

Improved Care for Acute Myocardial Infarction

safer healthcare

now!

By Cleo Cyr RN, BN, MHS, CCN (C)

Safer Healthcare Now! is a campaign designed to enlist Canadian healthcare organizations to implement targeted evidence based interventions in patient care. The campaign is supported by the Institute for Healthcare Improvement (IHI) and is patterned after IHI's **100,000 Lives** Campaign. Cardiovascular diseases (CVD) are the primary cause of death in Canada. Approximately one-third of the several million people in Canada and the United States diagnosed with acute myocardial infarction (AMI) die during the acute phase. It is for this reason that one of the *Safer Health Care Now!* goals is to prevent deaths among patients hospitalized for AMI by ensuring reliable delivery of evidence based care¹.

To accomplish this task the American College of Cardiology (ACC), the American Heart Association (AHA), the Canadian Cardiovascular Society and the Canadian Cardiovascular Outcomes Research Team (CCORT) have worked with clinicians to develop guidelines for care based on evidence and to promote awareness of evidenced-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 treatment¹.

The Key Components of Reliable, Evidence-Based AMI Care

Studies have shown that patients with AMI should receive specified components of care in order to reduce morbidity and mortality. The total number and type of care components a patient receives during the hospital course and post-discharge may vary based on clinical condition and other co-morbidities. However, there is strong evidence in the literature to support that the following seven key care components should be provided to all AMI patients except where contraindicated:

1. Early administration of aspirin
2. Aspirin at discharge
3. Beta-blocker at discharge
4. Timely initiation of reperfusion (thrombolysis or percutaneous intervention)
5. ACE-inhibitor or angiotensin receptor blockers (ARB) at discharge for patients with systolic dysfunction
6. Smoking cessation intervention (counseling / nicotine replacement / serotonin uptake inhibitor / referral to cardiac rehabilitation program)
7. Statins at discharge

Documentation that each component of care was provided or contraindicated should be in the medical record for each AMI patient. These are "process measures". Improvement in an individual measure indicates that the processes surrounding that care element have improved. However, if it is identified that care components are not at a predetermined goal level, a change in practice is necessary and improvement strategies need to be developed.

The Saint John Regional Hospital (SJRH) Experience

In September of 2005, following corporate and quality risk management leadership from the Atlantic Health Sciences Corporation (AHSC), a multidisciplinary team of health care professionals under the direct leadership of the NB Heart Centre (NBHC) was established. The team's mandate was to develop a strategy that identified current practice while simultaneously developing a **Safer Health Care Now!** (SHN) Improvement Charter based on four key concepts:

1. What are we trying to accomplish?
2. How will we know a change is an improvement?
3. What changes can we make that will result in an improvement?
4. How will we manage the improvement project?

The project was divided into three phases. Phase 1 included performing a retrospective chart audit to determine baseline AMI care at the SJRH. The second phase identified

change concepts that could be tested using an evidenced based Improvement Model and fine-tuning the Improvement Charter based on the baseline data. Phase 3 was designed to identify opportunities to spread the project to other care areas. Some overlap has occurred across the phases.

Retrospective Baseline Analysis

Identifying change concepts requires knowing where to begin. A retrospective analysis of AMI patients admitted through the emergency department at the SJRH from September 2004 to June 2005 was performed and provided baseline data for analysis of the components for AMI care. Other data collected for information purposes included the number of appropriate patients prescribed lipid-lowering therapy on discharge and the number of patients referred to cardiac rehabilitation. It should be noted that prescribing statins at discharge was added as a seventh care component in April 2007. Care components that did not meet SHN goals included timely initiation of reperfusion (thrombolysis and percutaneous coronary intervention [PCI]), smoking cessation intervention, and perfect care (percentage of patients that received all care components, if not contraindicated) (Table 1).

Key Factors Identified

Performing the chart audit and retrospective analysis helped identify key factors from which the Improvement Charter could be further defined. These included:

1. Lack of 'easy to find' documentation of all care components.
2. Documentation discrepancies between the exact times electrocardiograms (ECG) were performed, physicians were notified and treatment initiated in the emergency department (ED).
3. Unclear reasons why patients may or may not have been discharged on certain types of medications (i.e. beta blockers and ACE inhibitors).

