF, Gottlieb SH. Smoking following myocardial infarction: A critical review of the literature. *Health Psychology.* 1984;3:83-96.
13. Ryan TJ, Anderson JL, Antman EM, Brainiff BA, Brooks NH, Califf RM, Hillis LD, Hiratzka LF, Rapaport E, Riegel BJ, Russell RO, Smith EE III, Weaver WD. ACC/AHA Guidelines for the management of patients with acute myocardial infarction: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Acute Myocardial Infarction). *J Am Coll Cardiol.* 1996;28:1328-428.
14. Ryan TJ, Antman EM, Brooks NH, Califf RM, Hillis LD, Hiratzka LF, Rapaport E, Riegel B, Russell RO, Smith EE III, Weaver WD. ACC/AHA Guidelines for the management of patients with acute myocardial infarction: 1999 Web update. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Acute Myocardial Infarction). Available at: <http://www.acc.org>. Accessed on January 10, 2003.
15. Ryan TJ, Anderson JL, Antman EM, Brainiff BA, Brooks NH, Califf RN, Hillis LD, Hiratzka LF, Rapaport E, Riegel BJ, Russell RO, Smith EE III, Weaver WD. ACC/AHA Guidelines for the Management of Patients with Acute Myocardial Infarction: 2000 Update. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Acute Myocardial Infarction).
16. Gibbons RJ, Antman EM, Alpert JS, Faxon DP, Fuster V, Gregoratos G, Hiratzka LF, Smith SC. ACC/AHA guideline update for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on the Management of Patients with Unstable Angina). Available at: http://www.acc.org/clinical/guidelines/unstable/update_index.htm. Accessed on January 10, 2003.

Performance Measures

17. Ellerbeck DF, Jencks SF, Radford MJ, Kresowik TF, Craig AS, Gold JA, Krumholz HM, Vogel RA. Quality of care for Medicare patients with acute myocardial infarction: A four-state pilot study from the Cooperative Cardiovascular Project. *JAMA*. 1995;273:1509-1514.
18. Marciniak TA, Ellerbeck EF, Radford MJ, Kresowik TF, Gold JA, Krumholz HM, Kiefe CI, Allmann RM, Vogel RA, Jencks, SF. Improving the quality of care for Medicare patients with acute myocardial infarction. *JAMA*. 1998;279:1351-1357.
19. O'Connor GT, Quinton HB, Traven ND, Ramunno LD, Dodds TA, Marciniak TA, Wennberg JE. Geographic variation in the treatment of elderly patient after acute myocardial infarction: National Cooperative Cardiovascular Project. *JAMA*. 1999;281:627-633.

Heart Failure National Project Overview

Heart failure accounts for more than 700,000 hospitalizations among Medicare beneficiaries every year and is associated with high rates of mortality and morbidity. The National Heart Failure Project focuses on increasing the use of appropriate care processes to improve outcomes for patients hospitalized with heart failure.

Public Health Importance

Heart failure is a uniquely appropriate target for quality improvement efforts. It is a common disease in the elderly, accounting for more hospital admissions than any other diagnosis in patients over the age of 65. The prevalence of heart failure is rising dramatically with the aging of the United States population. In addition, heart failure is associated with 20 to 30 percent one-year mortality rates in the elderly and causes significant functional limitation.¹ Estimates of annual expenditures on heart failure in the U.S. range from \$10 billion to \$40 billion.^{2,3}

Main Objective

To decrease the morbidity and mortality associated with heart failure in Medicare beneficiaries.

Process Objectives

To increase the use of the following care processes for patients hospitalized with heart failure:

- Appropriate diagnostic tests to evaluate left ventricular systolic function (LVSF) in heart failure
- Angiotensin-converting enzyme inhibitor (ACEI) for heart failure patients with a left ventricular ejection fraction (LVEF) less than 40 percent
- Smoking cessation counseling during hospitalization
- Comprehensive discharge instructions to patients hospitalized with heart failure

Clinical Background

The quality measures for heart failure are based on extensive scientific evidence demonstrating their efficacy in improving quality of care of heart failure patients.

Opportunity For Improvement

Surveys published between the late 1980s and the late 1990s showed ACE inhibitor prescription rates between 30 and 70 percent. Data from the National Heart Failure Project from 2000 and 2001 show that substantial gaps in the quality of the care of patients with heart failure still exist. The results listed below are national averages; however, measure rates are characterized by substantial geographic variation. Because these measures only include those patients eligible for the intervention, the target measure rates are 100 percent.

