Improving Care for Acute Myocardial Infarction
Toolkit
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Acknowledgement
This document is an adaptation of the Getting Started Kit: Improving care for Acute Myocardial Infarction – How-to Guide prepared by the Institute for Healthcare Improvement www.ihi.org/IHI/Programs/Campaign/

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The Department of Human Services (Victoria) would like to thank the expert panel members for their valuable contributions in the consultation process for the Improving Care for Acute Myocardial Infarction toolkit. They have generously shared their insights, successes and lessons learned; in doing so, they have paved a path that many will follow.

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Foreword

Safer Systems – Saving Lives is a national collaborative initiated by the Australian Council for Safety and Quality in Health Care. The aim of the Safer Systems – Savings Lives project is to provide tangible evidence on the impact of six key interventions when applied consistently and comprehensively in Australian hospitals. Based on scientific evidence and known to improve patient care and prevent avoidable deaths, the interventions are:

- Preventing ventilator-associated complications
- Preventing surgical site infection
- Preventing central venous catheter related infections
- Implementing a rapid response system
- Preventing adverse drug events
- Improving care for acute myocardial infarction.

The interventions are based on implementing a formalised process or applying a ‘bundle’ of care components. The care bundle builds on the concept that, whilst each component is of value, if all elements of the ‘bundle’ are used, the prevention factor is increased.

The Quality and Safety Branch of the Department of Human Services in Victoria will provide organisational lead and overarching project management. Commencing in October 2005 the project will be implemented in hospitals across Australia. More information on the project and the interventions can be found on the Safer Systems – Saving Lives website at www.health.vic.gov.au/ssl

Safer Systems – Saving Lives project is based on the 100,000 Lives Campaign, an initiative by the Institute for Healthcare Improvement (IHI). Through the implementation of the six interventions the 100K campaign aims to avoid 100,000 deaths by June 2006, and every year thereafter. More information on the institute and the 100K campaign can be found on the IHI website <http://www.ihi.org>.
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Introduction

What is acute myocardial infarction?

Acute myocardial infarction (AMI) is a sudden loss of blood supply to an area of the heart, causing permanent heart damage or death. There are different types of AMI, classified by the location in the heart of the actual event (for example, inferior wall as opposed to the anterior wall) or the type of changes seen on an electrocardiogram (ST elevation or non-ST elevation).

A clinician must consider a variety of parameters in making a diagnosis of AMI, including the presence of elevated troponin levels, ST elevation or changes on electrocardiograms, as well as the symptoms stated by the patient, some of which are considered as ‘classic AMI’ symptoms, for example, chest pain. Presentation of AMI may vary and not all patients will have the same signs and symptoms; in fact, some may present in an atypical manner with none of the aforementioned signs or symptoms.

For the purposes of the Safer Systems – Saving Lives (SSSL) project, we are starting with the simple definition that includes all patients with AMI and does not differentiate by the various types or modes of presentation.

What is the aim of improving care for AMI

The aim of improving care for AMI is to significantly increase the likelihood of surviving an AMI and considerably reduce the chance of readmission.

The case for improving care for AMI

Cardiovascular disease is Australia’s major cause of morbidity and mortality and a major cause of death in the industrialised world. Of those Australians experiencing an AMI, twenty-five per cent die within an hour of their first-ever symptoms and more than 40 per cent will be dead within a year. The Australian Institute for Health and Welfare has reported that between the years 1993 and 2002, deaths in Australia resulting from AMI amounted to 161,626. Though this represents, on average, 16,162 deaths per year, it is worth noting that during that period the annual amount dropped from nearly 20,000 (1993) to 14,318 (2002) a reduction of more than 33 per cent. This is an encouraging trend and one that may be accelerated by ensuring that all Australians experiencing an AMI receive the same evidence based treatments.

The National Heart Foundation of Australia (NHF) and the Australian Cardiac Rehabilitation Association have developed guidelines to promote awareness of evidence-based care in the clinical community. Efforts have also been made to educate the general public and emergency responders about the symptoms of AMI and the need for immediate treatment.