4. Lack of evidence that smoking cessation interventions were initiated unless referral to cardiac rehabilitation programs had occurred.
5. Lack of availability of Nicotine Replacement Therapy through the hospital formulary.
6. Although 40% of patients arrived by ambulance to the ED, 60% of patients arrived by other means.
7. The average time from arrival to physician assessment for patients with ST elevation myocardial infarctions (STEMI) was 12 minutes.
8. Although 40% of ECG's in the ED were signed by a physician, 60% were not.

**Table 1: Retrospective Baseline Results:
10 month period from Sept 2004 – June 2005 (n=95)**

AMI Indicators	Goals	(SJRH) Results
ASA at Arrival	90%	100%
ASA at Discharge	90%	100%
Beta Blocker at Discharge	90%	97.6%
Thrombolytic Agent within 30 minutes	85%	*72.4%
PCI within 90 minutes	90%	*77.8%
ACE/ARB on Discharge (EF <40%)	85%	86.9%
Adult Cigarette Smoking Cessation Advice	100%	*78.7%
Perfect Care	95%	*74.5%
Other data collected		
Cardiac Rehab Referrals	**NA	60%
Lipid Lowering Med on discharge	**NA Until April 2007	86.5%

* Components of care not at Safer Health Care Now! goals on the Retrospective Baseline Analysis. ** Not applicable

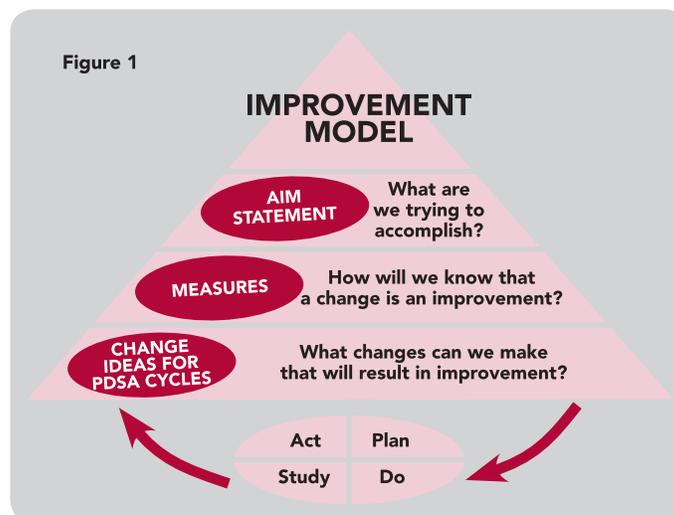
Using the Model for Improvement

Four areas of improvement were identified following analysis of the baseline data.

- 1) Improve 'door to thrombolysis time' (optimally less than 30 minutes).
- 2) Improve 'door to PCI time' (optimally less than 90 minutes).
- 3) Improve smoking cessation interventions for identified smokers.
- 4) Improve documentation for all elements.

Safer Health Care Now! strategists have adopted a Model for Improvement called the Plan-Do-Study-Act (PDSA) Cycle (Figure 1). Developed by Associates in Process Improvement, this model is a simple yet powerful tool for accelerating improvement that has been used successfully by hundreds of health care organizations to improve many different health care processes and outcomes. The model has two parts. The first is designed to set clear aims; establish

measures that will tell if changes are leading to improvement; and identify changes that are likely to lead to improvement. The second part is designed to conduct small-scale tests of change in real work settings. This is accomplished by identifying a change then implementing Plan-Do-Study-Act (PDSA) cycles. After testing a change on a small scale, learning from each test, and refining the change through several PDSA



cycles, the team can implement the change on a broader scale. This scientific method is used for action-oriented learning.

