A Performance Monitoring Resource for Critical Access Hospitals, States, and Communities

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Policy Brief #28
August 2012

Evidence-Based Acute Myocardial Infarction (AMI) Quality Improvement Programs/Strategies for Critical Access Hospitals

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This brief is one in a series of policy briefs identifying and assessing evidence-based patient safety and quality improvement interventions appropriate for use by state Flex Programs and Critical Access Hospitals (CAHs).

Introduction

This policy brief focuses on evidence-based AMI Quality Improvement (QI) programs and strategies that are applicable to CAHs. This work is part of a series of Flex Monitoring Team policy briefs, whose purpose is 1) to identify successful evidence-based quality improvement (QI) programs and strategies that could be replicated in CAHs and 2) to disseminate information about these programs and strategies to State Flex Programs.

Background

QI programs can encompass a wide range of strategies, and many QI interventions include multiple strategies, which has made it difficult to evaluate their effectiveness. There is a growing awareness that QI strategies need to rest on a strong evidence base, and that greater attention needs to be paid to understanding why particular interventions work and the factors that affect their success in different settings.[1-3]

Evidence-based quality measures for AMI care have been recommended by the American College of Cardiology and American Heart Association (ACC/AHA).[4] Figure 1 shows the AMI process of care measures currently being used in the Centers for Medicare and Medicaid Services (CMS) Inpatient and Outpatient Quality Reporting Programs and publicly reported in Hospital Compare.[5]

Importance to CAHs and the Flex Program

Improving the quality of care provided by CAHs is an important goal of the Medicare Rural Hospital Flexibility (Flex) Program. Throughout the Flex Program, CAHs have implemented a range of QI activities with support from State Flex Programs, as documented by previous Flex Monitoring Team CAH surveys and case studies.[6-8] A recent Flex Monitoring Team policy brief focused specifically on regional systems of care for patients with ST-segment elevation myocardial infarction (STEMI).[9]

Key Findings

- Few reports in peer-reviewed literature evaluate the effectiveness of Quality Improvement (QI) programs for acute myocardial infarction (AMI) quality of care specifically for Critical Access Hospitals (CAHs).
- QI programs to improve hospitals' AMI care in the literature primarily focus on: 1) improving the processes of care and creating standardized pathways of care in AMI in individual hospitals and 2) creating larger networks for delivery of AMI care.
- Several QI strategies have been shown to improve AMI care and are potentially replicable in CAHs.

This study was conducted by the Flex Monitoring Team with funding from the Federal Office of Rural Health Policy (PHS Grant No. U27RH01080).

Figure 1. CMS AMI Quality Measures

*Inpatient Measures**
- Aspirin at Arrival**
- Fibrinolytic medication within 30 minutes of arrival
- Aspirin at Discharge
- Angiotensin Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) for Left Ventricular Systolic Dysfunction (LVSD)**
- Beta blocker at discharge**
- Percutaneous Coronary Intervention (PCI) within 90 minutes of hospital arrival

Outpatient/Emergency Department Measures
- Aspirin at arrival
- Fibrinolytic medication within 30 minutes of arrival
- Median Time to Fibrinolysis
- Median time to transfer to another facility for acute coronary intervention
- Median Time to Electrocardiogram (ECG)

*CMS retired the AMI smoking cessation advice quality measure effective January 1, 2012. The Joint Commission has adopted a set of global tobacco cessation measures, which apply to eligible patients with AMI as well as patients with other medical conditions.

**CMS suspended data collection for these three measures effective January 1, 2012; they remain Joint Commission measures.

Support for QI in CAHs is a core activity area of focus in the current State Flex Programs, and the Federal Office of Rural Health Policy, through the Flex Program, has implemented a new special project, the Medicare Beneficiary Quality Improvement Project (MBQIP). MBQIP is focused on Medicare beneficiary health status improvement, and is being implemented in three phases. Phase two includes a focus on improving outpatient AMI measures, which makes it especially important to identify successful QI programs that can be replicated in CAHs.

Over the past several years, CAHs have improved their overall performance on publicly reported inpatient process of care quality measures for AMI. However, CAH performance on AMI measures continues to lag behind that of rural and urban Prospective Payment System hospitals. In addition, there is considerable variation in quality performance among CAHs, with some hospitals performing well, and others needing much more improvement.