The gap between reliable, evidence-based-care and actual care

In an attempt to promote uniform evidence-based practice, the NHF provides a comprehensive range of independent, evidence-based cardiovascular health information for health professionals. Despite the profile of the NHF and the availability of these guidelines, the Australian Institute for Health and Welfare has found that gaps exist between the care recommended in guidelines prepared for health professionals and the care that is actually provided. The NHF has found that often patients are discharged following an acute coronary event with lower than recommended doses of key medications.
A series of recent studies in the USA, reinforce both the benefit of compliance with guidelines and the failure of many health professionals to comply\textsuperscript{8,9,10}.

A three and a half year retrospective cohort study involving two general hospitals in Queensland, noted that patients not receiving care in line with guidelines had a death and reinfarction rate 2.5 times higher than patients who received guideline driven care\textsuperscript{11}.

Despite evidence demonstrating the effectiveness of care components for treatment of patients experiencing an AMI, many patient medical records have no documentation that these care components were either provided or contraindicated. A study by the RAND Corporation, including a review of thousands of patient records, showed that only 61 per cent of AMI patients received Aspirin and 45 per cent received beta-blockers\textsuperscript{12}.

In the USA, the Centers for Medicare & Medicaid Services (CMS) collected data from state quality improvement organisations on the rate of adherence to the AMI care components in Medicare patients. CMS found that, at a time when guidelines recommended the administration of ACE-inhibitor at discharge for patients with systolic dysfunction, in 1998–99 the median state rate was 71 per cent. Despite improvement efforts in this area, the median increased to only 74 per cent in 2000–01\textsuperscript{13}.

Clinicians often challenge these numbers and frequently do not believe the results. However, it is important to note that the statistics are based on documentation. If patients receive the key care components, but clinicians do not document the care clearly and thoroughly, then there is no way to capture the information. Perhaps in some cases actual practice is better than these studies have shown, however, without the documentation this will never be known. Even if the actual rate of compliance with evidence-based care is higher than the studies reflect, it is still well below what it should be and what patients have a right to expect.

**Potential impact of improving care for acute myocardial infarction**

Many references in the literature demonstrate the effectiveness of key components of AMI care. For example, studies report that prompt aspirin administration results in a 15 per cent reduction in vascular events\textsuperscript{14,2} and beta-blockers reduce AMI mortality in the first week by 13 per cent and long-term mortality by 23 per cent\textsuperscript{15}. The NHF has reported a 23 per cent reduction in mortality from early use of Aspirin alone\textsuperscript{16}.

Hackensack University Medical Center in New Jersey has been working on improving AMI care for some time. They are participating in a pay-for-performance demonstration project with CMS, which includes AMI as one area of focus. In the demonstration project, hospitals are ranked based on performance using a composite measure that takes into account that AMI patients had documentation that all seven components of care were provided, if appropriate Hackensack had a composite score of 72 per cent for AMI in the first quarter of 2003.

Improvement efforts led by their Cardiac Service Line, which included representatives from the emergency department, inpatient units and cardiology, resulted in an increase in the composite score to 91 per cent by the fourth quarter of 2003. During the same time period, the inpatient mortality for AMI decreased from 7 per cent to 5.2 per cent, considerably lower than their national peer group and the average from hospitals reporting to the Joint Commission on Accreditation of Healthcare Organisations (JCAHO).
McLeod Regional Medical Center in South Carolina has been a member of the Pursuing Perfection Initiative, funded by The Robert Wood Johnson Foundation. Participating hospitals have worked on providing patients with ‘perfect care’ and the team at McLeod chose AMI as an area of focus.

McLeod defines ‘perfect care’ for AMI patients as provision of seven key components of care or documentation of clear contraindication. Patients are only counted as having received ‘perfect care’ if all seven care components are documented as having been given in appropriate time frames, or that clear contraindications existed. If documentation for any one item is missing, the patient is not considered as having received ‘perfect care’. In the measure of ‘per cent of AMI patients with perfect care’, all AMI patients are included in the denominator and only those AMI patients with documentation of ‘perfect care’ are included in the numerator.