A challenge at the SJRH was to coordinate an action plan between the emergency department, interventional cardiology, the coronary care unit and the coronary stepdown unit. Raising awareness was the first PDSA cycle established with presentation of the baseline data made to multiple stakeholders in all areas involved. Simultaneously, a data collection form that included the seven components of care was developed (Appendix A). This AMI documentation tool was also designed to collect data for Acute Coronary Syndrome (ACS) patients as the care team felt it was necessary to analyze care across this population as well. The form was designed to be completed by health care professionals in each care area from the patient's arrival in the ED to the cardiac catheterization lab if indicated, to the coronary care unit and finally for completion in the coronary stepdown unit at time of discharge. The inclusion of the question "If not, why not?" in the discharge medication section was designed as a specific intervention to improve documentation.

Multiple small PDSA cycles performed from March to May 2006 involved using, analyzing and finalizing the documentation form resulting in full implementation of this useful tool in June 2006. Improvement has been seen in components of care (Table 2) with reperfusion times for STEMI patients increased by 22% for both thrombolysis and PCI interventions and 11% for lipid lowering therapy across all populations. As well, for patients who use a tobacco product, smoking cessation interventions have increased by 13%. Documentation has become a succinct process with usage of the data collection form. Raising awareness of baseline versus concurrent practice was

**Table 2: Full Implementation Results
March to October 2006 (n=128)**

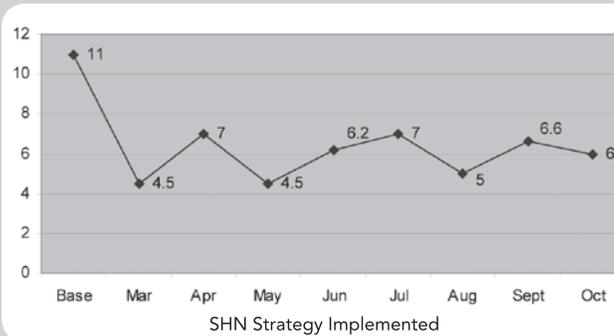
AMI Indicators	Goals	SJRH Retrospective Baseline Results 10 month period from Sept 2004 – June 2005 (n=95)	Full Implementation Results
ASA at Arrival	90%	100%	96%
ASA at Discharge	90%	100%	100%
Beta Blocker at Discharge	90%	97.6%	96.5%
Thrombolytic Agent within 30 minutes	85%	*72.4%	93.6%
PCI within 90 minutes	90%	*77.8%	100%
ACE/ARB on Discharge (EF <40%)	85%	86.9%	100%
Adult Cigarette Smoking Cessation Advice	100%	*78.7%	92%
Perfect Care	95%	*74.5%	92%
Other data collected			
Cardiac Rehab Referrals	**NA	60%	80%
Lipid Lowering Med on discharge	NA Until April 2007	86.5%	97.5%
Clopidogrel on discharge when indicated	**NA	Not Assessed	100%

* Components of care not at Safer Health Care Now! goals on Retrospective Baseline Analysis.
** Not applicable

the key factor for improvement. Small changes such as improvement in the time patients received the first ECG (Figure 2) and time to physician assessment for STEMI patients (Figure 3) in the ED helped improve outcomes. The significant increase in the number of signed ECG's in the ED (Figure 4) was evidence of increased awareness and accountability. To recognize and celebrate the successes of improved outcomes, run charts were posted in each of the clinical areas involved and results shared at department

meetings. A "Believe & Succeed" slogan was adapted as a motivational tool with posters displayed in key care areas (Appendix B).

**Figure 2: STEMI: Time to 1st ECG in Minutes
March - October 2006 (Avg 5.3 min n=55)**



Spinoffs: Opportunities for Improvement

There have been significant opportunities for improvement in unexpected areas through the process of implementing the AMI improvement model of care. A committee has been established to discuss the feasibility of paramedics initiating electrocardiograms

in ambulances with the intention of early provision of thrombolysis supported by emergency department physicians. As well, referral to cardiac rehabilitation programs has increased by 20% and discharge teaching practices have improved.