Approach

We reviewed and synthesized several types of literature on QI programs and strategies, including articles in peer-reviewed healthcare journals and reports from a variety of public and private organizations working on QI issues in hospitals. The focus of this literature review and synthesis was on initiatives to improve care for AMI. We sought to identify programs and strategies that have been successfully implemented in small rural hospitals, as well as other programs and strategies that hold promise for adoption in the small rural hospital environment because the type of resources used to implement them are generally available to CAHs. A literature review on heart care prepared by the Oklahoma Foundation for Medical Quality was a valuable resource.[10]

To help identify additional QI programs and strategies that have not been documented in the literature, we consulted with members of the Flex Monitoring Team Expert Work Group, including State Flex Coordinators and CAH administrators. As needed, we also contacted sponsoring organizations to provide supplemental information on participant characteristics and QI methods and strategies used.

Results

Hospital QI programs to improve AMI care have primarily focused on 1) improving the processes of care and creating standardized pathways of care in AMI in individual hospitals and 2) creating larger networks for care delivery in AMI.

The programs and strategies for improving AMI care that were identified in peer-reviewed literature and through reports from Quality Improvement Organizations (QIOs) or other state or national organizations are summarized by category below (the numbers after each program or strategy refer to the references that follow). See Table 1 for additional information about these programs and strategies, sponsoring organizations, program details and results, and the extent to which they included CAHs and other small rural hospitals, and Figure 2 for links to Tools and Resources for implementing the AMI strategies.

QI Programs/Strategies focused on improving AMI processes of care in individual hospitals:

- Provision of baseline data on hospital performance (e.g., data on individual hospital-level performance on AMI care quality measures provided prior to implementation of a QI intervention).[11-14]
- Data feedback and benchmarking to assess and communicate information about improvements in performance (e.g., data provided on hospital performance over time and in relation to other hospitals and/or desired levels of performance). [12,13,20,24,30,34]
- Development of a QI plan (e.g., a plan for the hospital that defines the QI goals and activities to be implemented, the roles and responsibilities of hospital staff, performance indicators to be used, and evaluation metrics).[11,13,15,25,30,31,33]
- Engagement of staff through the support of physician/nursing/pharmacy champions using educational sessions with medical staff or subsets of medical staff (e.g., Emergency Department) and/or QI staff including guidelines, tools, and literature and financial bonuses for guideline use.[11,13,15, 17,21,23,25,29,31,33]
- Process flow tools such as standardized/ pre-printed admission order sheets, clinical pathways, standing orders, medical records checklists, forms and reminders, patient management. [13,15, 18,20,21,24, 25,26,29,30,32,34] (See Figure 1 for examples.)

QI Programs/Strategies focused on creating larger networks for care delivery in AMI:

- Creation of a network of hospitals to ensure effective transfers of AMI patients. [11,12,19,24,31-33]
- Provision of data feedback and benchmarking related to handoffs and shared care with larger hospitals. [11-14,19,20,26,30,34]
- Standardized transfer forms and processes/ medical records checklists, forms and reminders. [16,18,22,25,32-34]
- Assure seamless handoff that includes real-time communication.[16,24,32,33,34]

Conclusions

While few articles in the peer-reviewed literature have evaluated the effectiveness of AMI QI programs specifically for CAHs, several QI programs and strategies have been shown to improve AMI care in hospitals and are potentially replicable in CAHs.

How can State Flex Programs help CAHs improve outcomes for AMI measures?

- Encourage CAHs to use the evidence-based AMI programs, tools and resources highlighted in this policy brief.
- Encourage CAHs to report data on AMI quality measures and benchmark their performance against other CAHs. Participation in MBQIP will allow hospitals to do this for outpatient (Emergency Department) AMI measures.
- Provide technical assistance and support to assist CAHs in implementing evidence-based QI activities to improve AMI care.
- Foster collaborative relationships between CAHs and QIOs.
- Encourage CAHs to participate in regional STEMI systems of care as described in Flex Monitoring Team Policy Brief #23. http://flexmonitoring.org/documents/Policy-Brief23_STEMI.pdf

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This policy brief is available at www.flexmonitoring.org. For more information, please contact Shailendra Prasad, pras0054@umn.edu.