- Documentation of LVSF in the hospital chart: 69%
- ACE inhibitor prescription at hospital discharge: 66%

CMS Measure Specifications for Heart Failure

<i>Quality Measures</i>	<i>Criterion Met or Acceptable Alternative</i>
<p>1. Heart failure patients discharged home with written instructions or educational material given to patient or caregiver at discharge or during the hospital stay address all of the following:</p> <ul style="list-style-type: none"> • Activity level • Diet • Discharge medications • Follow-up appointment • Weight monitoring • What to do if symptoms worsen 	<p>Discharge Instructions. For patients discharged home, with or without home health services, documentation of written instructions or education material given to the patient or caregiver must address all of the following:</p> <ul style="list-style-type: none"> • The patient’s activity level after discharge • The patient’s diet/fluid intake after discharge • The names of all discharge medications • Follow-up with a physician/nurse practitioner/physician assistant after discharge • Weight monitoring after discharge • What to do if heart failure symptoms worsen after discharge
<p>2. Heart failure patients with documentation in the hospital record that left ventricular function (LVF) was assessed before arrival, during hospitalization, or is planned for after discharge.</p>	<p>LVF Assessment. In cases where there is no reason documented by a physician, nurse practitioner, or physician assistant for not assessing LVF, there must be:</p> <ul style="list-style-type: none"> • Documentation that an echocardiogram, appropriate nuclear medicine test, or a cardiac catheterization with a left ventriculogram was done during this hospital stay, OR

<i>Quality Measures</i>	<i>Criterion Met or Acceptable Alternative</i>
	<ul style="list-style-type: none"> • Documentation that one of the above diagnostic tests was performed anytime prior to arrival, OR • Documentation of LVEF, either as an ejection fraction or a narrative qualitative description (e.g., “Pt. admitted with severe LV dysfunction.”), OR • Documentation of a plan to assess LVEF after discharge
<p>3. Heart failure patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACEI) contraindications who are prescribed an ACEI at hospital discharge.</p>	<p>ACEI for LVSD. Documentation that an ACEI was prescribed at discharge in patients with LVSD who are not participating in an ACEI alternative clinical trial at the time of discharge and where there is no documentation of a potential contraindication/reason for not prescribing an ACEI at discharge (ACEI allergy, moderate or severe aortic stenosis, or other reason documented by a physician, nurse practitioner, or physician assistant for not prescribing an ACEI at discharge). LVSD is defined as documentation of a left ventricular ejection fraction (LVEF) less than 40 percent or a narrative description of LVEF consistent with moderate or severe systolic dysfunction. When there are two or more documented LVEFs, the LVEF closest to discharge is used.</p>
<p>4. Heart failure patients with a history of smoking cigarettes who are given smoking cessation advice or counseling during hospital stay.</p>	<p>Adult Smoking Cessation Advice/Counseling. Documentation of smoking cessation advice or counseling in patients with a history of smoking cigarettes anytime during the year prior to hospital arrival. Smoking cessation advice/counseling includes prescription of a cessation aid.</p>

References

1. Parmley WW. Cost-effective management of heart failure. *Clin Cardiol.* 1996;19:240-2.
2. O’Connell JB, Bristow MR. Economic impact of heart failure in the United States: time for a different approach. *J Heart Lung Transplant.* 1994;37:161-84.
3. Garg R, Yusuf S. Overview of randomized trials of angiotensin-converting enzyme inhibitors on mortality and morbidity in patients with heart failure. *JAMA.* 1995; 273:1450- 1456.
4. Heart Failure Society of America. HFSA guidelines for management of patients with heart failure caused by left ventricular systolic dysfunction- pharmacological approaches. *J Cardiac Failure.* 1999; 5:357-382.
5. Hunt S, Baker D, Chin M, Cinquegrani M, Feldman A, Francis GS et al. ACC/AHA guidelines for the evaluation and management of chronic heart failure in the adult: a report of the

Performance Measures

American College of Cardiology/ American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1995 Guidelines for the Evaluation and Management of Heart Failure). 2001. Available at: www.acc.org/clinical/guidelines/failure/hf_index.htm. Accessed April 26, 2003.