The team at McLeod developed protocols as one step toward their goal of delivering perfect AMI care. In January 2001, 80 per cent of AMI patients received perfect care. This increased to 100 per cent by November 2003. Inpatient mortality for the same time period decreased and for the past year has been 4 per cent, nearly half the average reported by hospitals to JCAHO.
The components of care

As referred to previously, studies have shown that patients with AMI should receive a number of components of care in order to reduce morbidity and mortality. The total number and type of care components a patient receives during hospitalisation and post-discharge may vary based on clinical condition and other co-morbidities. However, strong evidence based on guidelines prepared by the NHF5,7,16,17 as well as the Cardiac Society of Australia and New Zealand7, and the American College of Cardiology/American Heart Association18,20 support the following key care components being provided to AMI patients.

The care provided at the time of admission varies according to the presence or absence of ST-segment elevation on the patient’s electrocardiograph. Subsequent care provided during hospitalisation and at discharge is the same for all patients with an AMI. This is reflected in the components of care for the improving care for AMI intervention.

On admission

The early treatment for patients presenting with AMI will vary depending on the presence or absence of ST-segment elevation on the patient’s electrocardiograph. Accordingly patients are classified as suffering either ST-segment elevation myocardial infarction (STEMI) or non ST-segment elevation myocardial infarction (non-STEMI). The care given to STEMI and non-STEMI patients will vary at the time of admission.

Care components for STEMI

1. Early administration of an antiplatelet agent.

Patients experiencing chest pain receive an antiplatelet agent before or within 24 hours after hospital arrival, where appropriate.

Combination treatment with Aspirin & Clopidogrel is recommended unless contraindications exist. (A contraindication for Clopidogrel is planned Coronary Artery Bypass Graft17).

2. Early administration of beta-blocker

Where not contraindicated patients should receive beta-blockers within 24 hours after hospital arrival7,17. Care must be taken in high-risk patients, for example, to avoid cardiogenic shock the patient must be haemodynamically stable before beta-blockers are commenced18.

3. Timely initiation of reperfusion (thrombolysis or percutaneous intervention)

Patients should receive either thrombolytics within 30 minutes of hospital arrival or Percutaneous Coronary Intervention (PCI) within 60 minutes of hospital arrival, where appropriate (see the NHF Reperfusion Therapy Algorithm)19. Concomitant IIb/IIIa receptor blockade is particularly advised in diabetic patients undergoing PCI21.
Care components for non-STEMI
(see NHF, management of non-ST elevation chest pain/discomfort flow chart)

1. Early administration of an antiplatelet agent.
Patients experiencing chest pain receive an antiplatelet agent before or within 24 hours after hospital arrival, where appropriate.
Combination treatment with Aspirin & Clopidogrel is recommended unless contraindications exist.

2. Early administration of beta-blocker
Where not contraindicated patients should receive beta-blockers within 24 hours after hospital arrival. Care must be taken in high-risk patients, for example, to avoid cardiogenic shock the patient must be haemodynamically stable before beta-blockers are commenced.

3. Administration of antithrombin
Antithrombin therapy should be administered to all patients presenting with a non-STEMI.


During hospitalisation
A 1996 Ministerial review of coronary care services in Victoria recognised patient education as an essential but under utilised component of the management of patients with cardiac disease. The provision of planned patient education is also supported by the American Heart Association 2004 guidelines.

Participants in the SSSL project will demonstrate provision of two components of patient education:

1. Patient information
Information provided to patients and their family or care-givers will enable them to:
   1. understand medication prescribed as ongoing treatment of cardiac disease
   2. identify acute cardiac symptoms and prompt response to chest pain

2. Risk prevention counseling
Following assessment of the patient’s individual risk factors, planned multidisciplinary risk prevention counselling should be provided. This process may include referrals to a dietician and a psychologist. Risk prevention counselling will enable patients to make informed choices about:
   - smoking cessation
   - nutrition
   - alcohol
   - physical activity, and
   - weight reduction.
At discharge

1. **Beta-blocker at discharge**
   Beta-blocker therapy established during the early stages of treatment should be continued at discharge unless contraindicated\(^{17}\).

2. **ACE-inhibitor at discharge** for patients with systolic dysfunction.
   Where a contraindication or intolerance of ACE Inhibitor therapy exists, angiotensin receptor blockers (ARB) should be considered\(^{17}\).