Figure 2. Tools and Resources to Improve AMI Care

To help hospitals improve their AMI care, many online tools are available including:

Institute for Healthcare Improvement (IHI) Tools and Programs

- "Getting Started Kit: Improved Care for Acute Myocardial Infarction." This how-to guide describes key evidence-based care components that should be provided to acute myocardial infarction (AMI) patients, describes how to implement these interventions, and recommends measures to gauge improvement. The guide was initially developed as part of IHI's 100,000 Lives Campaign. Available at: http://www.ihi.org/knowledge/Pages/Tools/HowtoGuideImprovedCareAMI.aspx

- IHI Mentorship programs for AMI process improvement http://www.ihi.org/IHI/Programs/Campaign/mentor_registry_ami.htm

- Institute for Healthcare Improvement conferences and seminars http://www.ihi.org/offerings/Conferences/Pages/default.aspx

Maryland Health Care Commission Hospital Leader Guide

This guide from the Maryland Health Care Commission describes best practices for AMI care and links to online tools. Available at: http://mhcc.maryland.gov/consumerinfo/hospitalguide/hospital_leaders/best_practices/ami.htm

Agency for Healthcare Research and Quality (AHRQ).

The ARHQ Innovations Exchange website provides links to tools and innovations used to improve quality for various health care conditions, including AMI. Available at: http://www.innovations.ahrq.gov/index.aspx.

- An example from the AHRQ Innovations Exchange website is: "Alerts, Standing Orders, and Care Pathways Boost Quality of Care for Pneumonia, Heart Attack, and Heart Failure," 2009. Available at: http://www.innovations.ahrq.gov/content.aspx?id=1750

Table 1. Evidence-Based AMI QI Programs/Strategies					
Measures Addressed, Strategies Used	Sponsoring Organizations	Program Description	Results	Inclusion of CAHs/small rural hospitals	Citations
Measures addressed: All AMI measures Strategies Used: Care pathways for AMI and standing orders	Reid Hospital and Health Care Services Richmond, IN	When AMI is diagnosed, a message pops up to alert the nurse to start an AMI care pathway e.g., the system notes that the patient's left ventricular ejection fraction must be assessed on diagnosis, identifies any previous left ventricular ejection fraction records for the patient and posts them automatically to the record for physician review. At discharge, patient care instructions automatically print out with customized discharge orders.	• Significant improvement on 24 of 25 public indicators: improvement from 74-88% to 100% performance on 9 of the 10 measures. • This level of performance was largely sustained (ranging between 96-100%) in subsequent quarters.	Project was done in a 250 bed rural hospital, but would be easily replicable in small rural hospitals.	The Commonwealth Fund Web site, January 24, 2006.[29] http://www.commonwealthfund.org/Innovations/Case-Studies/2006/Jan/Case-Study--Achieving-High-Quality-Care-at-Reid-Hospital---Health-Care-Services.aspx.
Measures addressed: PCI Strategies Used: 4-step triage algorithm and 3 treatment protocols available at: http://circ.ahajournals.org/content/117/9/1145.long	The Stat Heart Program, a regional consortium in Illinois	This study assessed the feasibility of interhospital transfer of ST-elevation myocardial infarction (STEMI) patients for primary percutaneous coronary intervention (PCI) from non–PCI-capable (STEMI-referral) to PCI-capable (STEMI-accepting) facilities. A standard treatment protocol using rapid inter-hospital transfer for primary PCI or rescue PCI after full-dose intravenous fibrinolysis (in event of unanticipated transfer delays), was initiated by the STEMI-referral emergency department physician. Three time inter	• The median door 1–to-departure time was 46 minutes; approximately two thirds of this delay was attributable to the wait for transport arrival and departure. • The transport and door 2–to-balloon times were 29 minutes and 35 minutes respectively. • The door 1–to-balloon time was 117 minutes with 12.2% and 58%	The hospitals studied were small hospitals in rural areas and larger hospitals that accepted transfers.	Aguirre et al.[12] The PubMed link to free full text of this article is: http://www.ncbi.nlm.nih.gov/pubmed/1826815