A Tobacco Reduction Strategy for patients has been developed and spread region wide. The strategy has involved the hospital formulary inclusion of nicotine replacement therapy for inpatients and implementation of a Clinical Tobacco Intervention "Train the Trainer" program that addresses the issue of every inpatient and outpatient being offered assistance through an "Ask, Advise and Assist" program. Cessation materials can be ordered through a central repository located in the health regions'

Health Sciences Library at the SJRH for dissemination within the region. Through this one example a culture of awareness has helped move the SHN campaign to a level where impact is increased by spreading interventions across patient populations, not only to those requiring AMI care. Other issues have included a closer evaluation of clopidogrel usage, development of a patient discharge tool that incorporates SHN care components, and improved communication and documentation.

Other Spread Opportunities

The goal of having at least 90% of AMI patients receive identified care components has been accomplished. A three-pronged process to spread the initiative further includes implementing the documentation tool in another SJRH intensive care unit that receives a small number of AMI patients, as well as to three other hospital facilities in the region. Efforts are ongoing to continue to foster collaborative relationships with other hospitals in New Brunswick currently involved in SHN processes. The goal is to work together to improve linkages that ultimately support improved patient care.

Creating a Culture for Change and Quality Improvement

Successful improvement in AMI care cannot occur without dedicated teams and defined steps for quality improvement. The following eight steps for improvement, as defined by SHN, have helped shape the success of this campaign at the SJRH. These steps include:

1. Know your system by mapping it out while recognizing and respecting the busy health care environment in which health care professionals work.
2. Collect baseline data to identify areas for improvement.
3. Improve leadership awareness and approval by using data for support.
4. Form a multidisciplinary team – people involved in the day-to-day

Figure 3: Time to Charted Physician Assessment (ED) in minutes for STEMI Patients. March - October 2006 (Avg 7.4 min n=55)

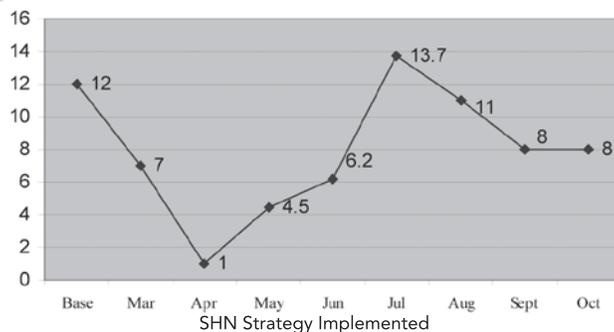
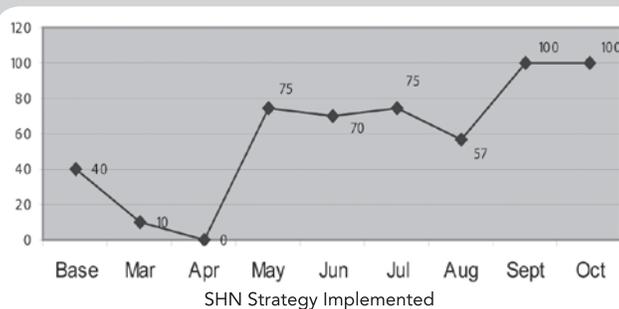


Figure 4: Percentage of STEMI ECG's signed by physicians in ED March - October 2006 (n=55)



safety while in the care of health care providers, SHN teams have evoked a collaborative effort that has proven to be successful. Part of that success involves the creation of a supportive infrastructure that includes four groups of people distributed across Canada within Western, Ontario, Quebec and Atlantic Nodes. The purpose of each node is to:

- Raise awareness of the SHN Campaign.
- Facilitate and promote enrollment.
- Facilitate and provide educational opportunities for Campaign participants related to interventions, measurement, and quality improvement.
- Share Campaign updates.
- Coordinate and provide intervention-related clinical, quality improvement and measurement assistance.
- Facilitate communication between and among:

teams, nodes, working groups, clinical supports, partners, funders, the Node Steering Committee and the National Steering Committee¹.