3. **Antiplatelet agent at discharge**
   Antiplatelet therapy established during the early stages of treatment should be continued indefinitely\(^{7,17}\).

4. **Pre-discharge Statins**
   The NHF and the Cardiac Society of Australia and New Zealand recommends that Statin therapy for patient’s experiencing coronary events commences prior to discharge\(^{23}\).

5. **Referral for appropriate follow-up**
   1. \(^{20}\) cardiac rehabilitation\(^{7}\) and
   2. other referrals, for example, cardiologist, stress test, echocardiology.
Establishing the strategy

Successful strategy implementation is motivated by leadership and commitment to provide adequate resources and attention. Prior to the implementation of an AMI strategy, the following should be considered:

- engaging senior leadership support
- determining the best structure for an AMI team
- providing education and training
- using a structured documentation tool
- establishing feedback mechanisms
- methods for measuring the AMI strategy’s effectiveness.

Establish the team

A team, based on the key stakeholders essential in ensuring that patients receive the seven care components for AMI, should be developed. For example, several of the AMI care components must be provided or started in the emergency department, so it will be important to include someone from that area. The team should also include a nursing clinical coordinator or educator, physiotherapist, dietitian, occupational therapist, pharmacist, social worker, psychologist, cardiologist, cardiac surgeon and general practitioner.

Establish the aim

Before starting any improvement work, it is always wise to establish the aim of the work. In this area of SSSL, the aim is to significantly reduce AMI mortality by October 2006. A more specific aim should be developed by the team responsible for implementing the seven care components for AMI.

The aim should be ‘SMART’:

- Specific
- Measurable
- Achievable
- Realistic and
- Timely.

A sample aim statement might be:
Reduce inpatient AMI mortality by 40 per cent by implementing all seven evidence-based care components by June 2006.
Implementing the strategy

Once a team has prepared the way for change by studying the current process and educating the affected parties, the next step is to begin implementing the AMI bundle.

At the beginning of implementation it is suggested that teams conduct small tests of change to start improvement work. With this approach, team members can learn quickly what works or how changes need to be refined before full implementation.

- Begin using the bundle with only those patients who walk into the emergency department with an AMI. Once the team has implemented improvements with this group, roll-out the improvements to other groups, such as patients who arrive by ambulance.

There will always be exceptions that the team feels they cannot control, such as the patient transferred from another facility where it is unknown if Aspirin was administered. Don’t start with the exceptions; start with those for which you can control most of the factors and bring in the rest later.

- Remember that the timed care components (such as time to reperfusion) are different from those that can be provided at any time (such as smoking cessation). Designing timed care components will require different types of strategies and redesign from designing the others.

- Work with each nurse who cares for the patient to be sure they are able to follow the bundle and implement the checklist and daily goals sheet.

- Make sure that the approach can be carried over from shift to shift to eliminate gaps in teaching and utilisation.

- Process feedback and incorporate suggestions for improvement.

- Once the bundle has been applied to one patient and several shifts, increase utilisation to the remainder of the ward/unit.

- Engage in additional Plan Do Study Act (PDSA) cycles to refine the process and make it more reliable.

General considerations for improvement

Hospitals may experience a range of challenges while attempting to improve processes and systems. Any successful process of improvement is driven by leadership and commitment to provide adequate resources and attention.

To be successful, the AMI improvement process must involve multidisciplinary teams and incorporate the following actions in order to find the ones that lead to improvement in a particular setting:

- set clear aims for the process
- establish baseline measurements of performance
- regularly measure and study the results of the improvement, and
- test various process and systems changes over a range of conditions.
Barriers that may be encountered

Teams working on improving care for AMIs may face resistance and other barriers to improvement. The following table identifies some common challenges and suggested solutions.