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		vals were evaluated: STEMI-referral care (door 1 to departure), transport time (door 1 departure to STEMI-accepting hospital arrival [door 2]), and STEMI-accepting hospital care (door 2 to balloon).	of patients achieving a time of ≤90 and ≤120 minutes, respectively. • No adverse clinical events during transport.		
<u>Measures addressed:</u> Smoking Cessation <u>Strategies Used:</u> Participation in inpatient smoking cessation classes and/or cardiac rehabilitation.	The Prospective Registry Evaluating Outcomes After Myocardial Infarction Events and Recovery (PREMIER)	Review of successful methods of smoking cessation following AMI.	• 639 of 834 patients who smoked at the time of AMI hospitalization were interviewed and reported smoking habits 6 months post-AMI (77%). Of these, 297 were not smoking at 6 months (46%). • Odds of smoking cessation were greater among those with recommendations for cardiac rehabilitation (odds ratio [OR], 1.80; 95% confidence interval [CI], 1.17-2.75) and being treated at a facility that offered an inpatient smoking cessation program (OR, 1.71; 95% CI, 1.03-2.83). • Individual smoking cessation counseling did not predict smoking cessation rates (OR, 0.80; 95% CI, 0.51-1.25). • Patients with depressive symptoms during AMI hospitalization were less likely to quit smoking (OR, 0.57; 95% CI, 0.36-0.90).	Multiple types of hospitals were studied including small rural hospitals.	Dawood et al. [16]

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Measures Addressed, Strategies Used	Sponsoring Organizations	Program Description	Results	Inclusion of CAHs/small rural hospitals	Citations
<u>Measures addressed:</u> All AMI measures <u>Strategies Used:</u> More complete medical records	The CRUSADE (Can Rapid Risk Stratification of Unstable Angina Patients Suppress ADverse Outcomes with Early Implementation of the ACC/AHA Guidelines) National Quality Improvement	Ongoing study of various efforts to improve quality of care in Acute MI. It is an effort of data collection to a single database from high-risk patients with Non-ST-Segment Elevation Acute Coronary Syndrome admitted to US hospitals since November 2001.	• Higher medical record quality scores were associated with greater use of evidence based medical (EBM) care among the medical records quality cohort (P=.006). • A similar trend was observed in CRUSADE overall: adjusted OR 1.26 (95% confidence interval, 0.92-1.72) for high vs. low medical records quality. Higher medical records quality scores were associated with lower in-hospital mortality: adjusted OR 0.79 (95% confidence interval, 0.65-0.97).	Participating hospitals were from diverse regions and of varied sizes.	Dunlay et al.[17]
<u>Measures addressed:</u> Reperfusion <u>Strategies Used:</u> Standing orders and regional single-call catheterization laboratory activation	Reperfusion of Acute Myocardial Infarction in North Carolina Emergency Departments (RACE)	Early diagnosis and the most expedient coronary reperfusion method at each point of care: emergency medical systems, emergency department, catheterization laboratory, and transfer. Within 5 regions, PCI hospitals agreed to provide single-call catheterization laboratory activation by emergency medical personnel, accept patients regardless of bed availability,	• Median reperfusion times significantly improved according to first door-to-device (presenting to PCI hospital 85 to 74 minutes, P<.001; transferred to PCI hospital 165 to 128 minutes, P<.001), door-to-needle in non-PCI hospitals (35 to 29 minutes, P=.002), and door-in to door-out for patients transferred from non-PCI hospitals (120 to 71 minutes, P<.001).	The hospitals studied were small hospitals in rural areas and larger hospitals that accepted transfers.	Jollis et al.[19] Glickman et al.[34] The PubMed link to free full text of the Glickman article is: http://www.ncbi.nlm.nih.gov/pubmed/21712523