Atlantic Node leader Theresa Fillatre, and Safety and Improvement Advisor Dannie Currie, have been instrumental in moving the campaign forward in Atlantic

Figure 5: Ingredients to Build an Effective Team



Canada. As data is collected it is forwarded by secure website to the University of Toronto where the Central Measurement Team under the direction of Virginia Flintoft provides analysis. Quarterly reports are forwarded to teams involved in SHN improvement projects that help teams evaluate progress in relation to other groups regionally and nationally (Figure 6). The process of ongoing support and feedback is therefore evident locally, provincially, regionally and nationally. SHN is a grassroots campaign designed to link multiple levels of people involved in patient care – to the benefit of all!

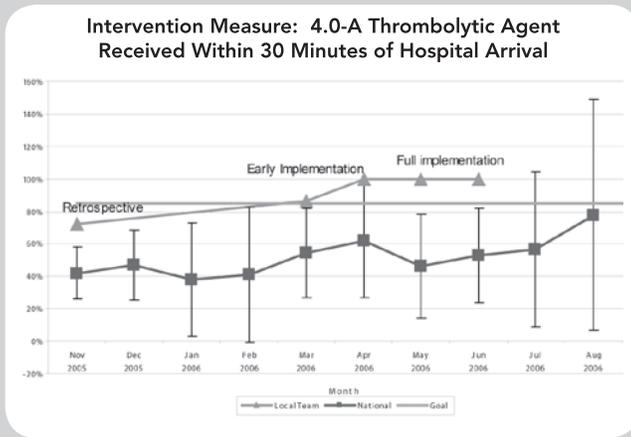
Summary

Implementing SHN has resulted in improvement in reperfusion care and smoking cessation interventions at

the SJRH. Additional benefits have been an increase in the administration of lipid lowering therapy, referral to cardiac rehabilitation programs and improved access times to ECGs and physician assessment in the emergency department. Spinoffs have resulted in discussion that will potentially lead to earlier delivery of care by paramedics and a tobacco reduction strategy that has spread throughout the Atlantic Health Sciences Corporation area of care delivery. NB Heart Centre strategies for spreading the SHN campaign include enhancing local, regional and provincial partnerships. The success

of the campaign and improved patient care are best described by the simple fact that better outcomes can be achieved in small steps designed to happen over time. As a result, patients benefit from both Safer Health Care and improved outcomes.

**Figure 6: Quarterly Reports:
SJRH Run Chart for Thrombolytic Care**



References

1. Safer Health Care Now! Website: www.saferhealthcarenow.ca



Atlantic Health Sciences Corporation
Corporation des sciences de la santé de l'Atlantique

COLLABORATIVE PLAN FOR IMPROVED AMI & ACS CARE

PATIENT IDENTIFICATION

AFFIX PATIENT LABEL or

Name: _____
PPRN # _____
Medicare # _____
Registration Date to ED: _____

PERMANENT PATIENT RECORD

Transferred **in from** another ED/UCC Yes No
Transferred **out to** another ED/UCC Yes No
Admitted to: CCU ICU Ward _____
Age > 18 years old Yes No
History of tobacco use in past year: Yes No

ED

POINT OF ENTRY: EMS (EMERGENCY MEDICAL SERVICE)

Patient contact at _____ hrs.
Onset of relevant cardiac symptoms at _____ hrs.
Arrived hospital at _____ hrs.
1st 12- lead ECG at _____ hrs. Sent or reported to ED at _____ hrs. Lytic Eligible? Yes No
2nd 12-Lead ECG at _____ hrs. Sent or reported to ED at _____ hrs. Lytic Eligible? Yes No
ASA administered at home by patient at _____ hrs. by Paramedic at _____ hrs. Contraindications

EMS Master Incident # _____
Section Completed by: _____
ECG Interpreting Physician _____

EMS

POINT OF ENTRY: EMERGENCY DEPARTMENT

Onset of relevant cardiac symptoms at _____ hrs.
*Time seen by Triage/Charge/ED Nurse _____ hrs.
Time of 1st Hospital 12- ECG _____ hrs.
Signed by physician Yes
Time from arrival to 1st ECG _____ min.
Time of Initial Assessment By Physician _____ hrs.
Time of diagnostic (STEMI) ECG if not the 1st ECG _____ hrs.
ASA within 24 hours Yes No. Given in ED Yes No
If not, why not? Already taken Contraindicated
Thrombolytic Therapy given? Yes No
If not, why not? NSTEMI Late Presentation To Cath Lab
 Refused Other Time started _____ hrs.
Initial Nursing Assessment time (*) to needle time (Lytics) mins.
Less than 30 min. Yes No
To Cath Lab Date: _____ Time: _____ hrs.