Table three: Challenges and solutions

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solutions</th>
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<tr>
<td>Fear of change</td>
<td>The antidote to fear is knowledge</td>
</tr>
<tr>
<td></td>
<td>• Inform staff about the deficiencies of the present process and</td>
</tr>
<tr>
<td></td>
<td>• Provide reasons to be optimistic about the potential benefits of a new process.</td>
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<tr>
<td>Lack of support by leadership</td>
<td>• Use opinion leaders (physicians) and data.</td>
</tr>
<tr>
<td></td>
<td>• A business case for the project may help to win leadership support.</td>
</tr>
<tr>
<td>Uneven acceptance of new practices</td>
<td>• Use physician opinion leaders.</td>
</tr>
<tr>
<td></td>
<td>• Review medical literature and feedback data on a physician-specific level.</td>
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<td></td>
<td>• Work first with early adopters and use their stories to convince the majority.</td>
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<tr>
<td></td>
<td>• Share baseline data that demonstrates the reliability of the process.</td>
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<tr>
<td>‘Isn’t this the doctor’s job?’</td>
<td>• Educating staff that improving care for AMI is a team process. All disciplines must be involved and complete portions of the process.</td>
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<tr>
<td>Communication breakdown.</td>
<td>• Communicating the importance of improving care for AMI to staff.</td>
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<td></td>
<td>• Ongoing education of staff.</td>
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Feedback strategy

It is important to promote the benefits of having an AMI strategy to all participating staff. This can be achieved by creating feedback mechanisms, particularly during the initiation stages of the strategy, and can enhance the overall project success.

An analysis of AMI data for patterns, trends and lessons learned should be included in the AMI strategy. The information gained from AMI can be used in a variety of instances, for example, to augment future educational plans.
Measurement

To measure the effectiveness of the improving care for AMI intervention, accurate and pertinent data is required. Documentation that each component of care was provided or contraindicated should be in the medical record of each AMI patient.

Compliance process measure

The first measure is an assessment of how well the strategy is adhering to the AMI intervention. The US experience has been that improvement in outcomes is demonstrated when the AMI teams provide all components of the bundle. Therefore, we choose to measure the compliance with the AMI intervention as an entire bundle, not the individual components of the bundle.

We should aspire to provide our patients with ‘perfect care’, that is, providing all of the components of care unless documentation advises against the component due to an existing clear contradiction.

Patients are counted as having received ‘perfect care’ only if all care components are documented as given in appropriate timeframes or clear contraindications existed. If documentation for any one item is missing, the patient is not considered as having received ‘perfect care’.

At discharge, patients who have received care for AMI are assessed for compliance with the bundle. If even one component is missing, the case is not in compliance with the bundle. Compliance with the AMI bundle is assessed at the end of the reporting period.

This measurement requires participants to submit two numbers by means of an eForm:
1. amount of patients receiving all components of the AMI bundle, and
2. the number of patients with an AMI who were discharged during the reporting period.

The SSSL project team will calculate a hospital site’s compliance to the SSI bundle by:
• dividing the number of patients receiving all components by the number of receiving care for an AMI, and
• multiplying the result by 100, this will provide the percentage of compliance to the AMI intervention.

\[
\text{Number of patients with all components of care} \div \text{Number of patients with an AMI discharged during the reporting period} \times 100 = \text{percentage of compliance}
\]
Outcome measure
In addition to the process measure for the components of AMI care, hospitals are required to measure in-hospital mortality as a result of AMI.

The ultimate goal is to reduce unnecessary deaths from AMI and save lives, so this is the critical measure of success. This outcome measure should be tracked throughout the entire course of your work, as it is only after improving the care components and sustaining the success that mortality will improve.

Hospital sites will submit two numbers by means of an eForm.
1. The number of patients with an AMI who died in hospital during the reporting period,
2. The number of AMI patients treated during the same period.

The SSSL project team will calculate a hospital site’s AMI mortality rate by:
- Dividing the total number of patients with an AMI who died in hospital for that period of time by the number of AMI patients treated during the time period.
- Then multiplying the result by 1000, the result will be the AMI mortality rate for the time period.

\[
\text{Number of patients with an AMI who die in hospital} \div \text{Number of AMI patients treated during the same period} \times 1000 = \text{AMI mortality rate}
\]

Abbreviations
AMI Acute Myocardial Infarction
DHS Department of Human Services (Victoria)
NHF National Heart Foundation of Australia
PDSA Plan Do Study Act
SSSL Safer Systems – Saving Lives
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