Table 1. Evidence-Based AMI QI Programs/Strategies					
Measures Addressed, Strategies Used	Sponsoring Organizations	Program Description	Results	Inclusion of CAHs/small rural hospitals	Citations
		and improve STEMI care for the entire region regardless of hospital affiliation.	• Non-reperfusion rates were unchanged (15%) in non-PCI hospitals and decreased from 23% to 11% in PCI hospitals. • For patients presenting to or transferred to PCI hospitals, clinical outcomes including death, cardiac arrest, and cardiogenic shock did not significantly change following the intervention. • Hospital, ED, and EMS care processes were each independently associated with shorter door-in-door-out times.		
Measures addressed: Mortality Strategies Used: The initiative includes standard admission orders and a standard discharge contract.	American College of Cardiology (ACC) - Guidelines Application to Practice (GAP) AMI initiative in Michigan	The program used standard discharge contract emphasizing medications, lifestyle, and follow-up planning and outcomes among patients hospitalized for AMI in 33 hospitals in Michigan.	• Use of a discharge contract was associated with lower mortality in hospitals with relatively high contract use (OR 0.43 for middle tertile and 0.45 for highest tertile of contract use). • Although it seems unlikely that the discharge contract alone could be responsible for a nearly 60% reduction in the odds of death, these data provide some support for the use of such contracts as a part of routine pre-discharge patient education.	Hospitals of varied size and geographic distribution were part of the program.	Rogers et. al.[24]

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Measures Addressed, Strategies Used	Sponsoring Organizations	Program Description	Results	Inclusion of CAHs/small rural hospitals	Citations
Measures addressed: All AMI measures Strategies Used: Web-based patient management tool to collect clinical data, provide decision support, and provide real-time online reporting features.	American Heart Association (AHA)- The Get with The Guidelines Program	Three Get With The Guidelines (GWTG) programs have been implemented to date including heart failure, stroke, and coronary artery disease. All GWTG programs track performance on process of care measures based on guidelines of the American College of Cardiology and the AHA, provide quality improvement tools and process redesign support to hospitals including decision support and collaborative meetings, and regularly report performance back to the participating hospitals.	• Heidenrich et al: reduction in mortality was greater for GWTG award hospitals for acute myocardial infarction (–0.19%, 95% CI –0.33 to –0.05) • Lewis et al: participation in GWTG was independently associated with improvements in guideline adherence beyond that associated with public reporting. • Ambardekar et: patients with coronary disease treated at GWTG rural hospitals received similar quality of care and had similar outcomes as those at GWTG urban centers.	All types of hospitals were studied in this effort including CAHs.	Heidenreich et al[25] Lewis et al[20] Ambardekar et al[27] The PubMed link to free full text of the Lewis article is: http://www.ncbi.nlm.nih.gov/pubmed/18779470
Measures addressed: Beta blockers at admission and discharge Strategies Used: Evidence- based guidelines to standardize care processes	Arkansas Foundation of Medical Care (QIO for Arkansas)	The QIO developed and implemented a quality control program with the staff at Sparks Regional Medical Center to improve adherence to protocols. This involved multiple training sessions and developing standardized protocols.	• Use of beta-blockers at admission to treat AMI increased from 56% in January 2002 to 92% in February 2003. Beta-blockers given at discharge increased from 53% to 91% in the same period.	Study was in a small urban hospital but the use of guidelines to standardize care processes could be implemented in a CAH.	American Health Quality Association.[35]

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Measures addressed: Reperfusion Strategies Used: Rapid transfer of STEMI patients from community hospitals to a PCI center e using a standardized protocol with an integrated transfer system.	The Minneapolis Heart Institute, a group of 46 cardiovascular specialists at Abbott Northwestern Hospital, a 619-bed hospital in Minneapolis, MN.	This tertiary facility developed a standardized PCI-based treatment system for STEMI patients from 30 hospitals up to 210 miles from a PCI center.	• From March 2003 to November 2006, 1345 consecutive STEMI patients were treated, including 1048 patients transferred from non-PCI hospitals. Median first door-to-balloon time for patients <60 miles and 60 to 210 miles from the PCI center was 95 minutes and 120 minutes respectively. Despite the high-risk unselected patient population (cardiogenic shock, 12.3%; cardiac arrest, 10.8%; and elderly [> or =80 years of age], 14.6%), in-hospital mortality was 4.2%, and median length of stay was 3 days.	The referral non-PCI hospitals ranged in size from 10 to 162 hospital beds.	Henry et al[30,31] The PubMed link to free full text of the 2007 article is: http://www.ncbi.nlm.nih.gov/pubmed/17673457