Admitting Dx.

- STEMI
- NSTEMI
- Angina
- Other

Section completed by: _____

ED

34958 (may 06)

CATH LAB

CARDIAC CATH LAB

FROM ED

Arrived in Cath Lab Date: _____ Time: _____

Time of 1st coronary intervention (aspiration cath, balloon inflation, primary stent deployment) _____ Hrs.
PCI performed? Yes No.

*FOR STEMI PATIENTS: Time seen by nurse in ED to 1st coronary intervention time mins. Less than 90 min? Yes No

FROM INPATIENT UNIT

PCI performed? Yes No

Date: _____ Time: _____

Section Completed by: _____

Is Diagnosis Non Cardiac? Yes No If YES Do Not Complete Remainder of Form

PHYSICIAN

PHYSICIAN RX AT DISCHARGE FROM CCU/SDU/ICU/OTHER CARE AREA

ASA

Ordered: Yes No If not, why not? Allergy
 Active bleeding Warfarin Other

Beta Blocker

Ordered: Yes No If not, why not? Allergy Bradycardia
 LV failure SBP < 90 mm Hg PR-interval > 0.24 sec.
 Active asthma/reactive airways disease Other

ACE Inhibitor/ARB

Echo done Yes No
LVEF < 40% Yes No

Ordered: Yes No If not, why not? Allergy or intolerance
 Mod. Or severe AS Creatinine >200 µmol/L Not Indicated
 SBP <100 mmHg Bilateral renal artery stenosis K+ >4.5 mmol/L
 Other

Lipid Lowering Medication

Ordered: Yes No If not, why not? At Target Level Intolerance
 CK > 10 x upper limit ALT/AST > 3 x upper limit Other

Clopidogrel

Ordered: Yes No If not, why not? Allergy or intolerance
 Not indicated Other

Nitroglycerine PRN

Ordered on D/C: Yes No If not, why not?

Nicotine Replacement Therapy

Given as inpatient Yes No

Ordered on D/C: Yes No If not, why not? Non-smoker
 Allergy or intolerance Refused Other cessation medication given
Smoking Cessation Counseling given Yes No

Cardiac Rehab

Ordered: Yes No If not, why not?

Diagnosis

STEMI NSTEMI Angina CABG Other

NURSING

NURSING COUNSELLING INPATIENT AND ON DISCHARGE

Inpatient Dietary information given? Yes No Refused

Inpatient Cardiac Teaching Done? Yes No Refused

Has patient used a tobacco product in the past 12 months? Yes No

If 'yes' was the following offered to the patient?

Clinical Tobacco Intervention (Ask, Advise & Assist) initiated? Yes No Refused

DISCHARGE INFORMATION

Date of Discharge: mm ____ dd ____ yr ____ Transferred Out Yes No

To home hospital Yes No Transfer Date mm ____ dd ____ yr ____

Left Against Medical Advice Yes No Deceased Yes No Completed by: _____

Contact 648-6201 with questions. For Study Coordinator Use: ASA on Arrival Yes No NA/ ASA on D/C Yes No NA/ BB on D/C Yes No NA/ ACE/ARB on D/C Yes No NA/ Lytics or PCI Yes No
 NA/ Smoking couns. Yes No NA Perfect Care



safer healthcare

now!

www.saferhealthcarenow.ca

Believe & Succeed!

Improving AMI Care Together

Collaborative Team:

SJRH Emergency Dept • Emergency Medical Services • Quality Risk Management
NB Heart Centre • Cardiac Rehab • Cardiac Cath Lab • CCU/SDU • Cardiac Surgery
ICU • Electrodiagnostics Dept • Physicians • Nurse Clinicians • Nurse Associates